

**‘WE DON’T GO TO THE CASINO BUT WE’RE THE  
BIGGEST GAMBLERS IN THE WORLD’:**

**DRIVERS OF CHANGE IN THE MT MAGNET AND  
UPPER GASCOYNE REGIONS.**

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This thesis is presented for the degree of Master of Philosophy of Murdoch  
University

2006

I declare that this thesis is my own account of the research conducted by myself except where other sources are fully acknowledged by footnotes or referencing. This thesis consists mostly of published work and my writing and partly of leaseholders' comments. I declare that this thesis contains as its main content, work which has not previously been submitted for a degree at any University.

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

## **ABSTRACT**

This thesis examines the complex environmental, social, economic and political challenges surrounding sustainable land use of rangelands by European leaseholders in Western Australia. A study of historical, socio-economic and technological events, combined with the development of social values and policy, exposed a broad suite of factors that shaped pastoralism and grazing, and continues to influence development in these regions today. The thesis also explained how the emergence of the sustainable development paradigm is raising awareness of the ways societies define the issues of development, and the influence of this paradigm on attempts to shape change.

Extensive changes in animal production systems have been made in response to complex factors driving change in pastoralism and grazing in recent years. In the Upper Gascoyne, the change to cattle has resulted in extensive changes in infrastructure and raised new hopes for viable production systems in the future. Station amalgamation or sale of stations to Government Departments have been key factors of change in this region. In the Mt Magnet region, wool production remains dominant. However severe drought conditions and declining wool prices are increasingly forcing change to production of feral goats or Damara sheep.

Increasing conflict in the rangelands centred around competing claims to land and its use, against a backdrop of dry seasons and changing socio-economics, are escalating leaseholders' fears and concerns about growing community demands for multiple rangeland use. Government approaches now focus on multiple use of rangelands, providing incentives or opportunities to develop alternative methods of use for

rangeland resources. However, environmental barriers to sustainable land use and diverse perceptions of sustainability continue to create difficulties for developing effective policies and strategies for change. There is now an urgent need for a paradigm shift in attitudes towards rangelands that promotes more sustainable uses for the land, a greater equality in sharing resources and constructive integration of the values of all rangeland stakeholders.

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## **ACKNOWLEDGMENTS**

I would like to sincerely acknowledge the kindness of leaseholders in the Upper Gascoyne and Mt Magnet regions in participating in my interview process and their genuine open responses to the questions asked during their interviews. Without their considerate assistance, this thesis would not have been possible.

I would like to acknowledge the invaluable assistance of both my supervisors, Laura Stocker from Murdoch University and Hugh Pringle from the Centre Management for Arid Environments in Kalgoorlie. I also received useful and timely support from a number of staff members in The Department for Conservation and Land Management, Department of Agriculture and Food Western Australia and the Bureau of Meteorology that has enabled me to complete this thesis.

Lastly I would like to give heartfelt thanks to my partner Geoff Graham who has provided vital computer assistance by maintaining my computer and assisting me with a professional presentation of this thesis.

# CHAPTER 1

## INTRODUCTION

This thesis explores the changing attitudes and practices in European leaseholder pastoral and grazing systems in the shires of the Upper Gascoyne and Mt Magnet in Western Australia. It exposes the difficulties and risk leaseholders face in maintaining their industry today. Increasing conflict in the rangelands centred around competing claims to land and its use, against a backdrop of dry seasons and changing socio-economics, are creating pressure for change in these regions.

Mackenzie (2000) suggests that conflicts arise when one group of people try to establish an idea as ‘truth’ or a ‘fact’ and attempt to persuade, order, advise or argue in a way that influences other people. He suggests that the very fact that they need to do this shows ‘there is no simple agreement of interests, or that interests will always remain the same’ (Mackenzie 2000, 81). These ‘facts’ or ‘truths’ are established as a result of relations of power. Power relations occur because the actions of individuals and groups of people influence others. Conflicts are centred on the control of things or objects (Foucault 1983).

Conflict in the rangelands is centred on the land, and forms part of the relations of power that currently exist between leaseholders, government and the wider community. If we look at the history of rangeland development, we can begin to understand how these relations evolved to produce the modern-day leaseholder and the circumstances existing in the rangelands today. Because ways of knowing and behaving are embedded in the culture of rangeland development they can help us to understand the relations of power that have evolved over time. They also show how these relations supported certain ways of being and effectively limited possibilities for other relations and the ways of being they may have produced. This perspective

enables us to understand that the situation is not constant but is dynamic and continually changing. We develop social institutions and technologies that maintain the current situation, and the stories we tell and opinions we give of past circumstances or events influence others, which also serve to preserve our relations of power (Mackenzie 2000).

A small body of research exists on factors influencing change in the rangeland industry in Australia, although most relates to the Eastern States. Ison and Russell (2000, 2) and Webb, Cary, & Geldens (2002) both interviewed leaseholders in NSW to determine the capacity of leaseholders to change to management practices that are more sustainable and to develop new and improved ways of encouraging leaseholders to implement these changes. Neuman (2000) suggests that people are motivated to take actions for a wide variety of reasons and research needs to determine what these motivations are. Several recent reports, (Centre for International Economics, Bureau for Rural Sciences, CSIRO and Resource Planning and Management 2001; Holmes & Day 1995; Nicholls 2000) also suggest there is a need for more research into the attitude and motivation of leaseholders toward change. The present study will build on current knowledge about the differences between traditional European leaseholder ideology and the changing environmental and social values of the wider community (Holmes 1994a; Luciano & Vanclay 1996; Mackenzie 2000; McManus & Albrecht 2000; Shulman & Penman 1994). These, often conflicting, values are increasingly placing pressure on leaseholder's traditional way of life.

Western ideologies, on which pastoralism and grazing were founded, reflect values of 'industriousness and rational use' (Voyce 1996, 99). This ideology constructs rangelands as a resource to be used as a means of production for the benefit of

increasing capital wealth of individuals and the nation and this is certainly the dominant view of most leaseholders. Land not used for grazing is seen as being 'wasted' (Webb, Cary & Geldens 2002). However, this view is often in contrast to the emerging, consumption and protection priorities for land of the wider community, such as tourism, Aboriginal self-sufficiency, conservation, recreation and harvesting of native resources (Department of Premier and Cabinet 2002 and 2003; Pastoral Lands Board & DPI 2003). These views reflect the rising discourses about the non-consumptive and inherent values of natural resources, and Native Title. National perspectives for rangelands are now often in conflict with those of individual leaseholders. This is believed to be a significant barrier to change by many in the wider community.

'The economic value of the rangelands from a national perspective is changing to one of inherent value based on cultural perspectives, whereas many rangeland pastoralists see their individual enterprise as an economic unit. Therein lies one of the reasons for the breakdown between pastoralists and government agencies responding to new and emerging community values' (Centre for International Economics 1997, 8).

The problems that leaseholders face are as much social and political as they are economic and environmental. The Centre for International Economics (1997) report argued that the greatest impediments to the uptake of 'Landcare' in the rangelands were the lack of focus by pastoralists on sustainable land use practices and the enormous cultural divide between the city and the bush. Many of the laws and policies that have driven the production ethos in the past remain in place today, creating barriers to changes for sustainable land use. These factors increase the difficulties for policy and government agencies attempting to respond to the multiple values that now exist for the rangelands (Abel & Langston 2001).

Three recent government initiatives reflect changing attitudes in the wider community and changing sustainable land use institutional practices. These strategies sought to assist sustainable land use in the Upper Gascoyne and Mt Magnet regions. The first, Gascoyne Murchison Strategy (GMS) developed as a partnership between leaseholders in the region and Federal and State Governments. This Strategy assisted leaseholders to adjust to the changing circumstances and improve land management in the region (Laurence 2000; Lewis 2002a). The second initiative is the Ecosystem Management Unit (EMU) which was a program within the GMS.. This program built greater leaseholder awareness of ecosystem processes on their land and encouraged them to undertake changes in management practices that lead to more sustainable use of the natural resources (Pringle *et al* 2003). A recent survey of EMU participants found there was a very high level of support for the EMU process (Braddick 2005).

Government also determines policy options that attempt to balance the growing demands of all stakeholders involved with the rangelands; the Gascoyne Muster was the third government initiative organized in 2002-2003 to achieve these goals (Pastoral Lands Board & DPI 2003). This process attempted to bridge the gap between the different values and assumptions about rangeland land use involving pastoralists and graziers and other stakeholders of the rangelands. It was based on developing consensus by stakeholder representatives over issues concerning land use of the rangelands. The structure and role of these initiatives are discussed in this thesis.

Several difficulties arise with the adoption by leaseholders of rangeland policy strategies and scientific research. One is that these processes bind government and stakeholders into relations of power, influencing the type of changes leaseholders are

able to make (Mackenzie 2000; Pannell 1998; Webb, Cary & Geldens 2002) (see Chapter 3, The Development of Pastoral and Grazing Ideology). Another difficulty that occurs is that well-developed research is often not adopted by leaseholders, and the decisions they make to deal with specific problems, using technology or practices, are sometimes not recommended by scientists and government agencies. Recently, researchers have begun to determine what the barriers are to the adoption of what scientists consider are appropriate technology and practices (Cary, Webb & Barr 2002; Marsh 1998). While it may be easy to understand why individual leaseholders may decide not to adopt a technological innovation or management practice, there has been limited research into the attitudes and alternative actions taken by leaseholders.

**General Aims of Thesis:** The first general aim of this thesis is therefore to explore the background to the processes that explain why leaseholders in the Upper Gascoyne and Mt Magnet are in their current situation. The second general aim of the thesis is to investigate what leaseholders are doing to adjust to the situation and the challenges they face in this process of change. The third general aim is to explore the role of the government in facilitating change in the rangelands today. I attempt to acquit these aims by placing contemporary attitudes and actions within a context of historical proceedings leading up to the current situation, along with a discussion of past and present-day ideology that drives current changes occurring in these regions. By placing opinions and narratives from leaseholder interviews into historical and contemporary perspectives we can see more clearly how leaseholders affect and in turn are affected by the changing situation. This allows us to improve our understanding of the human drivers of the pastoral and grazing industry today.

## **THE CHANGING FACE OF PASTORALISM AND GRAZING IN AUSTRALIA**

Current definitions of rangelands in Australia reflect the changing values and uses of these extensive areas of land. More than 75% of Australia is broadly defined as rangelands (National Land & Water Resources Audit 2001). It covers 'extensive land that for reasons of climate or terrain is unable to support economically sustainable intensive crop, timber or agriculture production and has traditionally been used for grazing of livestock' (Holmes 1994a, 1).

Historical and contemporary conceptions of rangelands are generally encapsulated in the term 'The Outback'. Many Australians retain a romantic image of the outback pioneer forging a new way of life in the wilderness and regard it as an integral part of their national heritage (Bolton 1981). Colonial expansion based on a frontier economy has driven sheep and cattle production as the dominant land use activities over much of the region for the last 150 years and the great diversity of native vegetation has provided a natural buffer for pastoralists and graziers against the long dry periods which are a feature of these regions. Rangeland production has been part of a key industry in the history of development helping to shape Australian nationhood (Dovers 1992).

However, this development, based on a production ethos, has resulted in major changes to the environment of the rangelands. Since European settlement these regions have been transformed by: changes in traditional Aboriginal burning patterns, the elimination of the dingo from many areas, the provision of artificial sources of water, the introduction of pests such as feral goats, camels, rabbits, and donkeys, the spread of woody weeds such as the native Mulga and introduced species such as Mesquite and Buffel grass (FAO 2001). Feral cats and dogs have also had a major impact on rangeland ecosystems.

## DALGETY DOWNS



This photo encapsulates the vast areas of flat land containing sparse, low lying vegetation that is a feature of the landscape in much of the Upper Gascoyne region. Most roads within the region remain red gravel. Source: Lynda Braddick

In the past leaseholders in the Upper Gascoyne and Mt Magnet regions have received good incomes for the production of large amounts of good quality Merino wool. However, times are changing. Globalisation and successive government policy responses to exterior economic pressures, as well as the ways that policies have been managed and implemented by governments over the last 50 years, have resulted in a general decline in the socio-economic status of rural and regional Australia. This is resulting in considerable pressure for leaseholders to change their production systems (Centre for International Economics 1997; Gerritsen 2000; Robertson 2002). In recent decades a combination of low commodity prices, increasing input costs, decreased productive potential of the land and an increase in kangaroos and pest animals is reducing leaseholder incomes and their ability to maintain ecological, economic and socially sustainable production systems. Australia's economy is shifting from a basis of frontier expansion to one of sustainable land use, and the past significance of rangeland pastoral and grazing enterprises to the national economy

has dramatically reduced. 'Rural production is no longer as important to Australia's future as it was three or four decades ago: it is just another industry struggling to survive in a world of globalised production relations' (Lawrence & Gray 2000, 48).

Recent decades have also been characterised by changes in public attitudes throughout the world relating to the relationship between notions of development and the environment. Furze (1992) suggests there is now a growing recognition that current land use practices and the assumptions that go with it are urgently in need of being reconceptualised. A steady groundswell of concern about land care and preservation of land use options for current and future generations has arisen from a growing awareness and understanding of the social and ecological impacts that are occurring in rural regions of Australia. 'It is well recognized that traditional land management and farming practices in Western Australia are contributing to the rapid degradation of our agricultural resource and remaining natural habitat resources' (Marsh 1998,1). Impacts from land use include soil erosion, the increasing loss of biodiversity, the spread of woody weeds as well as excessive losses and emerging salinity problems from underground water reserves. Widespread recognition that conventional Western forms of land use are fundamentally inadequate and generally not sustainable (Fargher, Howard, Burnside & Andrew 2002; Harrington, Wilson & Young 1984; Walker & Hodgkinson n.d.; Wilcox and McKinnon 1972) has resulted in acknowledgement of the need for sustainable land use, and leaseholders are increasingly being expected to play their part in new management strategies for rangelands. Leaseholders today are therefore developing a greater understanding and awareness of ecological processes and the importance of this to their economic and social goals. However, leaseholders' traditional experience and skills do not equip them well to deal with the emerging social pressures of urban people and the legacy

of previous rangeland practices (Centre for International Economics 1997; National Land & Water Resources Audit 2001).

Several factors have combined to influence the change in urban attitudes toward rangeland values and land use (Andrews 2004; Burnside & Boladeras 2002; Holmes 1994a, 1996, 2004a; Holmes & Day 1995, Nicholls 2000; Pritchard 2000). Mining has become a major export industry for many regions of the rangelands producing metals such as gold, iron ore and nickel as well as many other metals and minerals. Tourism is currently the fastest growing industry and many people are attracted to the unique ecosystems containing a wide natural diversity of plants and animals. Recreational activities such as four wheel drives have also become very popular in rangeland environments in recent decades. There have also been rapid increases in urbanization combined with steady declines in rural populations in most inland regions of Western Australia. This has created detrimental changes in rural communities, such as declining living standards and increasing social instability (Dovers 1992). Combined with an overall decline in pastoral industry performance and reduced agricultural importance to the economy, these factors have created a rising urban perception that the rangelands may be better used for other purposes. People are now looking to rangelands to support multiple land uses that include the conventional industries of pastoralism and mining, but also allow newer uses such as ecotourism, recreation, conservation reserves and older uses such as Aboriginal self sufficiency (Holmes 1994a; Hughes & Schuele 2002; National Land & Water Resources Audit 2001). Urban growth and the desire of many Australians for a 'country life' is also placing pressure on the fringes of metropolitan regions and slowly creeping into agriculture and rangeland regions.

As pest and native animal populations including goats, kangaroos, camels and buffaloes expand and increasingly compete with traditional livestock production there is a growing trend for both leaseholders and commercial enterprises to take advantage of the opportunities to use these animals for income production (Caughley, Shepherd & Short 1987; Grigg, Hale & Lunney 1995; Kangaroo Industry Association of Australia 2004; Parkes, Henzell & Pickles 1996). Native seeds, bush foods and cut flowers are providing ways for people to earn income from the natural vegetation of the area. The development of aquaculture allows opportunities for certain areas to gain an income from the increasingly prevalent saline waters (Department of Fisheries 1998). These forms of non-pastoral land use provide opportunities for increasing the economic development and environmental management of the rangelands by: increasing the efficiency of resource use, providing opportunities for development and employment in rural areas, and aiding ecologically sustainable land use. This vision is driving a mounting impetus for change.

Andrews (2004, 211) points out that the larger the area of land and the longer the period of time, the more land users and variety of land use there are likely to be. Therefore establishing and managing the land for multiple use becomes increasingly complex. She suggests this complexity is founded on multiple values which raise questions such as 'How do we negotiate with multiple users who seek different uses and may hold different values? How do we manage conflicting uses and values? And how do we ensure that uses do not compromise each other or any values?' The growing complexity of rangeland management involving multiple stakeholders is now demanding new approaches. There is a recognition that the traditional top-down approaches of scientific and government institutions are not effective and are often

detrimental to people and the environment (Ison & Russell 2000; Johnson & Walker 2000; Keen & Stockmayer 1999). Increasingly it is being acknowledged that adoption of changes in production systems and land management practices are largely influenced by complex social, cultural, economic, political as well as environmental factors and that land users themselves are the most effective drivers of these processes. 'Decision-making and priority setting at regional level, by regional people, brings with it qualities of empathy and attention to detail that cannot be achieved through centralized programs driven from within bureaucracy' (Laurence 2000, 9).

Consideration of the needs of stakeholders now generally forms an integral part of decision-making processes. Newly developed processes such as those outlined by Ison and Russell (2000) and the EMU project, pioneered in the Gascoyne Murchison, use community science approaches (see Stocker 1995). These processes involve knowledge and ideas drawn from pastoralists, combined with scientific ecological understandings, in order to forge new approaches to station and catchment management (Pringle *et al* 2003). However, as a result of differences in value systems, the communication of science to leaseholders and others in the community is not always effective at bringing about changes in behaviour. The complex reasoning behind leaseholder adoption processes are also sometimes difficult to understand by others involved in rangeland management (Johnson & Walker 2000).

Natural science approaches have often failed because of social, economic and cultural reasons. Established approaches to decisions made under uncertain conditions have traditionally been quantitative in nature and have therefore focused on the development of natural sciences, limiting the role of the more qualitative and interpretive approaches of the social sciences (Vogler & Jordan 2003). It is now

being acknowledged that risks involved in decision-making are influenced by a wide variety of factors. Social science is now constructing strong challenges to conventional approaches to risk assessment and providing potential for developing improved strategies for sustainability (Stirling 2003). Vanclay (2004) argues the contribution of social science is as much in the narrative as in the conclusion. This thesis presents background information about pastoralism and grazing combined with narrative from leaseholder interviews to provide a building block in the social science debate on rangeland use today.

### **SUSTAINABILITY AS A DRIVER OF CHANGE**

This thesis is also based on the concept of rangeland sustainability. Emerging changes in attitudes toward the environment and community have resulted in sustainable land use becoming a central concept in the use of rangeland resources. In the Western Australian State Sustainability Strategy, sustainability is defined as ‘meeting the needs of current and future generations through simultaneous environmental, social and economic improvement’ (Department of Premier and Cabinet 2002, 24). The three overarching and inter-related goals for sustainable land use of natural rangeland resources stated in the National Principles and Guidelines for Rangeland Management, 1999, are:

1. Conservation and management of the natural environment,
2. Sustainable economic activity,
3. Recognition and support for social, aesthetic, cultural and heritage values, diversity and development (Australian & New Zealand Environment & Conservation Council (ANZECC and Agriculture & Resource Management Council of Australia & New Zealand (ARMCANZ) 1999, 11).

Stafford Smith, Morton & Ash (2000) argue that the concept of sustainability in the rangelands exists at two scales; the sustainable grazing for production on individual properties at a local level (which also has a greater focus on economic sustainability) and the wider scale of management for ecological sustainability on a regional level. They suggest that some of the confusion surrounding sustainability arises from these differences and explain this concept of local and regional scales of sustainability in the following table, which is also my working concept of sustainability.

**Table 1. Sustainability in the Rangelands.**

	<b>Environmental</b>	<b>Economic</b>	<b>Social</b>
<b>Sustainable land use</b>	The long-term productivity of the land for the given land use is maintained: necessary rehabilitation is occurring	The land use (perhaps based on a mix of enterprises on the one piece of land) is economically viable	The management strategies needed to meet environmental and economic goals are feasible, and do not require unrealistic personal deprivation or impossibly complex management, etc.
<b>Regional sustainability</b>	The interactions between land uses do not destroy ecological function; biodiversity is maintained regionally (not on every hectare); etc	The region is in net economic balance, or an imbalance/subsidy has an on-going justification from the point of view of society	The region's social fabric is capable of supporting its human communities; the diversity of these can adapt in the face of future changes

Source: Stafford Smith, Morton & Ash 2000, 191.

Sustainable land use research is therefore not primarily concerned with conservation of the natural environment but is based on how societies define the issues of development. Becker, Jahn & Stuess (1999, 4) suggest that sustainable land use 'addresses the question of how societies can shape their modes of change in such a way so as to ensure the preconditions of development for future generations' and

refers to the viability of relationships between communities and their environment over long periods of time. They argue it is based on subjective indicators such as attitudes and values that reveal a community's capacity to achieve sustainability.

However, significant difficulties for sustainable land use arise because of the diverse nature of the definition of sustainability and also because of its prominent association with ecological impacts such as the loss of biodiversity, deforestation, climate change or soil degradation. Sustainable land use is a rather vague concept that means different things to different people and the emphasis that people place on certain aspects of their notion of sustainable land use varies with their aspirations. It is 'fundamentally a fuzzy concept when analysed by itself. It begins to make sense when it is applied to specific issues' (Department of Premier and Cabinet 2003, 25). The diffuse nature of the definition of sustainability the government currently places on leasehold land also makes it difficult to define outcomes. Therefore although a shared process may be based on sustainability, various stakeholders' objectives may differ (see Braddick 2005).

Shulman and Penman (1994, 269) discuss the difficulties of defining the term 'sustainability'. These authors argue that 'sustainability fails on the grounds of referential adequacy', because 'It is semantically vague and semantically undifferentiated'. They suggest that producers and natural resource managers disagree on the referential meaning of sustainability and argue that this makes it inadequate to use as a reference. Therefore, participative processes designed to develop strategies for multiple use policies make better progress when the term is not used. They argue that pastoralists and graziers who managed their properties conservatively with the concept of passing it on to their next generation may not have used the word 'sustainable' but the underlying philosophy is the same. As a

result the concept of sustainability is confusing because it was imposed on leaseholders by those outside the rural community. These authors use this illustration to suggest that scientists may therefore have traditionally inhibited participants from negotiating meanings. Consequently management of rangeland has, and will continue to produce, outcomes that are not relevant to all rangeland communities (Shulman & Penman 1994).

Although the strong economy of Australia provides a reasonable lifestyle for most of its citizens there remains a multitude of compelling reasons why we need a shift to a more sustainable, long-term agenda. The Centre for International Economics (1997) report suggests that health of our natural environment is compromised by threats from climate change, land degradation, salinity and biodiversity loss and the existence of social issues such as homelessness, isolation, and poverty which fragments communities and reduces their social capital. The challenge is therefore to address these issues in a more sustainable way that integrates the social and natural elements and develops opportunities for new forms of development that do not compromise either the environment or communities.

### **THESIS STRUCTURE AND RESEARCH QUESTIONS**

Based around the three general aims outlined above, the following thesis chapters attempt to answer 11 specific research questions. First, Chapter 2 provides an outline of the methodology used in this study and describes the regions undertaken in the study.

Chapter 3 draws on existing literature from Australian researchers and government agencies and responds to the contextual question:

**Research Question 1.** In a broad overview, what are the historical events, environmental conditions and social attitudes that have influenced pastoral development, and will continue to influence future development in the regions under study?

Chapter 4 also uses existing Australian literature combined with leaseholder comments to focus on the question:

**Research Question 2.** What are the socio-economic, political and technological factors that have formed the current situation and continue to drive change?

Chapter 5 discusses current literature on the changing value systems of the wider community and the impact these are having on traditional leaseholder values. It focuses on the question:

**Research Question 3.** What are the value systems driving changes that affect leaseholders and other stakeholders in the region under study?

Chapter 6 is engaged with recent concepts of sustainability that are driving change. It discusses the ecological, social and economic difficulties facing leaseholders in attempting to deal with changing expectations in the wider community and demands for sustainable land use. The benefits and disadvantages of changes in land management for both leaseholders and the environment are discussed. This chapter also reveals the effectiveness of current strategies to improve income and sustainable land use and discusses the remaining barriers leaseholders face in developing sustainable management of their land and production systems. It also reflects critically on the social sustainability of individuals and communities in the regions. This chapter focuses on the questions:

**Research Question 4.** How has the ecological sustainability paradigm driven change in the regions of study?

**Research Question 5.** How have changes in management impacted on the sustainability of land use?

**Research Question 6.** How have changing practices and policies impacted on the social sustainability of individuals and communities?

Chapter 7 draws on interview results to explore the changes leaseholders are making to their production systems and the difficulties they face in trying to cope with their changing circumstances. It discusses this question:

**Research Question 7.** What are the changes to animal production systems that have occurred and what are the difficulties, impacts and sustainability of these changes?

Chapter 8 explores the limited options for diversification being undertaken by leaseholders. It also provides a brief outline of the market and management strategies undertaken by leaseholders to align their production systems more with changing market demands or to develop niche markets for their product. This chapter contains two questions.

**Research Question 8.** What are the opportunities for and barriers to diversification of leaseholders' production systems?

**Research Question 9.** What are the market and management strategies currently being undertaken by leaseholders to cope with changing demands and how effective are these?

Chapter 9 discusses the emergence of government initiated participative processes facilitating important changes in sustainable land use practices and multiple land use

in the two study regions, as a result of community demands. It reveals leaseholder perceptions of power in community participation as well as the impacts and their opinions of these strategies. This chapter asks the questions:

**Research Question 10.** What government strategies have been developed to assist the wider community demands for improved land use management and multiple use of the rangelands?

**Research Question 11.** What are the impacts of these strategies on leaseholders and what are their attitudes toward them?

These 11 questions form the basis for the thesis which aims to improve our knowledge and understanding of the changing attitudes and practices in pastoral and grazing systems in the shires of the Upper Gascoyne and Mt Magnet in Western Australia today. This thesis is also designed to provide an overall view of the ideology and events that have driven the development of the pastoral and grazing industry and how the outcomes influence the sustainability of the industry today. Leaseholder comments used in this thesis provide their views on the development of the industry, and how they believe the activities they have undertaken will influence sustainability outcomes. Their comments also reveal how they envision globalisation and the changing values of the wider community will affect the sustainability of their industry and lifestyle in the future.

## **CHAPTER 2**

### **METHODOLOGY**

Chapter 2 describes the rangelands of Western Australia, the two regions under study and their location in the wider political, institutional and environmental boundaries. The general approach of the thesis and methodology used in the research are also described in this chapter.

### **REGIONS OF THIS STUDY**

#### **WESTERN AUSTRALIAN RANGELANDS**

The rangelands of Western Australia cover about 87% or 2.5 million square kilometres of the state. Pastoral leases cover over 1/3 of Western Australia's rangeland and the Lands Act 1933 stipulates that a maximum area of 500,000 hectares is allowed to be held by one party (DPI 2003a). There were a total of 514 pastoral leases in 1996 and 471 in 2003. The number has declined in recent years due to a reduction in pastoralist holdings of 6.5 million hectares and an increase in holdings by other interests: Indigenous, 2.7 million hectares; CALM, 4 million hectares (see Chapter 9, Gascoyne Murchison Strategy); Mining, 2 million hectares. Pastoral leases produce mainly sheep or goats in the southern regions and cattle in the northern regions and can range in size from 3000 to 500,000 hectares (Department of Agriculture 2003). By 2001 the proportion of family owned pastoral leases for whom pastoral activity was the main source of income had declined to only 60% (Southern Rangelands Herald 2001, 3: 1).

Table 2.

**Pastoral Lease Information for the Gascoyne and Murchison Regions.**

<i>Region</i>	<b>Family &amp; Company</b>		<b>Aboriginal</b>		<b>CALM</b>		<b>Mining</b>		<b>Special</b>	<b>Vacant Crown Land</b>
	<i>No.</i>	<i>Area ('000 ha)</i>	<i>No.</i>	<i>Area ('000 ha)</i>	<i>No.</i>	<i>Area ('000 ha)</i>	<i>No.</i>	<i>Area ('000 ha)</i>	<i>Area ('000 ha)</i>	<i>Area ('000 ha)</i>
Gascoyne	69	10,657	4	490	6	884	1	60	2	1,345
Murchison	106	18,709	7	1,584	8	1,428	14	2,385	209	2,269

Gascoyne Region includes Shark Bay,

Murchison Region includes Cue, Mt Magnet, Meekatharra, Murchison and Wiluna

Source: Department of Western Australia (DAWA) 2002c cited in Department of Agriculture Western Australia 2003. Note: Part CALM leases not included.

All leases are allocated for 50 years duration and this term is due to expire on 30 June 2015. At this time there will be exclusions to the new leases affecting 97 of the leases which is about 2% or 2 million hectares of land. This legislative structure was put in place over 70 years ago by the Lands Act 1933 (DPI 2003b).

In 2001 Western Australian agriculture production as Gross Value of Production (GVAP) was \$4.4 billion. Western Australian Rangelands contributed \$412 million (Pastoral Lands Board & DPI 2003).

Table 3.

<b>Gross Value of Agriculture Production by Major Shire 1996/97</b>			
	<i>GVAP</i>	<i>Number of</i>	<i>Area of farms</i>
	<i>(\$M)</i>	<i>farms</i>	<i>('000 ha)</i>
Upper Gascoyne	6.93	23	5,517
Mt Magnet	3.86	18	2,055

Source: Annan & Dearden 2000.

Pastoral properties are administered by the Pastoral Lands Board (PLB) which is established under the Land Administration Act 1997. Its functions include:

- providing advice to the minister on policy in relation to the pastoral industry,
- ensuring that pastoral leases are managed on an ecologically sustainable basis,

- developing land management policies (s95).

Under this Act the lessee is also required to:

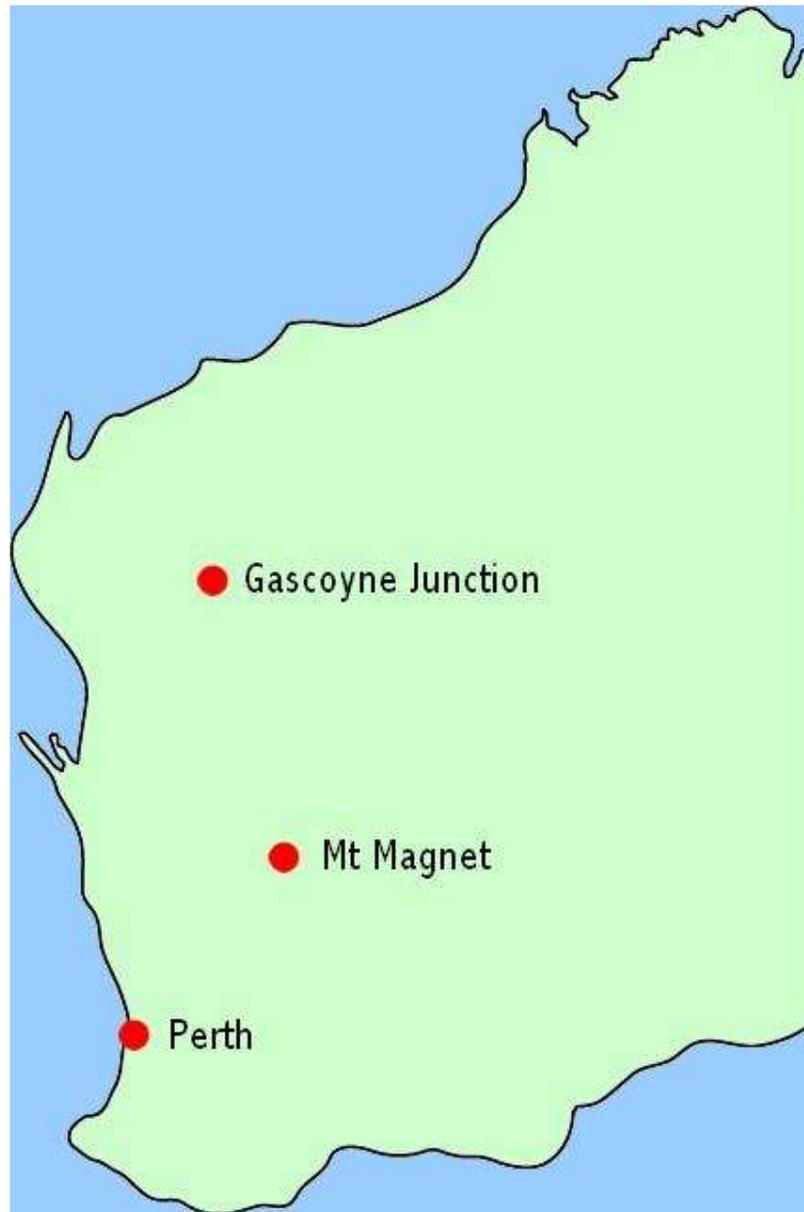
- use methods of best pastoral and environmental management practice,
- maintain the indigenous pasture and other vegetation on the land (s108).

The Board may also determine the stocking rate based on the sustainable carrying capacity of the land (s110). Following a Rangeland Condition Assessment carried out by the Department of Agriculture Western Australia (DAWA) the PLB sometimes requires pastoralists to develop a management plan to address specific issues that have been raised (s106)..

The Gascoyne-Murchison region includes the shires of Upper Gascoyne and Mt Magnet and is located in the Southern Rangelands. The Southern Rangelands covers an area of 178.1 million hectares. The townsite of Gascoyne Junction is in the Upper Gascoyne, 178km east of Carnarvon and is around 905 kilometres north of Perth, the capital city of Western Australia. The town of Mt Magnet is in the Mid West region, 569 kilometres north east of Perth, and 345 kilometres east of Geraldton. Map 1 shows the location of the towns of Gascoyne Junction and Mt Magnet in relation to Perth.

Map 1.

MAP SHOWING GASCOYNE JUNCTION AND MT MAGNET IN  
RELATION TO PERTH



In 2003, within my area of study, the Upper Gascoyne had 26 stations with 19 leaseholders and Mt Magnet had 16 stations with 16 leaseholders. (This calculation does not include multiple lessees). Thirteen leaseholders were interviewed in the Upper Gascoyne, their stations totalling 3,622,331ha and 12 leaseholders were interviewed in Mt Magnet, their stations totalling 1,112,923 ha. This constituted

around 68% of leases in the shires of Mt Magnet and the Upper Gascoyne (Annan & Dearden 2000; Pastoral Lands Board & DPI 2003).

The Gascoyne and Murchison rivers and their catchments are part of the bio-physical basis of the current study area. The catchment boundaries differ from the various boundaries established by governments for political and development purposes. The Upper Gascoyne Shire (Map 3) is part of the Gascoyne Development Region (Map 2), and Mt Magnet Shire (Map 5) lies within the Mid West Development Region (Map 4). These larger regions provide a base for socio-economic and political development. The area of both of these regions, excluding the coastal region around Geraldton, was also the basis for the Gascoyne-Murchison Strategy (Map 8). The study area for the present thesis was defined by the boundaries of the Upper Gascoyne Shire (minus two stations with very little land included in the shire); and the Mt Magnet Shire (minus the Aboriginal station in this region which was not included as it is not listed on pastoral stations supplied by the Pastoral Lands Board) (see Chapter 3, Change in Station Sizes).

### **THE GASCOYNE DEVELOPMENT REGION**

The Gascoyne Development Region is about twice the size of Tasmania. It represents about 5% of the total area of Western Australia and covers 136,110 square kilometres of land. The region currently has a population of 10,250 people (Gascoyne Development Commission n.d.). The major population settlement in the region is Carnarvon with smaller centres in Exmouth, Coral Bay, Denham and Gascoyne Junction. Burringurrah is an Aboriginal community. Map 2 shows the location and size of the Upper Gascoyne Shire in the Gascoyne Development Region.

Map 2.

MAP OF GASCOYNE DEVELOPMENT REGION



Source: Department of Sport and Recreation 2002

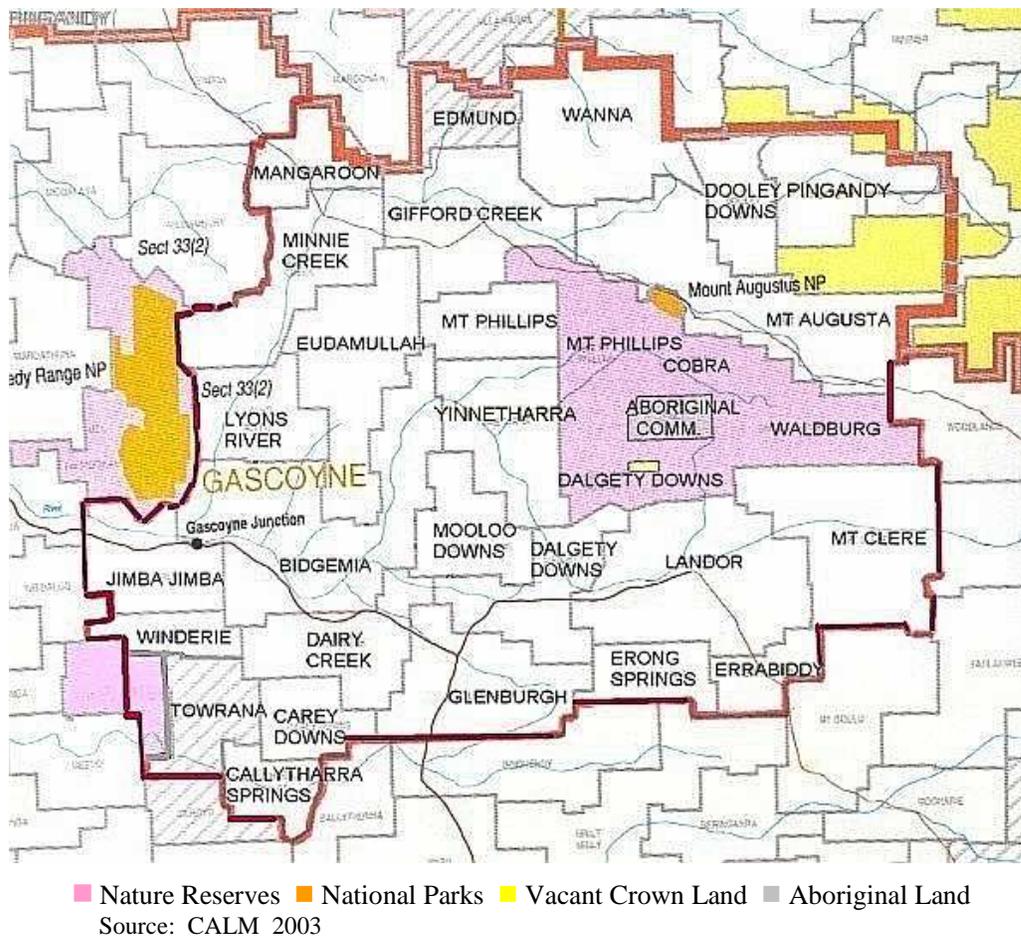
Much of the wealth for the region stems from pastoralism, tourism, horticulture, fishing and a small amount of mining. For a number of reasons such as distance from Perth, lack of a major port, limited mineral resources and the small area from which to draw resources and income, the Gascoyne region does not have as many opportunities for development as the Mid West Development Region (See Map 4). Therefore attracting capital investment for infrastructure and business development remains one of the key challenges facing the region. (Department of Transport and Regional Services 2000; Patterson Market Research, Focused Management & Hames Sharley 1999).

## THE UPPER GASCOYNE SHIRE

The Upper Gascoyne Shire is 46602 km<sup>2</sup>, (Western Australian Whole of Local Government Portal 2005) or around 35% of the total area for the Gascoyne Development region. Map 3 shows the pastoral and grazing stations in the Upper Gascoyne Shire.

Map 3.

### UPPER GASCOYNE SHIRE



Latest council statistics for the population of the shire is 370. It consists of Crown leasehold land, in addition to the conservation reserves of the Kennedy Ranges and Mt Augustus National Park. Cattle production is now dominant in the northern Gascoyne. In the southern Gascoyne wool production is slowly being replaced by

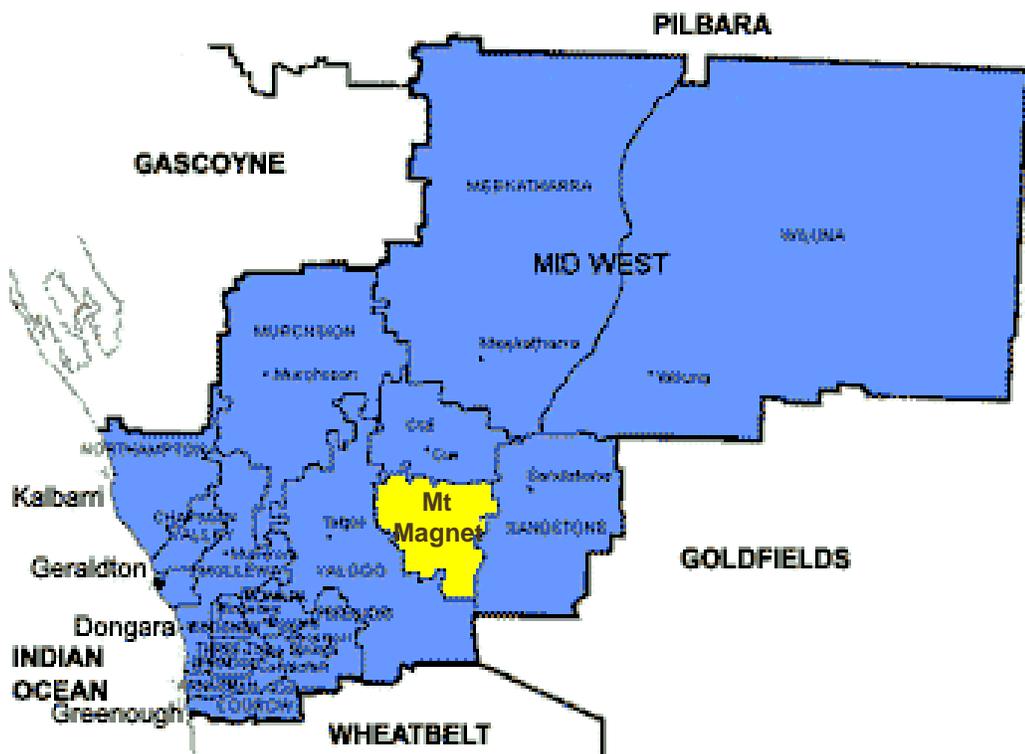
sheep and goat meat production. The shire contains much of the pastoral production of the Gascoyne region. The shire townsite of Gascoyne Junction is located on the main road between Carnarvon and Meekatharra which is currently being upgraded and sealed at an estimated cost of \$20 million (Gascoyne Development Commission n.d.). This will improve accessibility and may significantly affect the future of the region.

### **MID WEST DEVELOPMENT REGION**

The Mid West Development Region covers an area of over 470,000 square kilometres, nearly 1/5 of the state. It is therefore much larger than the Gascoyne Development Region. Map 4 shows the location and size of the Mt Magnet Shire in the Mid West Development Region.

Map 4.

MAP OF MID WEST DEVELOPMENT REGION



Source: Department of Sport and Recreation 2002

The Mid West Development Region has a population of more than 50,000 people. The major city of Geraldton-Greenough has 60% of the region's population, and a further 10% of the population resides in the smaller town centres in the region. Ten percent of the total population of the region are Indigenous (Mid-West Development Commission n.d.)

Mining is the major contributor to the economy of the Mid West region producing around \$1.9 billion annually. This is a significant advantage for the Mid West region as a whole as it provides income for the development of infrastructure and services. It also encourages investment to the area and the Mid West is currently a region where industry growth and investment is occurring. Recent State Government investment in Geraldton has improved the port providing access for large container vessels engaged in export of primary produce which will benefit Mt Magnet leaseholders' production of live animals for overseas trade.

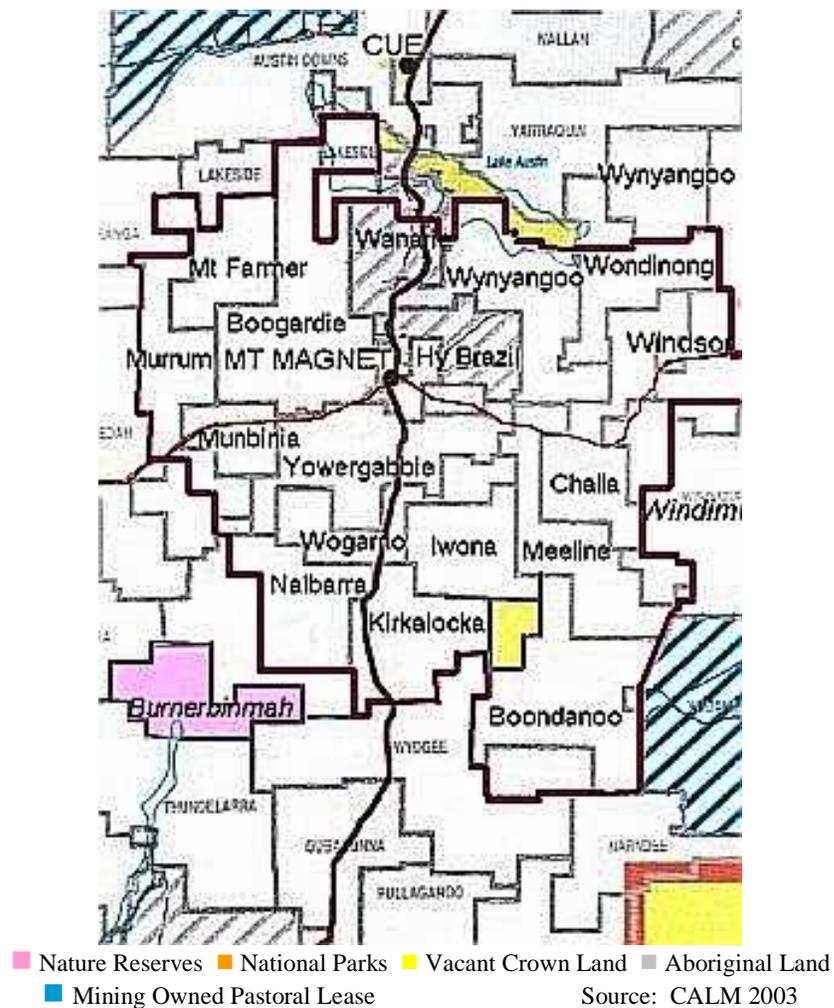
This will have a number of advantages such as increasing employment and attracting potential investment and business enterprise to the region. It may also reduce transport costs for industries and leaseholders in the region. New developments and diversification are also occurring in land use with a rising number of aquaculture and ecotourism enterprises. Increased development in the region will provide significant benefits to the population by providing opportunities of employment, especially for young people, and by encouraging more visitors to the area (The West Australian Liftout, 7 May, 2003). This in turn provides opportunities for new and innovative enterprises to be established within the region and may provide greater opportunities for diversification for Mt Magnet leaseholders than for those in the Upper Gascoyne.

## MT MAGNET SHIRE

Mt Magnet is a small town in the Mid West Region with a resident shire population of 727 and a leaseholder population of no more than 58. Map 5 shows the position of the town of Mt Magnet and the surrounding pastoral stations.

Map 5.

### MT MAGNET SHIRE



The town also has many fly-in-fly-out mine workers (Shire office pers. comm. 3/7/03). The shire area is 13877 sq km (Western Australian Whole of Local Government Portal 2005). Gold was discovered in the Mt Magnet area in July 1891 and the town was established in 1895. Most of the surrounding land consists of

Crown lease land used predominantly for Merino wool production. Cattle production has almost ceased in this region. However, sheep for meat production such as Merino and Damara as well as goats are becoming increasingly popular. Much of the income from the town comes from gold mining and variations in the growth of the industry significantly influence the number of people living in Mt Magnet. The population fluctuations shown in Table 4 can be attributed to the increase and contraction of gold mining over this period.

Table 4. **Mt Magnet Shire Population Distribution**

**Population Distribution**

<b>Shire/City</b>	<b>1981</b>	<b>1986</b>	<b>1991</b>	<b>1996</b>	<b>1999</b>
Mt. Magnet	770	1,177	1,133	869	717

Source: Mid West Development Commission n.d.

Changes in the tax laws in the 1970s also had a huge impact on the township as well as on the leaseholders in the surrounding district. As a result of the tax changes, gold mining companies in Mt Magnet changed their strategy of providing housing and infrastructure for mine workers to live at Mt Magnet and instead implemented a fly-in/fly-out system for their workers (Pastoral Lands Board & DPI 2003). The consequential loss of people and money within the township reduced the local services and social interactions for leaseholders.

**THE GENERAL APPROACH OF THESIS**

‘Research work into rangeland productivity appears to point to subtle managerial decisions having long-term productivity impacts. These subtle decisions are far more likely to be exemplified in anecdote and story’ (Ison & Russell 2000, 124).

The general approach for the current thesis involved ongoing reflection, re-examination and evaluation of individual points of view during both the interview and writing process to determine the different meaning that each leaseholder assigned to the question and answer. As Shulman & Penman (1994) explain, the interview process is biased by the values or perceived values of the researcher. Our intervention, including our presence and the questions we ask, influences the response by the participant. As an experienced interviewer I consider it necessary to engage in conversation when appropriate. However, while this course of action may have encouraged dialogue with leaseholders, it may also have influenced their responses. My age, gender and status as a University student may also have biased their perceptions and therefore the way they answered the questions.

The present study uses the words of leaseholders to explain their value system and how it relates to the growing protection and consumption values of the wider community (see Chapter 5, Changing Value Systems and the Difficulties for Leaseholders). It is concerned with the social activities of leaseholders involved in production systems and focuses on what changes are occurring, who are involved in making changes and why the changes are occurring. Interviews and other research data are used to contradict, support or build the existing theories that explain why and how land use practices in the rangelands occur.

Leaseholders are not a homogenous group and there exists a wide range of different concerns and interests amongst those interviewed. The information in this study is not representative of all leaseholders in all situations. However, the best and most appropriate information for the development of management strategies and planning is gained by community surveys, such as this one, that are aimed at obtaining local information about issues that are specific to the area. I have attempted in this thesis

to understand the factors that influence individual actions, how those actions are constructed and their consequences. I used individual viewpoints to determine the interplay between these attitudes and assumptions and the total social process. It is a story about the arrangements of power in a culture and how the effects of this power create the facts and truths that influence the ways that people act and the knowledge that is produced. It is a 'story of the relations of power and the ways in which people affect each other' (Mackenzie 2000, 81).

The thesis is based on the premise that every point of view is particular to a social situation; therefore a situation is only how we as researchers perceive it at the time. Furthermore the morals, values and ideology that drive the human conduct under study are themselves socially and historically conditioned. Events that have occurred and the reason they have occurred were determined by the conduct at that time in history so it was not possible to categorise and fully understand the ideology of the situation using today's values and ideology. As Mannheim (1936, 76) stated; '...the meanings which make up our world are simply an historically determined and continuously developing structure in which man develops, and are in no sense absolute'. He points out that the way the situation is approached and the degree of insight or understanding that is obtained is dependent on the experience and mental intellect of the person doing the thinking. The perception and interpretation of the social situation is therefore based on the intellectual thinking of the time and the nature of the person involved.

## **RESEARCH METHODS**

The primary research for this study used semi-structured interviews of leaseholders in the shires of Mt Magnet and the Upper Gascoyne. The semi-structured interview schedule was a guide to ensure that key issues were explored in depth. The questions

were used as prompts for leaseholders' stories, which could then be reported using leaseholders' own words and language. The information containing their actions, experiences and interpretations of relevant factors was used to provide an historical, current and future context for the focus of the research (Neuman 2000). The thesis methodology uses a combination of deductive and inductive approaches. I have drawn on theory from the literature and from information gained from leaseholders in my earlier field trip and have moved back and forwards from theory to interview data in an attempt to build new theory or modify existing theory. Using interpretive methods, I attempt to describe and understand how leaseholders conduct their daily lives by revealing meanings, values, interpretive schemes and rules that are used by leaseholders, and to determine the individual motives behind their actions (Neuman 2000). I have attempted to seek a rational account and provide a fair representation of leaseholders' views and endeavoured not to intentionally convert their words to my own meanings (Tripp 1983).

Around two weeks prior to the principal fieldwork, an introductory letter inviting leaseholders to participate was posted to all leaseholders within the two areas of study. This was followed up a week later by a phone call to ask if they would participate and to schedule a time to meet. Because of the time it took to travel the large distances between interviews I found only two interviews at the most could effectively be completed in one day. The process undertaken for this study was similar to that of the study of Western Division grazing families conducted by Webb, Cary, & Geldens (2002).

'To facilitate the interviews we used a guide that contained a set of questions around a number of topics relevant to the research. While the guide presented the questions in a scripted and ordered manner it did not dictate how the interviews actually took place. ...The exact wording and ordering of

questions was determined within the context of the interview itself. This approach enabled us to be responsive to those being interviewed, whilst ensuring that the information collected was systematic across the interviews and was relevant to the research. One of the major benefits of this approach was the ability to explore in much greater detail specific topics that arise during an interview that were not originally seen or recognized as important aspects of the research.’ (Webb, Cary, & Geldens 2002, 21).

My semi-structured questionnaire used as a guide for my interview process consisted of nine sections:

- The first section focussed on leaseholder likes and dislikes and was designed to gain some understanding of their values and to encourage them to openly begin to talk about themselves.
- The second section sought to ascertain what changes had occurred in recent years and why they considered these changes had taken place. The questions asked about the changes that had happened in the last decade affecting leaseholder production systems, what changes they had made to their production system in the last 5 years and why they had decided to adopt these changes.
- The third section determined what impacts had occurred as a result of these changes that were affecting production systems in the region and what leaseholders believed about the social, economic and environmental sustainability of these changes.
- The fourth section explored their attitudes toward Aboriginal issues and how leaseholders felt about these issues. Questions were asked about leaseholder attitudes about the rights of Aboriginals to have access to leasehold land, whether they foresaw problems with this in the future and what they believed about the role of indigenous people in station and resource management in the rangelands.
- In the fifth section leaseholders were asked to consider how the issues they had previously discussed might be resolved and what role all stakeholders, including leaseholders, government agency staff, private companies, local

community groups and the general public of Western Australia, should play in this.

- The sixth section focused on the live animal trade and what the advantages and disadvantages of this was for leaseholders. The questions explored the changes they had recently made to their production systems to cater for this trade, the advantages or disadvantages to their production systems and how they thought they may be affected if the trade was disrupted or discontinued.
- The seventh section aimed at establishing leaseholder attitudes toward the availability and quality of information and assistance they received as well as their opinion on issues that affect them. This included marketing issues such as niche marketing organizations and technology issues such as the types of technology that have benefited their production systems and lifestyles in recent decades.
- In the eighth section leaseholders were asked to name the three issues that were of greatest concern to them and explain why these issues were a problem. Questions about leaseholder concern with security and access issues were also asked if these were not mentioned to determine attitudes toward access to facilities and services, security of land tenure, public access issues, leaseholder attitudes toward changing urban attitudes and opinions on the problems of succession.
- The final section linked in with the first section to determine leaseholder values by asking where they would live if they had no financial restrictions. This provided an overall assessment of their level of satisfaction with their lifestyle and was a measure of their attachment to their value system.

Additional to these questions the demographic details of leaseholder families were also sought. These questions covered details on the age and structure of families, education of leaseholders, employment details, length of experience as leaseholders and involvement in local organizations. Table 5 shows the demographic details of the leaseholders interviewed.

Table 5. **Demographics of Interviewees.**

	Total	Males	Females	Couples	Couple & Son	Male & Son	M 50+	F 50+	M <50	F <50
<b>Interviews</b>	25									
<b>Upper Gascoyne</b>	13	5	5	2	1		4	4	5	4
<b>Mt Magnet</b>	12	5	2	4		1	6	4	5	2

Leaseholders were informed at the commencement of the interview process about the purpose of the research, and how the information would be used. They were also asked to sign a form consenting to proceed with audio recording. The study included interviews with people on 25 different leases.

The initial fieldwork undertaken in March 2003 provided me with a general introduction to the leaseholders in these two regions and their issues of concern. Combined with the former literature review, this information formed the basis for my questionnaire construction. The principal interview process was completed over a period of 3 weeks during October and November 2003. Transcription was then undertaken and leaseholders received their account of their interviews by the end of January 2004. Coding of the data allowed me to define the key themes for the thesis and this took around two weeks to complete. The process of writing the thesis has been carried out during the whole study period.

Leaseholders in these regions form a diverse range of different types of people engaged in a wide range of different forms of income production. One interviewee was a female leaseholder in her own right and one property was Aboriginal land. The leaseholder interviewed was Aboriginal and subleased the property from the Aboriginal family who now owned it and his inclusion provided useful information on the position and attitude of some Aboriginal people in the pastoral and grazing industry. My presence as a mature female may have had some influence on the percentage of women who volunteered to undertake the interview, especially in the

Upper Gascoyne region, and this may have introduced bias to the information received between the two regions.

To ensure that the report of their activities is fair and valid, leaseholders were provided with a transcript of their interview and encouraged to provide feedback. Providing them with written versions of what they said enabled them to verify any remarks that may be attributed to them in the thesis. This process not only improved the accuracy and validity of the thesis, it may also have encouraged leaseholders to refocus their attention and reflect on their attitudes and actions. Conducting this fieldwork was fun and very informative and I have genuinely enjoyed listening and learning. Those leaseholders who kindly consented to take part also appeared to enjoy the opportunity to tell their side of the story.

## **CHAPTER 3**

### **THE HISTORICAL DEVELOPMENT OF THE PASTORAL INDUSTRY**

This chapter provides a broad overview of the historical events, environmental conditions and social attitudes that have influenced pastoral development, and will continue to influence future development, in the regions under study. It provides a brief history of the development of the pastoral and grazing industry that includes the social relations, the historical events of the industry, and the environmental influences. It introduces the reader to the influence that relations of power have had on the development of pastoralism and grazing in Australia. It also reveals how the historical ideology of the pastoral and grazing industry formed today's culture and identity of the pastoralists and graziers themselves.

This historical account of the history of the industry allows us to see how the industry has evolved and how these events influence the industry today. A short history of the development of pastoral and grazing in Western Australia also focuses our attention on the events that have shaped the current situation in the Upper Gascoyne and Mt Magnet regions. In addition, the chapter includes a discussion on how the different environments of the two regions have created different impacts on change within the regions.

### **THE INFLUENCE OF POWER AND TRADITIONAL VALUE SYSTEMS ON THE DEVELOPMENT OF PASTORALISM AND GRAZING IN AUSTRALIA.**

In his work entitled *The Subject and Power*, Foucault (1983) discusses the role of power in society and describes how relations of power influence the actions of individuals and groups of people on others. He reveals how power relations become institutionalized, sustaining existing systems of power that are sometimes detrimental to individuals or society as a whole. Relations of power are therefore inevitable, with

both benefits and disadvantages for those involved. Using Foucault's interpretations of power, Flyvbjerg (2001, 132) suggests that knowledge is an integral part of the relations of power. He argues that power and knowledge are inseparable and that 'power produces knowledge, and knowledge produces power'. These relations had a prevailing influence on the evolution of the pastoral and grazing industries in Australia. They influenced the value systems and cultural identity, continually shaping the economic, social and environmental development and the notion of what is to be a pastoralist or grazier.

Today social scientists analyse discourse, the use of words, symbols and meaning, to explain links to power and knowledge. Lockie (2000, 16) suggests that 'the focus on discourse in contemporary social science reflects the proposition that the most powerful forms of coercion are often the most subtle'. He argues that power is used by individuals or groups to change others' minds for their own self-interest and so 'define the content of a discourse'. The relationship between discourse and power will therefore always be contested, debated and resisted. The emerging values currently shaping power relations in the rangelands are a growing arena for discourse analysis by social scientists today. Holmes & Day (1995) maintain that the distinctive value system of pastoralists and graziers strongly influences their actions and suggests these values are very different from and poorly understood by urban Australians.

A survey completed by Nicholls (2000) found a general consensus by urban dwellers that they were not well informed about the rangelands. That perception was reflected by leaseholders in the Upper Gascoyne and Mt Magnet study in their concern about the threat they felt from urban community pressures. Nicholls's study also revealed a strong desire by urban residents for placing environmental values above economic

or social values in the development of rangeland management strategies (see Chapter 5, Changing Value Systems and the Difficulties for Leaseholders). As Holmes & Day (1995) suggest, there is a marked difference in value systems between leaseholders and the wider community which may reduce leaseholders' ability to meet the challenge pastoralism faces in adjusting to the complex demands of other interest groups. To develop the changes in resource use and land management that are increasingly being demanded by the wider community today, we therefore need to bear in mind the relations of power that have shaped the current situation and incorporate all perspectives in our management strategies and policies for change (Gray 1992). To do this we need to improve our understanding of the value systems that drive the industry and how these value systems influence the behaviour of pastoralists and graziers today.

#### **THE DEVELOPMENT OF PASTORAL AND GRAZING IDEOLOGY**

Pastoralism and grazing are predominantly social processes with components that are environmental, economic and political. These are driven by leaseholders' own world views and motives which are influenced in turn by their subculture. This subculture contains its own value system of beliefs, ideas and visions that determine pastoral and grazing practices and influence adoption of change. To motivate adoption of change or improve practices it is essential to understand these value systems (Luciano & Vanclay 1996).

Values are 'generally conceptualized as higher-order evaluation standards that refer to desirable means and ends of action' and as such are considered to influence preferences and attitudes. It is therefore important to understand the values of leaseholders to 'determine potential behavioural intentions' (Shulman & Penman 1994, 266).

Webb, Cary & Gelden (2002) suggest that pastoralist and grazier families are embedded in a strong traditional culture driven by an ideology that influences their beliefs and attitudes as well as their actions, which in combination characterises the contemporary pastoralist or grazier family. The ideology that underpins and maintains the current system of pastoralism and grazing in Australia has its roots in the European colonization of Australia during the 19<sup>th</sup> century. Bolton (1981, 11) informs us this arose from the imported perceptions, beliefs and values of early settlers from Britain founded on the notion that property ownership would provide the power to protect individual rights. ‘...the protection of liberty and property were the main purposes of government’. The ownership of land was regarded as a form of prestige within the community. According to Molony (1988, 166) ‘...the lust for the land, grown out of ancient serfdoms and the loss of land in the home countries, was in us all’. Bolton (1981) also explains that the conception of what an ideal landscape should look like was based on their perceptions of an English park. This was an ideology focused on production and resource use and was based on exploitation with little appreciation of the Australian environment or management of the natural resource.

He suggests there were many pastoralists in these early days whose singular ambition was to gain maximum economic benefits from their enterprise so they were able to live in the more affluent suburbs of Sydney or Melbourne or return to live back in England. This attitude resulted in a tendency to limit investment in infrastructure and exploit the natural resource, beginning the land degradation that followed. A highly urbanized society, dependent on the export of rural resources and produce, developed early in Australia’s history, which reduced the focus on rural regions. This produced an imbalance in the use and exploitation of natural resources which best promoted

social and economic welfare. It also restricted growth in public awareness of environmental conservation that would lead to enlightened policy development. The spread of sheep and cattle throughout Australia was accomplished in 100 years and changed the original Australian bush landscape to one that suited the economic development of pastoralists and graziers of the time (Bolton 1981).

During the early days of settlement, Mackenzie (2000) suggests, colonies faced the problems of establishing order by controlling convicts and Aboriginals and finding ways to civilize an unfamiliar landscape. To do this they had to increase production, to feed the growing population and to make the colony a viable, productive independent entity. The aims of the Government were therefore to gain control over the settlement of the land so they could accommodate the increasing population and improve agricultural production in Australia. Relations of power between government and leaseholders developed that promoted both the practices of survey and surveillance, and production. The ideology of rural settlement was based on the theory of productive land use. Williams (1975, paraphrased in Dovers 1992, 7) comments: 'The land needed to be used and civilized, and that, of course, would best result from its settlement by a stable and sedentary society of farmers'. According to Mackenzie (2000) the denial of the previous Aboriginal culture by defining the land as *terra nullius* allowed early settlers to occupy land where Aborigines had survived for thousands of years before and to treat the original inhabitants as nonhuman. Marcus (1999) argues the great Australian myth of a timeless land and empty space, peopled with a timeless, unbounded, race of wanderers, provided easy justification for the settler presence and all that followed from it.

During the early years of pastoral settlement the opportunistic development by squatters resulted in rapid expansion. This was also the beginning of our

understanding of the environment of inland Australia. Settlement was aided by official government explorers and later the establishment of Pastoral Leases to encourage orderly development and stocking of the leased land (Dovers 1992). Mackenzie (2000) suggests that initial order and control of land was established not so much through the use of enforced regulations, but through use of surveys and maps that legitimized land use and promoted the interests of the pastoral industry as well as the government institutions that developed in support of them. The map was the technology developed for the representation of geographical space. It was allied to the state and was used as a means of collecting government revenue, increasing the control of power for government and providing funds to maintain that power. State control was also aided by the development of other technologies and the institutions that supported them. The relations of power between leaseholders, government and commercial industries were therefore established.

As technology improved and the use of the map was refined, changes have occurred in these relations of power. Bolton (1991) informs us that originally the focus was on alleviating problems that reduced production. As the pastoral industry continued to prosper, government established regulations to encourage closer settlement. However, it was soon obvious that the climatic conditions, limited markets and inadequate infrastructure prevented this happening. In many cases this resulted in hardship or abandonment of land and long-term environmental damage with few infrastructure improvements. It also reduced the potential of the land to produce, leaving leaseholders today with a legacy of land use that impacts on their production and management strategies.

The depression of the early 1930's, combined with increasing mechanization, encouraged the movement toward urbanization in Australia. According to Shaw

(1973) rural ideology at the time of early settlement was based on the belief that small farm holders were inefficient and the role of the gentleman farmer was vital to society. They believed it was necessary, he suggests, to develop a hierarchical relationship between the squatter as employer and bushman or stockman as worker. As pastoralism and grazing developed in the mid nineteenth century and became more intensified with the emergence of the small producer, the ideology of the family farmer was incorporated into an Australian rural ideology. Lockie (2000) advocates that from the early 1920's to around 1960 there was a firming of agrarian values and a strong perception of the special place in society of rural producers. The basic elements of agrarianism have been described by a number of authors and include those set out in List 1.

List 1. **Basic Elements of Agrarianism.**

- Primary production is the most basic occupation on which others depend. It provides the high standard of living for the nation and only those who produce a physical good add to the country's wealth. Therefore in their own interests all citizens should support policies that aim to improve the position of primary producers.
- A productive life on the land is natural. It is based on hard work, considered to be virtuous, ennobling and co-operative, bringing out the best in people, whilst in contrast city life is evil, competitive and parasitical.
- The character of an Australian is that of a countryman and the core elements of the national character arise from the struggles of country people to tame their environment and make it productive, whereas city people are much the same the world over.
- Economic independence is desirable.
- Family farms are linked to the maintenance of democracy and are needed for purposes such as defence. For all these reasons people should be encouraged to settle in the country, not the city.

(Sources: Flinn & Johnson 1974, 1; Lockie 2000, 18).

Flinn & Johnson (1974) also found these values were higher amongst farmers with lower incomes who were older and less educated, were long-term farmers and had low debt so required less contact with outside sources. These values were particularly pronounced in the pastoral industry and reached a peak in 1950-51 when wool prices were at their highest ever and the contribution of wool to the economy created an image of the country 'riding on the sheep's back' (ABS 2002)

'Pastoralism formed the base of an emerging nation which rode into the twentieth century on the sheep's back.' (Caughley, Shepherd & Short 1987, 4).

Unlike the farmer who was required to work long hours toiling on his farm, Lawrence & Gray (2000) suggest the public's image of the pastoralist and grazier was one of an elite producer who grazed animals on extensive areas of land with wealth gained from the lucrative years of high wool prices. Pastoralists and graziers were thought to reside in large mansions, have a good education and be able to employ a manager to run their estate, enabling them to participate in the affairs of State. This ideological belief was supported by both urban and rural populations to varying degrees (Lawrence & Gray 2000). Lockie (2000) argues that although this is not the only image of a typical Australian, these versions have historically been represented as the rural Australian male and have figured prominently in constructions of Australian national identity. Because the traditional rural male was represented as the embodiment of the rural producer his interests were represented as the interests of all Australians, both city and rural alike. As a result those who did not fit this profile, such as women, indigenous people, those who worked for wages, or were gay or lesbian, were not included in the discourse and policy development of the time. Traditional concepts of male inheritance of property also suppressed challenges by women to the dominance of males (Lockie 2000). These dominant male traditions and ideals remain a cornerstone of the pastoral and grazing culture today. Notions of rural landscapes created by the pastoral industry were accepted as 'typically Australian', even though most Australians were urban dwellers, and this vision of their country was celebrated by poets and artists alike (Bolton 1981).

Mackenzie (2000) explains that the shift in focus from people to the land occurred around the turn of the 19<sup>th</sup> century when the government began to become aware of

the impacts that grazing was having on the vegetation and the production potential of the land. Improving productivity had become the main focus of government administration, and technology development and science became important. This gradually shifted the power base from local land knowledge to government scientists, and the roles of soil conservation and animal production were increasingly developed as separate entities. Scientific expertise and the development of technology became essential for land management and maps became a way of monitoring how the land was used or affected by those who were using it. This had the effect of reducing graziers' ability to understand or control the type of technology they used and increased the role and power of scientists. Sometimes grazer inventions were appropriated by government scientists, adding to their technological control and power.

As our scientific knowledge and awareness of land impacts has grown, government focus has shifted to monitoring the land's resources and ensuring the land is managed sustainably. Mackenzie (2000) argues that the implicit control through maps has re-emerged in Satellite imaging systems that provide clear and precise detail of changes. This has revealed the extent of changes in the condition of the land resulting in heightened research into sustainable land use. He suggests this again changed the focus of development and relations of power. Originally land became important as a means of production and revenue-raising and the role of the leaseholder was a productive manager. The role of leaseholder has now changed to ecological manager and the roles of natural and social science are merging. Current management strategies are based on improving livestock production using ecologically sustainable management such as Grazing for Profit, Better Business and Beef Plan. Mackenzie (2000) also argues that while these programs may be

beneficial to leaseholder production, they also bind leaseholders into the programs and their use of technology. This increases scientific control and reliance on institutional development processes. As a result these programs can become self-perpetuating and the interests of those in government may potentially become more important than the interests of the grazier.

Changing value systems and a reduction in the prominence of agriculture in the economy have weakened the belief in the ideology of production, especially amongst urban populations, and there is now a complex mix of values assigned to the rangelands. Morton (1993, 146) argues that writings on Australia and the rangelands reflect these changing attitudes in recent decades. He comments ‘...where once there was cultural and social unanimity there is now a multitude of voices’. However, Webb, Cary & Geldens (2002, 11) suggest that the values and beliefs that underpin this ideology remain the basis of the pastoral and grazing cultural identity today. ‘While the dominance of the ideology has waned, the values and beliefs that constitute it form the historical heritage from within which contemporary farm families operate.’ The strength of this cultural belief, however, varies considerably in its influence on leaseholders and largely depends on whether they have a greater inclination toward instrumental or intrinsic values, thereby influencing their adoption of change in the ways in which they manage the land. ‘The degree of investment in and management of a resource is related to its value, which varies according to when and where the resource is evaluated, as well as to who is making the value judgment’ (FAO 2001, 57). These decisions sometimes reduce the potential for increased income.

Leaseholders sometimes rationalize their choices by classifying their cultural values and beliefs as more important than their income. Therefore their independent

lifestyle, environment and the enjoyment of their work are given higher values than their financial benefits. Holmes & Day (1995) describe these incomes as 'psychic' income from farming values and 'real' income from financial benefits. Webb, Cary & Geldens (2002) also suggest that the overarching self identity of pastoralists and graziers consists of independence, physical labour, pride, breeding your own, preference for the rural and an optimism in the future, and that it is through this identity that leaseholders construct and understand their world. Their study found that these characteristics made it very difficult for graziers to exit from pastoralism, although those graziers they interviewed who had left and were now working in other industries considered they had an improved quality of life.

Webb Cary & Geldens (2002) suggest that leaseholder properties are seen as an economic unit as well as a natural landscape to be managed and this provides them with a reason for existing and meaning to their life. It also gives them security, stability and a sense of place that fosters a sense of pride and worthiness for both themselves and their community. Their study of grazing families in NSW found that although longevity of residence was linked to a strong sense of attachment to their property there was relatively no difference between those who lived on an ancestral property and those who had not, although this did have a source of meaning in itself.

Webb Cary & Geldens (2002, 63) also maintain that place attachment is an important dimension of leaseholders' relationship with their property and suggest the idea is constructed of two approaches. They explain these as 'place-identity', defined by the way the individual's personal identity relates to their physical environment, and 'place-dependence', referring to the degree to which individuals associate with specific places and how well they consider the particular place satisfies their needs and goals in relation to other places. Comments from leaseholders in the Upper

Gascoyne and Mt Magnet also showed how historical features that remained in their region provided them with an important sense of place. This subject is discussed in Chapter 5 (Leaseholder Cultural Issues and Perceptions that Influence Change) where leaseholders have commented on the cultural history that remains and their attitudes toward preserving this. The study by Webb Cary & Geldens (2002) also found that although leaseholder properties were a fundamental aspect of individual self identity, leaseholders did not always see their properties as providing the best opportunities for pastoralism and grazing.

Other studies suggest the constraints of the pastoralists' and graziers' culture limit communication of these issues amongst leaseholders. During their study with pastoralists in NSW, Ison and Russell (2000, 150) found that although they knew about it, other leaseholders did not attend the project sessions being undertaken by neighbouring leaseholders. These sessions structured education around the needs of the land user. They consisted of participatory processes designed to develop alternative methods of doing research and development. The authors explained that 'Most graziers rarely talked in any detail about their management practices with their neighbours. However when invited they were always enthusiastic to do so in considerable detail'. Ison and Russell (2000, 150) suggested that 'in certain sections of Australian society there exists a way of living which deems it inappropriate to impose your ideas on to other people or to be seen to be 'bragging'. The converse of this was that it is also seen as inappropriate to be a 'sticky beak' and to want to know too much of your neighbours affairs'. Many comments from the Upper Gascoyne and Mt Magnet leaseholders also reflected these attitudes.

The above characteristics often differentiate rural families from many urban families. Mannheim (1936, 255) suggests that rural and urban attitudes often differ in their

vision of what they value and see as 'reality'. He explains that this arises from the fact that what is meaningful or of value to rural or urban populations originates from their environmental, social and economic situation and this difference gives rise to the differing perspectives. '...the interests and powers of perception of the different perspectives are conditioned by the situations in which they arose and to which they are relevant'. Our view of the world therefore colours our perceptions of the system and influences how we deal with it.

In the past scientists and government experts have attempted to assist leaseholders with strategies and policies designed to control the way that leaseholders managed their production systems. However, strategies adopted by leaseholders are often different from those developed by scientists or government experts. FAO (2001, 29) maintains this is because 'pastoralists have their own cultures and their management strategies develop within their cultural frames of reference'. Government strategies are also contradictory at times as knowledge and attitudes toward the environment and animal production change. This presents leaseholders with difficult decisions about what to do and reduces their confidence in science and government experts. Therefore, perspectives on what is meaningful or of value differ because of the changing world views and the ideology of the culture to which we belong.

Today there are only a small number of people supported by the pastoral and grazing industry. Yet their political influence remains large in proportion. The question arises as to why this is so and Edmunds (1994, 36) suggests it is because it is embedded in our cultural ideology.

'The answer lies not only in Western Australia's historical economic dependence on primary resources, but also in the effectiveness of the myths that have been generated by this dependence. These are the myths of a

frontier society – values derived from beliefs about the nature of civilization and wilderness and the importance of the confrontation between the two. Such values are embodied in the person of the pastoralist’.

If we are to develop the changes in resource use and land management that are increasingly being demanded by the wider community today, we need to bear in mind the relations of power that have shaped the current situation and incorporate these perspectives when we develop strategies and policies for change. To do this we need to improve our understanding of the value systems that drive the industry and how these value systems influence the behaviour of pastoralists and graziers today.

To improve our knowledge and understanding of the rangeland situation today it is also necessary to have a clear awareness of the history of the industry. Vanclay (2004, 2) argues ‘It is vital to recognise the history of resource use, and the social, political, economic and cultural context of land use’. Appreciation of how pastoral and grazing development has influenced leaseholders, and in turn how they have influenced development in the past, provides us with greater insight and ability to comprehend the complexities of the current situation and to envision difficulties for change in the future.

Pastoral wool production was a key contributor to the early social, economic and environmental development of Australia. The change to meat production and the huge rise of the live export trade in recent years are important factors in the changes that are taking place today. However a detailed description of these factors was beyond the scope of this thesis. The following sections therefore provide a brief description of the history of land use in Western Australia and the two regions of study showing how this development has influenced the position today. Economic,

policy and technological development have also been key drivers of change in the pastoralism and grazing industry and these influences are discussed in Chapter 4.

#### **HISTORY OF LAND USE IN WESTERN AUSTRALIAN RANGELANDS AND ITS INFLUENCE ON CURRENT CHANGES**

Exploration of this region of Australia started in the 1850s. The State Government began to actively encourage settlement and development of the pastoral areas in Western Australia by establishing Pastoral Leases and by providing financial rewards and penalties to encourage the development and stocking of the leased land. Pastoral development quickly expanded out from the coast and along the river systems in the 1860s and 1870s (McDonald 1991). This was followed by the goldrushes in the 1880-90's. The chance to find gold encouraged large numbers of people to migrate to the area and the population increased from 46,000 non-Aboriginal people in Western Australia in 1890 to 180,000 in 1900 (Shaw 1973,115). As a result railways and new towns were built and this rapid development enhanced pastoral settlement in the regions. Shepherding along the river plains was the main form of pastoralism at this time and Aborigines were employed to mind the flocks. This arrangement benefited leaseholders but had very mixed impacts on Aborigines (McDonald 1991).

McDonald (1991) also suggests that life as an early pastoralist in the region was difficult and required considerable sacrifices by the early settlers. Hot temperatures, unreliable rainfall, cyclones and floods, along with the isolation and poor communications all contributed to make pastoralism an arduous and often demanding way of life, even by the standards of the time. This lifestyle was in direct contrast with the 'gentleman manager' image portrayal of a grazier described above. She suggests pastoralists often developed a hard-headed attitude toward life and that this toughness spilled over into the harsh treatment of Aborigines in the area who

were sometimes killed (interpreted by many people as murder) or forced to work for very little in the way of returns. The introduction of European diseases also reduced Aboriginal populations in the area significantly.

The attitude of many leaseholders was often one of pastoral care for the Aboriginal workers and their families with accommodation, food and clothing being provided for the worker's family. The women, children and elderly people were engaged in house work and general chores around the homestead. The Aboriginal men worked as labourers for very low wages developing and maintaining the grazing system, and much of the early success of the stations was due to their work efforts.

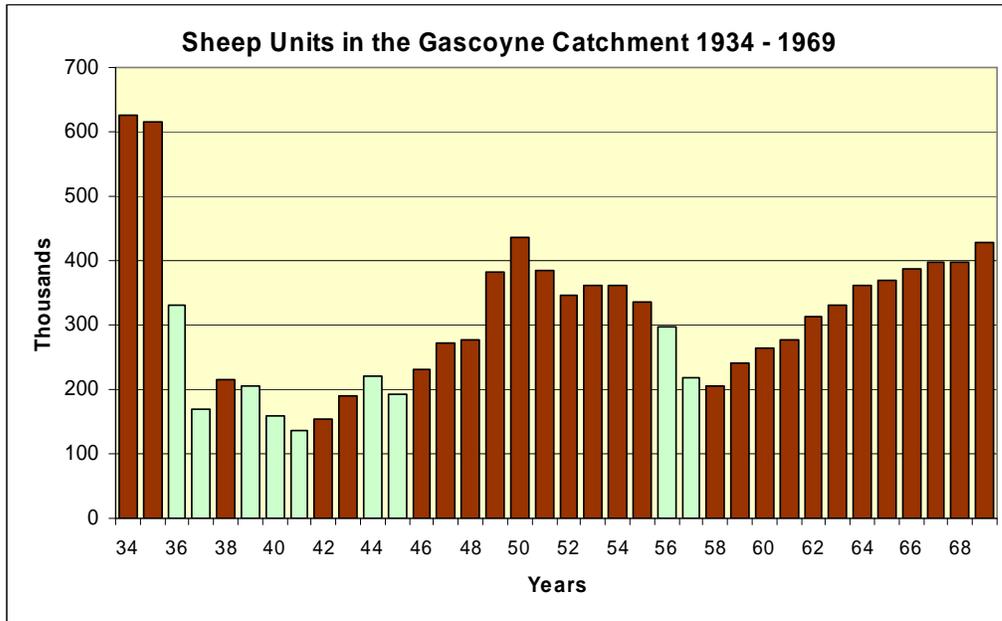
A number of Aboriginal men excelled as stockmen, a small number going on to become responsible for droving teams or as overall managers of the stations. Many of these men were mixed heritage, the result of Aboriginal women being raped or taken by European males as a sexual partner. Mixed heritage children were often disowned by both Aboriginals and Europeans and in later years became the focus for 'the stolen generation'. Because Aboriginal worker wages were lower than the average working wage, the leaseholder was able to afford to employ them and he usually had a number of workers (McDonald 1991).

The pastoral industry is almost entirely dependent on underground water sources and during the dry season they dug wells in the creek bed for water for the stock. The sheep grazed along the river banks and creek lines and vegetation was cut from the tops of the native shrubs that lined the rivers and creeks and fed to the stock to keep them alive. Pastoral development therefore tended to be in zones around these wells and much of these areas were 'mined' of the native vegetation causing major soil erosion and loss of perennial vegetation to sustain animals during times of drought (Curry *et al* 1994).

The Sandalwood industry and the discovery of gold both resulted in localized environmental impacts including abandoned mine pits, waste material and loss of vegetation. Few areas of higher country were used in these early times of settlement and there was limited infrastructure, mostly consisting of brush yards for confining animals at night or for shearing. By the early 1900's shepherding had been replaced by fenced paddocks and watering points and development now covered all land near the river systems and much of the inner regions as well. Camel and donkey teams were first established to cart stores, fencing supplies and wool for the stations and were often owned or managed by Afghans. During the 1920's these were replaced by trucks and as a result many of the camels were released into the wild and have since become part of the feral population in the area. However, these are more of a problem in the central regions than the Gascoyne or Murchison (Curry *et al* 1994).

Loss of native vegetation and soil erosion as a result of overstocking were already appearing in the mid 1920's around Carnarvon (Ammon 1966).

Graph 1.



**Low rainfall years: 1936, 1937, 1939, 1940, 1941, 1944, 1945, 1956, 1957.**

Source: Wilcox and McKinnon 1972.

As Graph 1 shows, after 1934/35 there was a significant drop in sheep numbers due to dry seasons and the resultant loss of perennial components of pasture. ‘The drought of the mid 1930’s coupled with high sheep numbers resulted in a large sheep loss and vegetation loss’ (Curry *et al* 1994, 24). Wool prices had reached a high in 1922 and remained high as sheep numbers continued to increase until they peaked in 1934 (see Graph 1). This encouraged high prices for the transfer of leases. Government expectations that pastoralists would be able to maintain high levels of production also resulted in high rental prices (House 1991). However, by 1938 wool prices were at an all time low and, combined with the impact of drought, leaseholders had to resort to cutting branches of mulga trees for the sheep to keep them alive. Sheep and native animals died in their thousands during this drought. (McDonald 1991).

This was a very difficult period financially for many leaseholders. Many had overcapitalised on their land. The situation was exacerbated in many cases when a single seasonal rainfall fell during the drought, encouraging leaseholders to buy in more animals, only to have them perish in the continuing drought (Ibid). The five year drought to 1939 resulted in substantial losses in vegetation, soil erosion and animal losses. Carter *et al* (2000) describes this period in the Gascoyne region as one of the eight major historical degradation episodes in Australia's rangelands.

Overstocking, inadequate lease development and lack of drought management by early pastoralists were recognized as major contributors to these events (House 1991). Curry *et al.* (1994) argue that all those involved in the industry, including leaseholders and government administrators had unrealistic expectations of the productive capabilities of the land in these early days of settlement as there was no information on what the impact of continuous grazing would do to the vegetation and soil. As a result leaseholders were encouraged by governments to increase their livestock numbers and unsustainable grazing levels continued until droughts and the productive potential of the land reduced numbers. They suggest that many of the more favoured areas remain degraded today.

The drought in 1940 dramatically reduced sheep numbers and the mediocre seasons of the 1950's allowed leaseholders to maintain a reasonable income. The carrying capacity and price of wool were used as the main base for fixing rentals and in 1949 the rentals were reassessed and as a result they were reduced by 61% in the Murchison-Cue area. Increase in rainfall in the early 1950's and late 1960's produced a corresponding rise and fall in stock numbers showing fluctuations in vegetation use for production. In 1952 the first research station to assist pastoralism was established at Wiluna. At this time the agricultural areas carried 80% of Western

Australia's sheep population and wheat-sheep farming became popular. Vermin became a problem in the eastern Goldfields and northern regions. Wool production remained dominant in the Western Australian rangelands (Ibid).

A survey of 33 leaseholders in 1953 carried out by the Bureau for Agricultural Economics found that 'On 30 of the 33 properties wool growing was the sole enterprise'. This survey also found that around half of the total labour costs on the properties were for wages paid. (The remaining costs were for shearing and other contract work). The report also suggested that the average labour force per property at this time ranged from a small amount of casual labour to 12 permanent men in addition to the leaseholder or manager, and quite a large proportion of the labour force consisted of Aborigines (Bureau of Agricultural Economics 1954, 5).

Heavy rains produced excess run-off due to land degradation of the catchment area and resulted in severe flooding in Carnarvon in February 1961. Soil from inland had been carried down the rivers into the Gascoyne River and had ended up covering the beaches and filling the harbour at Carnarvon (Ammon 1966). A report completed by Wilcox and McKinnon (1972) found that excessive overstocking in the past had resulted in severe local erosion and degradation of the native vegetation. Erosion was considered to be the major cause of land degradation in the Gascoyne region. They inform us that overgrazing in the Gascoyne catchment had resulted in over 3 ½ thousand square miles of the catchment badly eroded and a further 12,800 square miles degraded with some erosion. Only 7,944 square miles remained in acceptable condition, this being mostly hill or stony country.

Their report recommended that much of the region be removed from grazing altogether or be grazed intermittently with reduced numbers of stock. It also suggested that the existing system for determining the sheep carrying capacity

needed to be modified to suit the change in environmental data that was now available. However, the report raised conflict between leaseholders and government agencies because leaseholders did not agree with the recommendations. So although this report resulted in agreements to reduce stocking in the Gascoyne catchment over a period of 10 years, the lack of support by leaseholders resulted in the lapse of the agreement and little change in stocking rates in the region (House 1991; Morrissey 1984).

The ineffectiveness of regulatory approaches was revealed from these early survey processes resulting in changes to a more co-operative approach by government that now encourages participation by leaseholders in land management issues (House 1991). A comparable environmental report conducted by the Agricultural Department in 1985 found that a similar percentage of the Murchison, including areas in Mt Magnet, was severely degraded and eroded (Curry *et al* 1994). Current studies (see Chapter 6, Land Monitoring Systems), suggest the shrubland of the Gascoyne-Murchison is not in a dying state but is capable of responding to favourable seasonal conditions. However, they also suggest that around one third of species are potentially at risk of declining substantially throughout these regions due to grazing pressures (Watson & Thomas 2003).

Before the 1960's sheep numbers fluctuated in response to rainfall as there were few markets for sheep meat, and they remained on the station all their life. However, increased production in agricultural areas, and the development of the live overseas trade, has expanded opportunities to sell sheep since the 1960's. Improved seasonal conditions during the 1960's provided leaseholders with the opportunity to increase sheep numbers. The price of wool was higher during this period allowing leaseholders to regain income lost in previous decades (Curry *et al* 1994). Reduced

carrying capacities decreased sheep numbers to around 60% of early 1930's figures and vermin controls were introduced at this time because of increasing numbers of pests (Morrisey 1984).

In 1965 normal award wages for Aboriginal stockmen were introduced. Stations had formerly provided workers and their families with clothes and food and now that Aboriginal workers became breadwinners, it followed that they would assume financial responsibility for their families. As a result many Aborigines were displaced from stations (often their traditional country) and shifted to a depressing situation of towns without employment (Curry *et al* 1994). This displacement led to a decline in cultural traditions and health in many cases where they were no longer able to conduct traditional law ceremonies on their country. Ironically, the discontinuity in occupation of country also impacts on their ability to claim Native Title.

During the 1960's the costs of pastoral production were rapidly rising and it became increasingly difficult to maintain economic viability (Morrisey 1984). During the 1960's and 1970's a change in gender relations began to emerge and pastoral women became more dominant and began taking part in committees (Maisey 1979). By 1973 pastoralists in WA were in their fifth year of drought resulting in very low numbers of livestock and other herbivores and the sale of a number of stations. During 1973 and 1978 there was a union ban on the export of live sheep which affected the sale of sheep and in 1977 the rental for most leasehold stations was reduced.

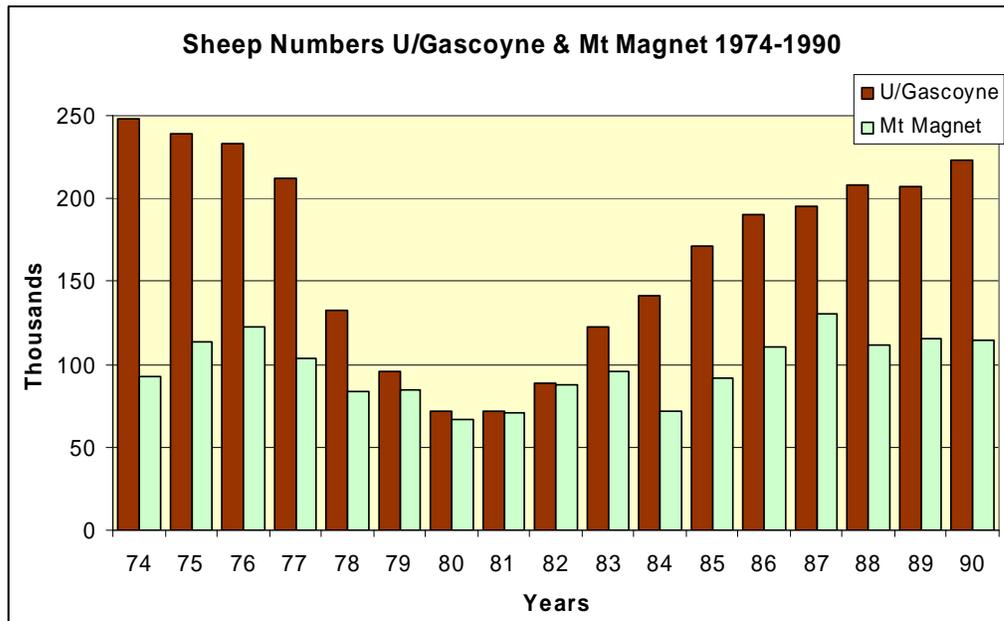
By 1980 drought had reduced sheep numbers to an all time low and they did not increase to reasonable numbers again until 1990 (Maisey 1979; Morrisey 1984). During the early 1990's another drought episode reduced animal numbers in the region again and consequently when an above average rainfall occurred during the

late 1990's there was a dramatic increase in the number of both livestock and other herbivorous animals. Livestock numbers during this period were almost double those at the end of the drought in 1980 and by 2001 remained over one and a half times as high as 1980 (McKeon *et al* 2004).

Good quality water has always been difficult to find in these arid rangeland regions and with the increase in watering points throughout the region there has been a growing demand on underground resources. The widespread use of artificial water sources reduced the number of areas where feed was in short supply during dry periods and effectively allowed animals to graze in areas that would usually have been abandoned. Native and feral animals that rely on natural water sources and would normally have died during dry seasons have been able to survive in areas not formerly habitable for most of the time (FAO 2001). The result of this has been significant increases in feral goat and kangaroo populations.

During 1974-1991 the Minimum Reserve Price Scheme was set by the Australian Wool Corporation and wool was purchased and stockpiled to stabilize future movement in prices. The value of Australian wool exports fluctuated for most of the 1990's and the excess of world wool production resulted in a steady decline in world prices and a difficult period for producers. The following graphs clearly show the difference in animal production between the 2 regions under study. Graph 2 demonstrates the large fluctuation in sheep numbers that occurred in the Upper Gascoyne and Mt Magnet Shires between 1974 and 1990.

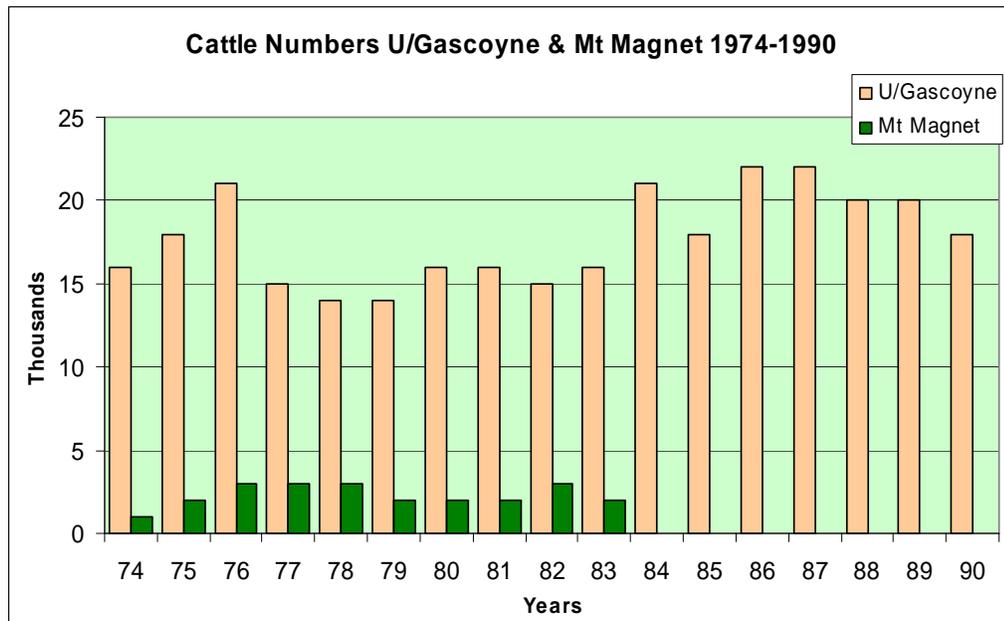
Graph 2. (NOTE: THESE FIGURES ARE FOR THE SHIRE REGION)



Source ABS Catalogue No. 7204.5

Graph 3 shows the big difference in cattle production between the two regions during the same period and the disappearance of cattle production in Mt Magnet during the 1980's. (ABS statistics changed after 1990 and livestock numbers were not printed in ABS data for shire regions only).

Graph 3.



Source: ABS Catalogue No. 7201.5

Land area for Upper Gascoyne and Mt Magnet Shires are;

- Upper Gascoyne Shire region 46602 km<sup>2</sup>
- Mt Magnet Shire region 13877 km<sup>2</sup> (Western Australian Whole of Local Government Portal 2005).

Over the last century, pastoral development has brought about major changes to the environment in the rangeland regions. The major drought episode in the early 1930's resulted in 'substantial loss of perennial shrubs, soil erosion and animal losses'. Combined with an increase in native and feral herbivores the result has been extensive removal or reduction of perennial pasture species and an increase of less palatable species or woody weeds, often in association with various forms of soil erosion. As a result, some form of land degradation has occurred over much of the region and has significantly lowered the productivity potential for current leaseholders (McKeon *et al* 2004, 24).

Pastoral lease inspections conducted in 2002/03 found that out of 52 stations inspected in the Southern rangelands 92% had land management and/or infrastructure issues compared with only 32% of Northern rangeland leases. The reason for this is that since the mid 1970's the Southern rangelands have experienced decreased commodity prices, adverse seasonal extremes, high total grazing pressure because of non-domestic graziers and a comparatively low level of investment in infrastructure compared to the Northern rangelands (Pastoral Lands Board & DPI 2003).

However, management practices have changed in recent years and rangeland conditions appear to be improving in some areas. Recent analysis of a network of monitoring sites established by the Department of Agriculture under the Western Australian Rangeland Monitoring System (WARMS) shows the perennial vegetation, and hence the condition of the rangeland in the Gascoyne-Murchison region, has improved in some areas over the last few years. However, this conclusion may be contentious (see Chapter 6, Land Monitoring Systems). Vegetation monitoring has now become an important tool in evaluating sustainable land use and many leaseholders considered this would become even more important in the future as a tool for accountability in their land use. A number of leaseholders mentioned they are developing their own monitoring systems as part of their station management plans. The survey completed by Braddick (2005) for the EMU project also found an increase in monitoring as a result of participant involvement in the process since a previous report by Shallcross (2002). The Department of Agriculture also provides the Pastoral Lands Board (PLB) with range condition assessments of individual leases as part of a regular program of lease inspection. The increased focus on research into the assessment, monitoring and management of rangelands

now provides many opportunities for both conservation and a more sustainable use of this extensive resource (Pastoral Lands Board & DPI 2003).

Today government agencies have an important role in the rangelands. The Pastoral Board has responsibility for administration of the pastoral lease, advising the government on pastoral industry policy, assisting with development of policies to prevent degradation of the rangelands and ensuring ecologically sustainable land use of pastoral leases. The Department of Land Administration (DOLA) and the Department of Agriculture also share responsibility for research, monitoring and management of the rangelands along with other agencies (Curry *et al* 1994; DPI 2003a). The role of the Department of Agriculture is to 'assist the State's Agriculture, Food and Fibre sector to be sustainable and profitable, with a clear focus on export-led growth' (Department of Agriculture Western Australia 2005, 1). The Department of Conservation and Land Management (CALM), has 'the lead responsibility for conserving the State's rich diversity of native plants, animals and natural ecosystems, and many of its unique landscapes' (The Department of Conservation and Land Management 2005, 1). These are the three main government agencies that interact with leaseholders. The Pastoralists and Graziers Association is a producer organisation aimed at supporting a free market system for producers while reducing impacts of government interventions (Pastoralists and Graziers Association of Western Australia 2005).

Wool was traditionally seen as a very suitable commodity for the development of Australia and has provided a significant economic benefit to the development of the country. However, since the introduction of synthetics after the 1950's there has been a steady decline in world demand resulting increasingly in the replacement of sheep production for meat rather than wool (ABS 2002). There has also been a strong

growth in cattle production (Ministerial Taskforce 2003). A growing percentage of Australia's live cattle and sheep trade is coming from Western Australia and this is having a big impact on the type of animal being produced in this state. Today, cattle exported to Asian markets generally consist of high Bos indicus type cattle such as Brahman or Droughtmaster cattle that are very hardy and able to survive during dry seasonal conditions. There are also increasing numbers of exotic sheep and goats being exported live (Livecorp 2004). (see Chapter 7, Animal Changes in the Upper Gascoyne and Mt Magnet).

The change in livestock production over the past decades has been driven by, and in turn driven, a huge increase in live animal export throughout Australia. Live sheep were first reported to be exported in 1845, and by 1895 around 1,000 sheep were being exported to Singapore. The current system of live export trade began in 1945/46 with a shipment of sheep also to Singapore. Regular trade to the Middle East was established during the 1970's, and continued to develop through the 1980's, expanding into countries such as Kuwait, Jordan and Saudi Arabia. Older animals that were heavier were considered to be better value for money by Middle Eastern markets at this time. These markets have now changed and the major reasons are because: the traditional preference for freshly slaughtered sheep meat handled according to Islamic religious beliefs, a lack of refrigeration and modern distribution systems and current emphasis on quality and leaner meat. Much of Australia's live exports now go to Middle Eastern markets (Livecorp and Meat and Livestock Australia 2003).

As a result most leaseholders in the Upper Gascoyne and Mt Magnet are now changing the type of animal they produce. However, these changes are having major impacts on the long-term viability of the industry. Most Middle Eastern markets are

concentrated in developing countries which are subject to economic and political instability and present significant levels of risk for long-term industry growth and stability (Ministerial Taskforce 2003). Problems with an aging shipping fleet, especially for sheep carriers, and a number of instances of high mortality rates during shipping have also caused concern for the industry. Animal welfare has therefore become an issue of major concern and protests continue to place pressure on the industry (RSPCA WA (Inc) 2005).

The changes in wool and meat markets, combined with deterioration in land resources, also appear to be influencing changes to the size of stations. This has currently occurred to a greater extent in the Upper Gascoyne than Mt Magnet, and is explained in the following sections. The change in the type of animal now being produced in these regions has also resulted in the predominance of animals that survive by feeding on different layers of vegetation than Merino sheep. Plant species most palatable to Merino sheep and kangaroos have been substantially degraded by overgrazing in the past (Curry *et al* 1994; Wilcox and McKinnon 1972) and this change in grazing pressure raises questions about the sustainability of the natural resource in these regions (see Chapter 6, Changes in Land and Animal Management).

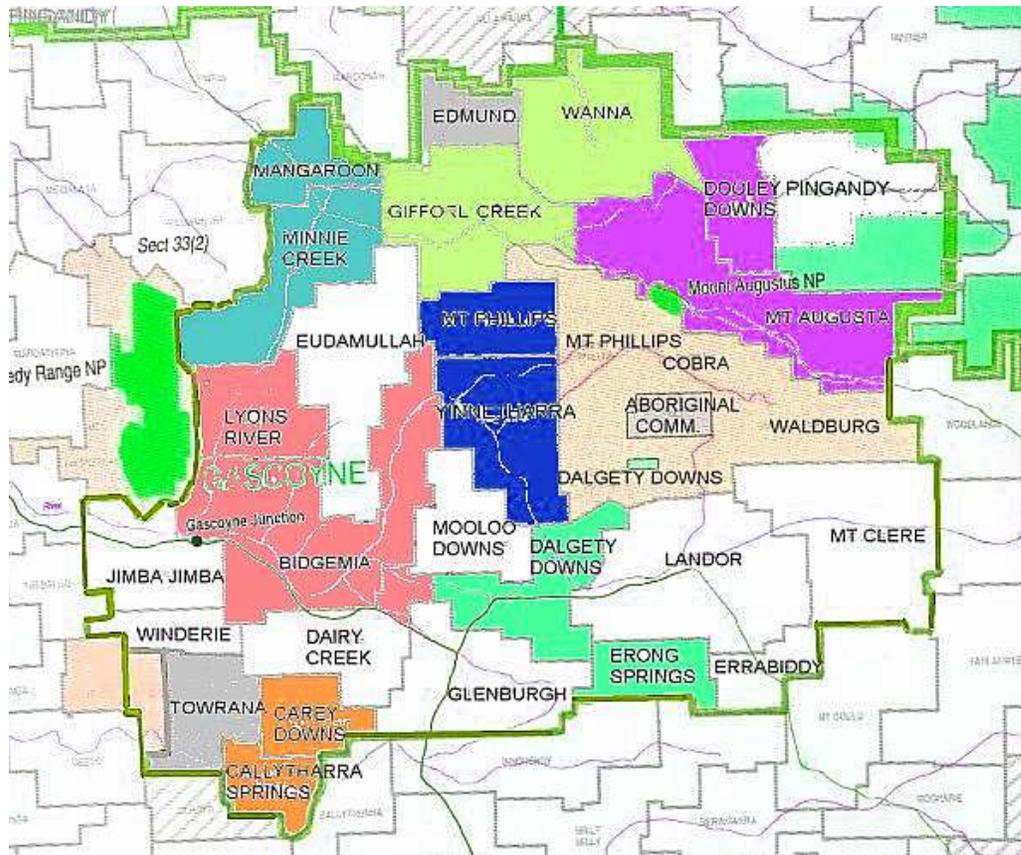
#### CHANGE IN STATION SIZES

In 2003 the Pastoral Lands Board (PLB) listed the Upper Gascoyne Local Government Area as containing 28 pastoral stations. However, two of these, Williambury and Woodlands, only have a small portion of their property within the LGA boundaries and were not included in the present study. These twenty six stations within the Upper Gascoyne Shire are currently being managed by 19 different lessees. Two of these 19 stations are currently Aboriginal owned, one of

which has an Aboriginal lessee (see Map 6). Map 6 of the Upper Gascoyne region shows the ongoing change in station lessees occurring within the last three decades.

Map 6.

**MAP OF UPPER GASCOYNE SHIRE STATION AMALGAMATIONS WITHIN THE LAST THREE DECADES.**



In 1970 there were at least four extra stations in the Gascoyne region than in 2003. These were Mt James station with an area of 154,317 hectares which was sold in 1978 to the Burringurrah Aboriginal Community. Coordewandy station with an area of 60,674 hectares and Yalbra station were both amalgamated into the Glenburgh station in 1959 and 1982 consecutively. The government has recently bought two other large stations, Cobra and Waldburg that existed as pastoral stations in the 1970's as well as part of Mt Phillips and Dalgety Downs stations. This area is now

combined into one large nature reserve that is being managed by the Department of Conservation and Land Management (CALM).

Pimbee station, part of which is in the south-west corner of the Upper Gascoyne area, has also been purchased by the government for conservation purposes. Small areas adjacent to the Kennedy Range National Park in Lyons River, Bidgemia and Jimba Jimba stations have also been excised for inclusion into the National Park. Two stations, Edmund and Towrana, are now being managed under Aboriginal ownership.

Changes in Upper Gascoyne Stations 1970-2003:

- Mt Sandiman and Minnie Creek were combined in 1973 and Mangaroon was purchased in 1984. This land is now managed by one lessee from Minnie Creek,
- Mt Augustus and Dooley Downs came under the management of one lessee in 1984,
- Wanna and Gifford Creek also combined management under one lessee in early 1990's,
- Lease bought and combined management, Carey Downs 1975, Callytharra Springs, 1984,
- The Nonning Pastoral Company (which was the McTaggart family company) purchased Bidgemia in 1946 and Lyons River in 1958. Current lessees purchased both properties, when the family partitioned the land in 1986,
- Mt Phillips and Yinnitharra combined management in 1990,
- Dairy Creek purchased and amalgamated Yalbra in 1982,
- Dalgety Downs has changed leaseholders 3 times since 1977 and was last purchased in 1997 along with Erong Springs, and management was combined in 2003. A portion of Mt Phillips and Dalgety Downs were sold to CALM in 1999.

The PLB listed 18 stations in the Mt Magnet Local Government Area. Windimurra is listed by the PLB as a pastoral station within the Mt Magnet region; however, only a

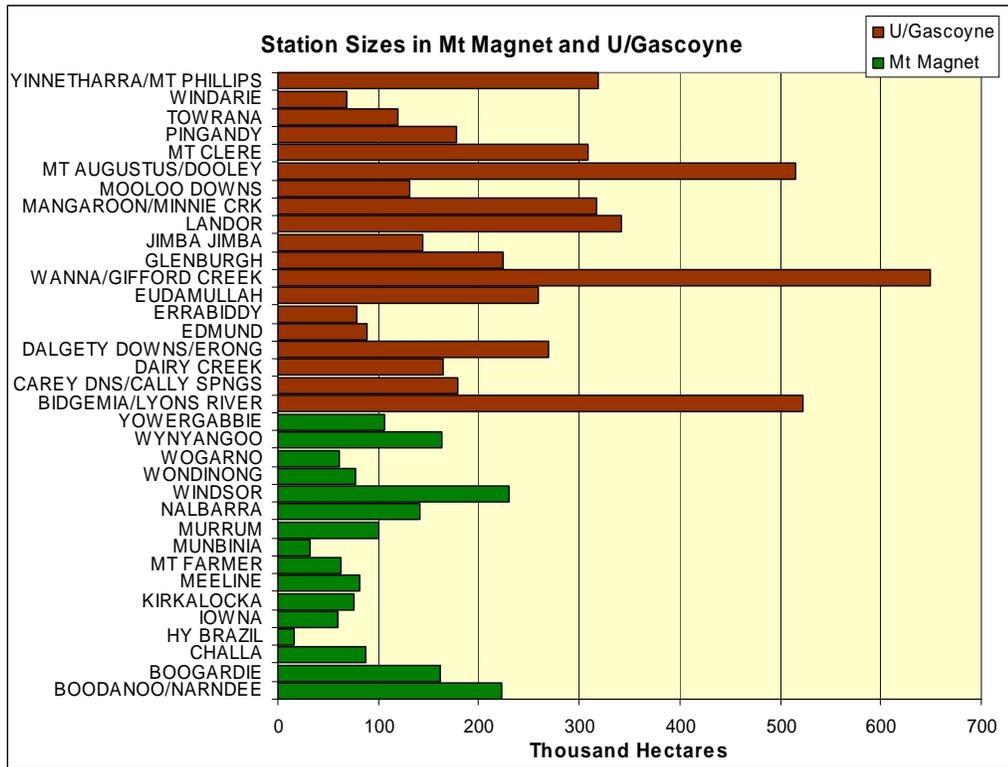
small portion of the station is within the LGA boundaries so it was not included in this study. Two stations are now managed by one leaseholder. Wanarie station is also in the Mt Magnet region but was not listed by the PLB as a pastoral station as it is now under Aboriginal ownership and currently not being managed as a station. Therefore, for the purposes of this study the number of stations in the region was 16.

#### Changes in Mt Magnet Stations:

- Boodanoo and Narndee were purchased from Kirkalocka 15 years ago. Now managed with Wynangoo as one station by two brothers (included in this study as one station with one lessee).
- Iwona was purchased by the current leaseholder about 15 years ago,
- Nalbarra was purchased by the current leaseholder 15 years ago.

The average size of pastoral lease holdings in Western Australia is around 200,000 hectares (Productivity Commission 2002). As can be seen from Graph 4, the stations in the Gascoyne region are representative of this figure while those in the Mt Magnet region have an average size of only half that area.

Graph 4.



One of the major differences between the two regions therefore is the large number of changes in lease ownership and Government land acquisition that have recently occurred in the Upper Gascoyne region compared to the relatively few changes in the Mt Magnet region. Of the 26 leases included in the Upper Gascoyne study region, within the last two to three decades, 14 have combined and are now managed by seven individual leaseholders, four have been bought by either the Department of Conservation and Land Management (CALM) or the Indigenous Land Council (ILC) and portions of two other stations have been acquired by CALM. Also within this period, one other lease was bought and amalgamated within an existing lease. As a result within the last two to three decades, the number of leaseholders in this Upper Gascoyne region has decreased from 28 European leaseholders to 17 European and one Aboriginal leaseholder, and one other Aboriginal owned station that is also being managed.

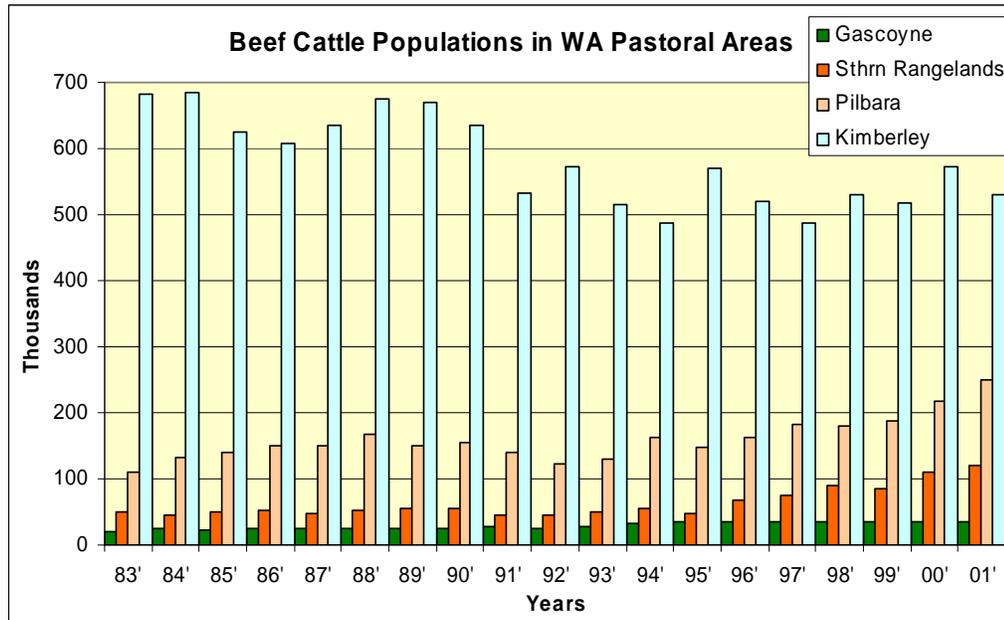
Of the 16 stations in the Mt Magnet study region, one lease was bought from another station and is now managed by two brothers as one station, resulting in 16 leaseholders overall in the Mt Magnet region. Changes in the Upper Gascoyne appear to be due to a number of factors including the sale of land to CALM for conservation and/or tourism or to neighbouring pastoralists and/or the sale of potentially unviable pastoral land to CALM or the ILC. The change to cattle generally required an expansion of land and this doubtless explains the number of leaseholder acquisitions and combining of leases in the region. These changes have contributed to a continuing decline of people and services and a breakdown in the general cohesion of the Upper Gascoyne community, leading to questions about the sustainability of community life in this region (see MacGregor & Fenton 1999).

There are two other reasons why a significant number of amalgamations of leases have occurred in the Upper Gascoyne region and not in the Mt Magnet region. One is because of past land degradation in the Upper Gascoyne that was encouraged by the prolific growth along the river regions. Much of the natural vegetation that was consumed by sheep has disappeared from the region. The reasons for increased production of cattle on this land appear to be due to the abundant growth of Buffel Grass. This does not grow very well in Mt Magnet (see Chapter 6, Buffel Grass). The other reason is because of the wild dog problem which has forced leaseholders to change to cattle because they are less likely to be killed than the smaller animals (see Chapter 7, Animal Changes in the Upper Gascoyne and Mt Magnet). Interestingly, the report by Dalton (2003) concluded that many stations in the Mt Magnet region may not be sustainable in the medium term because of the small sizes of the leases and suggested the need for restructuring leases to maintain profitability. Graphs 5

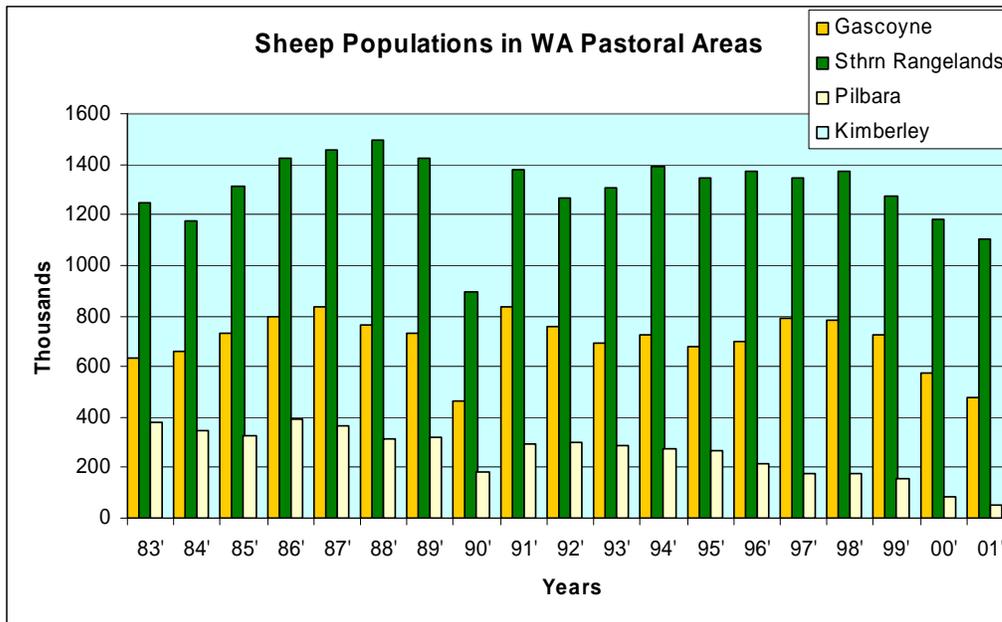
and 6 show the changes that have occurred in animal production in the pastoral regions of Western Australia compared to the State as a whole.

Change in Proportion of State's Animal Production In Pastoral Regions

Graph 5.



Graph 6.



Gascoyne: Includes Carnarvon, Upper Gascoyne, Shark Bay and Exmouth Shires.  
 Lower Southern Rangelands: Includes Meekatharra, Wiluna, Murchison, Cue, Yalgoo, Mt Magnet, Sandstone, Leonora, Laverton, Menzies, Coolgardie, Kalgoorlie-Boulder and Dundas Shires.

Source: ABS, Department of Agriculture.

**GEOGRAPHIC HISTORY IN THE TWO REGIONS AND ITS IMPLICATIONS.**

The geomorphology, climate and vegetation of the regions are somewhat different and have resulted in different erosional impacts. The Gascoyne region was formed more recently and has greater height variation than the Mt Magnet region, containing monadnocks or large rocks left after cycles of erosion have occurred in the past. The largest of these is Mt Augustus. Mt Magnet on the other hand is located on the large, old plateau of Western Australia and has an overall gently undulating surface. Gascoyne is also a region containing large rivers which carry the water to the sea while Mt Magnet is an area of internal drainage where the water flows into inland lakes such as Mt Austin, a dry lake that only contains water after heavy or continued rain. Natural erosion in Mt Magnet was therefore due to the general forces of wind and rains breaking down the rock whereas the main form of erosion in the Gascoyne

region was caused by rivers dissecting the plateau which formed the present land surface (Jutson 1950).

The regions evolved without large numbers of grazing herbivores and the vegetation adapted over millennia to survive on the large floodplains and peneplains without grazing pressures. The reduction of protective vegetation cover by grazing animals particularly during the 1920's and early 1930's reduced plant biomass, causing the soil to become dry and resulting in loss of the permeable surface and the subsequent increased runoff of water. These impacts have significantly changed the environment by inducing a more arid ecosystem. In the Gascoyne water levels in creeks and rivers have been lowered resulting in the catchment drying out a lot more quickly than it used to and increased erosional processes (Wilcox and McKinnon 1972).

The surfaces of these river beds are dry throughout most of the year, except for a few permanent water holes, but heavy intermittent rainfalls between February and August occasionally produce strong torrents of water. The river flows are essential to the region as they re-charge the aquifers in the river bed which provide large amounts of groundwater (Gascoyne Development Commission n.d.). The Gascoyne's sub-tropical weather and cyclonic rainfall produces a profuse abundance of vegetation during good seasons. In the early years of settlement, this created false assumptions by most people involved in the industry that there was abundant feed for livestock and resulted in the build up of numbers in livestock causing overgrazing and degradation along the river banks (Curry *et al* 1994).

Gascoyne and Murchison regions are both part of the geographic area known as the arid Mulga woodlands which occupies the central third of Western Australia. The shallow stone or clay soils support semi-arid or arid scrub with little or no tree cover.

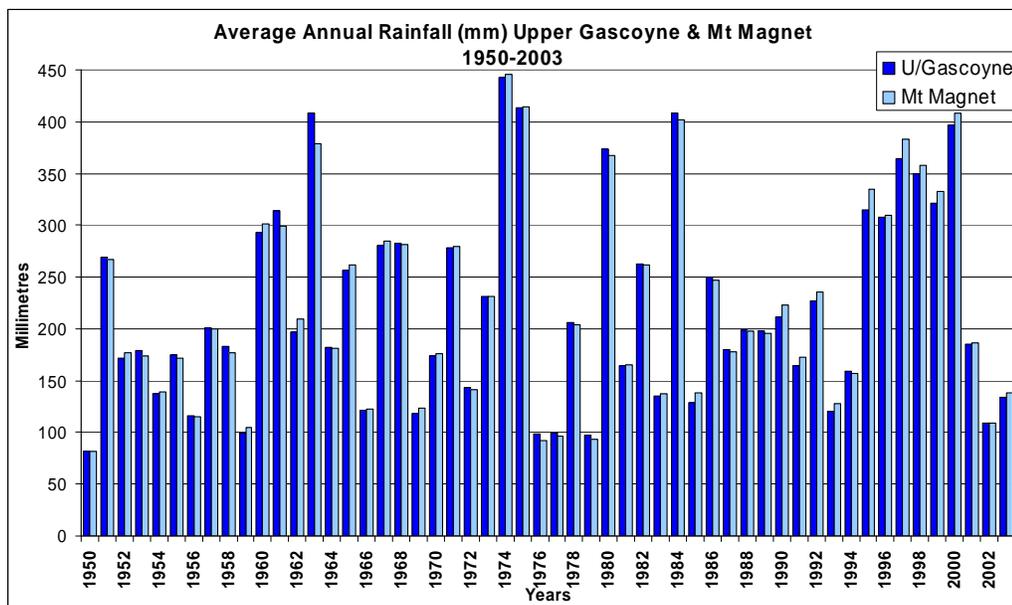
The natural vegetation has not been cleared over much of the area and is dominated by Acacia and Eucalypt scrub intersected by pockets and narrow strips of alluvial soils supporting chenopod shrubs. These include Saltbush and Bluebush which are high quality feed for stock. Even though the soils are highly weathered and unfertile, the redistribution of soil and nutrients by the forces of wind and water results in areas where there are better soils.

So even though the landscape may appear characteristically flat there are patches of water and nutrients that concentrate around trees or bushes or in small depressions. These areas are the key to productivity in the area and are very important for native plants and animals as well as the pastoral industry. These areas are usually overgrazed and eroded and in most need of better management. The major cause of variation in production of sheep and cattle within the Mulga woodlands region, however, is rainfall, although management can reduce the impact of seasonal conditions (Morrisey 1984).

As can be seen from the following graphs, the areas have no well-defined wet season but are subject to both summer and winter rain-influenced production. Both areas are located in the driest area of the State and are subject to high levels of evaporation (National Land & Water Resources Audit 2001). The hot, dry climate of the Gascoyne region can be measured by the three hundred and twenty days of sunshine it experiences each year. However, the area is also subject to the most erratic and irregular rainfall in Australia with huge fluctuations in weather conditions. 'Thirty to fifty percent of rainfall is the result of cyclones or tropical depressions' (Countryman 19 June 2003, 2). It experiences the intense heat of the northern wet season and the cooler winters of the south.

Mt Magnet on the other hand is situated further south and inland. The area is part of the ancient, flat, weathered Yilgarn block and contains no rivers or creeks (National Land & Water Resources Audit 2001). It is located in arid weather zones with extreme conditions of hot dry summers and cool wet winters with frosty nights. Mt Magnet has a well defined winter wet season with shorter, cooler growing seasons than the Gascoyne region. The rainfall in the Mt Magnet region has a mean annual average of 238 mm and is also unreliable with most years experiencing dry spells of four to six months. Mean annual rainfall in the Gascoyne is slightly lower, with around 215mm per year (BOM 2003).

Graph 7.



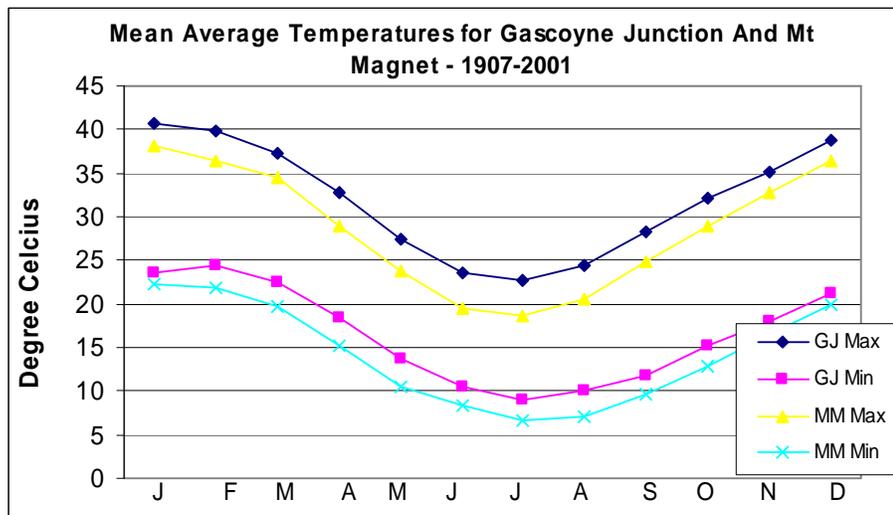
Source: BOM 2004, pers. email.

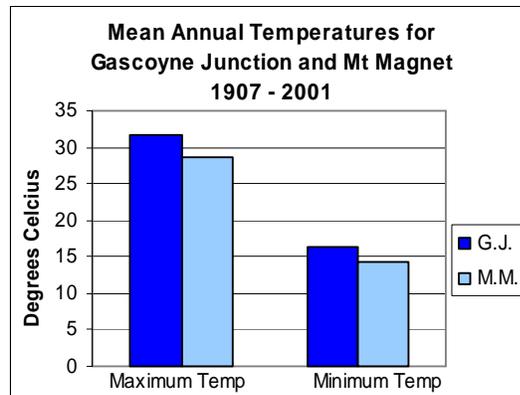
Graph 7 shows average rainfall from most stations in the Upper Gascoyne and Mt Magnet regions. It demonstrates there is no difference between the annual rainfalls recorded on stations in these two regions over the last 50 years. It also demonstrates there are no significant overall rainfall trends. Curry *et al* (1994) inform us the availability of soil moisture due to rainfall is considered by scientist to be the most

important factor influencing plant growth in these regions. Their studies suggest that the major growing season is during the winter months. Mt Magnet has very high chances of having effective winter growing seasons.

Therefore the major difference in effective rainfall for vegetation growth between the two regions is the large inter-annual variation. The Upper Gascoyne receives more of their rainfall in summer than Mt Magnet and much of it is in the form of cyclonic rains. The high runoff and high evaporation at this time of the year therefore limits growth. So even though the Mt Magnet area has a similar overall annual rainfall to the Gascoyne, the more even distribution of rainfall and the lower evaporation of the Mt Magnet region results in plant growth over longer periods of time and causes less erosion than the heavy summer cyclonic rainfalls of the Gascoyne region. Graphs 8 and 9 show temperatures for the regions.

Graphs 8 & 9, **Temperatures for Gascoyne Junction and Mt Magnet**





Source: BOM 2003.

Mean daily temperatures in Mt Magnet reach around 28°C with temperatures in January averaging around 38°C. This compares with the higher mean daily Gascoyne temperatures of 32°C with January temperatures averaging over 40°C. Winters have mild daytime temperatures in both regions but Mt Magnet experiences cooler night temperatures sometimes dropping below 0°C (BOM 2003). This difference in productive capacity was demonstrated by the different carrying capacities. These factors also potentially account for the different sizes of stations between the regions.

## **Summary**

Both the Upper Gascoyne and Mt Magnet regions have suffered severe land degradation in the past due to a variety of complex factors, one element of which is man's interaction with nature through grazing of introduced animals. Today the focus of development is aimed at natural resource management for ecological sustainability and traditional grazing practices are being questioned by an increasing number of people in the wider community (Ash & Stafford Smith 2002; Holmes 1994a; Luciano & Vanclay 1996; Mackenzie 2000; McManus & Albrecht 2000; Shulman & Penman 1994). However the concept of sustainability is vague and often has different meanings for different people creating barriers for leaseholders to change to more sustainable land use practices (see Chapter 6, Rangeland Use and Barriers that Arise for Sustainability).

## **CHAPTER 4**

### **ECONOMIC, POLITICAL AND TECHNOLOGICAL DRIVERS OF CHANGE**

The socio-economic, technological and policy factors that have formed the current situation in the Gascoyne Murchison region pastoral and grazing industry and their sustainability are examined in this chapter. The use of lease tenure as a government tool to manage rangelands in the past is revealed as a significant issue of concern for leaseholders today. The chapter also explores how technological innovations have influenced change. Chapter 4 complements Chapter 3 in providing a broad overview of the events and values that have influenced the direction and form of development in pastoralism and grazing we see in these regions today.

#### **ECONOMIC DRIVERS OF CHANGE**

Leaseholders in the Western Australian rangelands during the 1950's were still getting a very satisfactory return on their money. A survey undertaken by the Bureau of Agricultural Economics of sheep and wool properties for the year 1952-53 found the average rate of return on capital was over £21,000, amounting to around 40% rate of return on capital. (Bureau of Agricultural Economics 1954, 2). However, there appeared to be little incentive to use this money for capital improvements in the rangelands of Western Australia. This was because the land had low market value so any improvements that were completed contributed little in the way of increased market value for the land. The value for the land and improvements was only one third of the total capital value in WA, whereas in other States it was far more. In the Queensland pastoral zone the value of land and improvements represented 64% of the total capital value. The low market price for these leaseholdings was because:

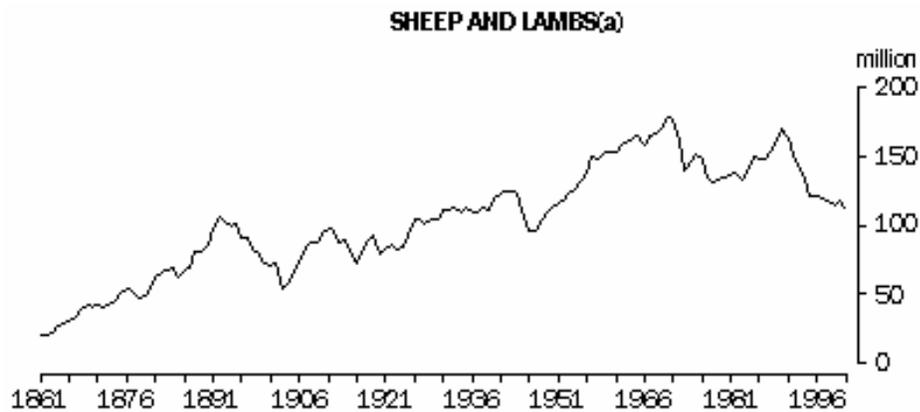
1. there was a high degree of risk involved in pastoralism in the Western Australian region, much of which was due to the low and erratic rainfall of the region,
2. there was a lot of capital involved in these enterprises,
3. the demand for these enterprises was low as a producer required a financial institution with a flexible credit policy to enable them to operate efficiently,
4. it was difficult to find competent managers so the owner was obliged to operate the station himself (Bureau of Agricultural Economics 1954).

So in many cases the market value was well below the costs of the original purchase price of the enterprise and the costs of subsequent improvements (Ibid). The difficulty today is that these factors remain constraints to pastoralism and grazing while profit margins and land value trends have reversed. Comments from leaseholders in the Upper Gascoyne and Mt Magnet suggest that difficult operating conditions, minimal profits and increasing land values for pastoral purposes are making the future of pastoralism and grazing a discouraging prospect for many young people. The recent evaluation of the Gascoyne-Murchison Strategy revealed there are now a large number of properties for sale which is having an unsettling effect on individuals and the community (URS Australia PTY Ltd (URS) 2004).

Changes in global and national focus since the 1970's, resulting in a more economic rationalist approach and less intervention, have contributed to a pattern of decline in rural and regional Australia (McKenzie 2000). (Environmental factors have also played a role in this decline). In recent years pastoralism and grazing has been greatly affected by declining wool prices. '...the declining terms of trade for wool (the prices received for wool deflated by the index of prices paid for farm inputs) has declined much faster than has the overall terms of trade for all Australian farming as

a whole' (Centre for International Economics 1997, 8). One of the major reasons is the increase in alternative fibres on the market. While Australian rangeland wool production still contributes 3.8% of the world's wool production, this only represents 0.4% of the world's apparel fibre (Robertson 2002). Graphs 10 and 11 show how the growth of sheep numbers and the resultant downturn in wool prices trigger a reduction in sheep numbers and demonstrate the trend in primary production toward oversupply.

Graph 10. **Sheep and Lamb Numbers in Australia.**



(a) Data for 2001 are preliminary.

Source: *Agriculture, Australia (7113.0)* — recent data; ABS data on request, *Agricultural Commodity Collections* — historical data.

Graph 11. **Price of Wool in Australia During the Last Century.**



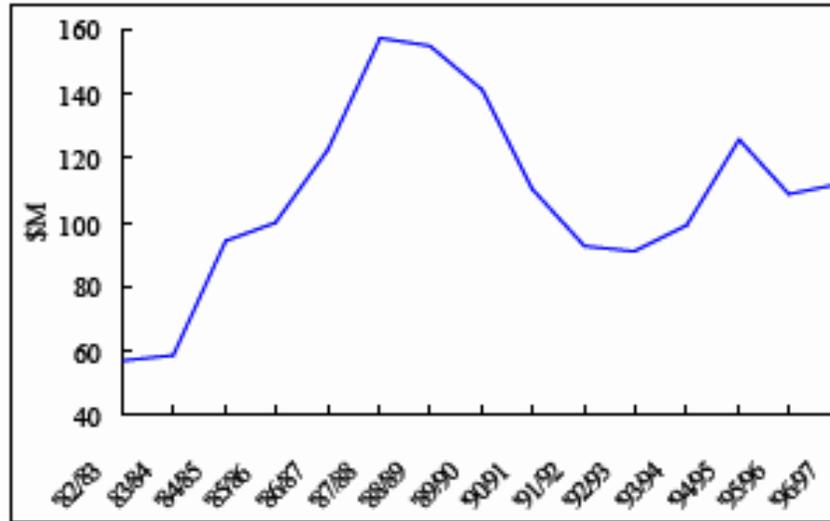
(a) At 2001 prices

Source: *Agriculture, Australia (7113.0)* — recent data; ABS data on request, *Value of Agricultural Commodities Produced* — historical data.

Source: ABS, 2002.

As Graph 11 shows, sheep numbers in Australia and Western Australia peaked during the 1960's, and continued to increase until 1990, partly caused by land clearing in the Great Southern region during the 1960's and 1970's. The general decline since 1990 throughout Australia relates to lower wool prices from 1989 (ABS 2002). McKenzie (2000) informs us the mid 1980's experienced a fall in commodity prices and the decline in the social fabric of the community and it became more difficult for the smaller properties to make a profit. He suggests the overall variability of the average income and profit received by rangeland producers during the 1990's was mostly due to fluctuations in seasonal conditions and commodity prices. He explained that producers experienced steady declines in income and profit through the early 1990's and a small decline in the mid-1990's. Graph 12 shows the contribution of the southern rangelands to the State's gross value of agricultural production (GVAP) from 1982-97. Annan & Dearden (2000) suggest the drop in GVAP between 1988-9 & 1991-2 was almost entirely due to a collapse in wool prices.

Graph 12. **Gross Value of Agricultural Production (GVAP) 1982/83 to 1996/97: Southern Rangelands.**



Source: Annan & Dearden 2000.

The Productivity Commission (2002) reports that poor market conditions for wool and unusually favourable seasonal growth conditions since about 1993 stimulated optimistic increases in cattle numbers. Cattle prices doubled in 5 years and by the beginning of 2002 beef prices were reaching record levels. Wool prices also began to rise dramatically at this time and were the highest they had been for a decade. By 1999/00 the average farm cash income for both corporate and family enterprises had doubled since 1995/96. However, dry seasonal conditions over much of Australia in the last 4-5 years have dramatically reduced both sheep and cattle numbers and the income for many family enterprises has therefore declined.

The level of income that leaseholders receive is a major determinant of their resilience and vulnerability and has huge impacts on their potential opportunities to make changes to production systems and improve sustainable land use practices. The Productivity Commission (2002) reported that in recent decades there has been an increase of leasehold properties being managed by large corporate entities dealing

mostly with the production of beef cattle. Most of these are located in the Northern Territory and their ability to take advantage of good seasonal conditions and improving prices for beef has contributed to their significantly higher returns than those leasehold properties managed by families.

The incomes of many small family leaseholders have been severely affected with many currently receiving an income below the Australian average. However, even amongst family-based enterprises there is a wide divergence of income distribution due to the operating characteristics such as location and size of pastoral lease, the seasonal conditions and management strategies. This report also pointed out that a survey carried out by the Australian Bureau of Agricultural and Resource Economics (ABARE) found that in 1999-2000, the difference in distribution of income amongst family enterprises ranged from \$200,000 earned by the upper 20% of enterprises to \$30,000 or less earned by the lower 40% (Productivity Commission 2002, 17).

An economist's report for the Gascoyne Muster Sustainability Working Group by Dalton (2003) found that leaseholders who had recently changed from sheep to cattle were currently in a good financial position because of their sell-off of stock. However, the report also proposed that their future cash flow is likely to be negative as they rebuild their herds (see leaseholder comments in Socio-economic Drivers of Change). Dalton also suggested that the effects of wool prices will be reduced in the future because of the change to meat sheep and goats. The report concluded that pastoralists will continue to face declining terms of trade even though future commodity prices are predicted to remain positive (Dalton 2003).

In recent decades the overall contribution of pastoralism and grazing to the economy of Australia has been declining. Current studies now show that rangeland pastoralism in Australia is an insignificant economic activity consisting of less than 0.2% of GDP

in 1996/97. Table 6 reveals the total contribution of the rangelands to Western Australian Agricultural production for 2000/01 was around 10%. It also shows that Southern Rangelands production in 2000/01 was only one third of production for the Northern Rangelands.

**Table 6. Productive Value of the Rangelands in Western Australia - 2000-01.**

	Southern Rangelands	Northern Rangelands	Total Rangelands	Western Australia
	\$'000	\$'000	\$'000	\$'000
Cattle and Calves	35,013	176,017	211,031	458,401
Sheep and Lambs	12,425	13,364	25,789	308,405
Total value of Agriculture	106,019	306,865	412,884	4,387,184

Source: ABS, Dept of Agriculture, cited in Pastoral Lands Board & DPI 2003, Pastoralism for Sustainability, App.3

What is more damning for the pastoral industry is that in financial terms, pastoralism in most areas costs the Australian community more than it benefits them. That is, ‘the total variable and fixed costs associated with generating this revenue was greater than the revenue’ (Fargher *et al* 2002, 41). In this respect the industry is not in net economic balance, and the industry is therefore not sustainable. But pastoralists are seen by urban communities to have contributed much to the development of Australia in the past and are valued today for their contribution to the economy and their Australian cultural identity. Therefore this imbalance/subsidy currently has an on-going justification from the point of view of society.

However, the study by Nicholls (2000) found that overall urban preferences for rangeland use are mostly for the consumption and protection values of conservation and ecotourism (see also Chapter 5, Cultural Drivers of Change). These results imply wider community attitudes may not support continued public funding of pastoralism in the future. It is of interest to note that Fargher *et al* (2002) argue that despite the growing significance of multiple-use in rangelands there is very little information on

the socio-economic activity from other land uses, such as mining, tourism or Indigenous sectors.

#### SOCIO-ECONOMIC DRIVERS OF CHANGE

During the last decade to 2000, leaseholders in Australia reduced debt levels and increased investment in capital assets (Productivity Commission 2002). The current Upper Gascoyne and Mt Magnet study did not include questions of income so it is difficult to know whether these leaseholders followed a similar trend. However, most leaseholders took advantage of the Gascoyne-Murchison Strategy funding during this period to upgrade their infrastructure and buy new land, animals or equipment. Leaseholders were generally required to match this funding on a dollar-for-dollar basis.

Some leaseholders discussed the significant debt levels that wool production generated and strategies they developed to overcome this difficult situation. These included a change in the type of animal they produced that allowed them to improve their cash income. The following leaseholder explains the difficulties he had with Merino wool production and the financial benefits of his change to feral goat management. This change was relatively easy because there was no financial outlay for the animals. He also changed at a time when the price being paid overseas for goats was beginning to increase and he has been able to take advantage of an expanding industry with limited supply.

'I lost a million dollars in 10 years and I just got sick of it. ..we had a 15 year drought and then about 7-8 years of good seasons and now I think we're in about our third year of drought again. Every drought when you're running sheep just reduces your production and you can't ever get sheep to respond back to where they were, they will never get back to their original numbers or condition, and the cost of production of sheep is what kills the sheep industry.

I sold all my sheep and got rid of my debt, or the majority of my debt, and basically in 2 years I was fully stocked with goats. I never ever paid income tax while I was running my sheep, but since I sold my sheep and now I'm running goats I paid income tax 3 years in a row so that speaks for itself' (male 40s).

Many leaseholders have difficulty accessing finance. This is generally due to factors such as level of risk involved, past financial history of the industry and the ability of the leaseholder to repay. This leaseholder provided an interesting account of some of the difficulties that leaseholders face, such as dealing with animal diseases and accessing finance, and the strategies he developed to overcome his predicament. His comment reveals the challenging situation some leaseholders face with having to borrow and repay large debts.

'We converted to Brahman cattle in 1993. ... we did have sheep up until 5-6 years ago and we built up a huge debt while we waited for the wool industry to recover. We only just got out in the nick of time. If we had stayed in any longer we probably would have been gone. Because refinancing is always pretty tough, and we sort of carried a big debt, and are still carrying a debt somewhat from the sheep days. And then we were affected by tuberculosis at the same time so it put a lot of pressure on that we could have done without. We still had sheep when we had to get rid of our cattle but we couldn't make anything off them and were still losing money. We had a rapidly growing debt with sheep. We knew once we did get through the period without cattle that we could start re-stocking. Admittedly you had to go and borrow money still, but there was an interest rate subsidy that you could apply to your loans, but you had to get your loans first, which was the hard thing and trying to borrow the money in one hit was impossible. You could only borrow small amounts and the time available to restock was rapidly running out and we actually weren't able to fully utilize our restocking.

We weren't able to refinance and borrow enough money to get back all the benefits that were offered because you can't borrow all that money in one hit,

or you've got a huge debt and you're trying to build up breeder numbers and create some turnoff out of it. You can't borrow money on leasehold country unless it's through a stock firm, but on the B.T.E.C., you're forced into these things to comply with the quarantine order and there's only 2 options, you get a testing procedure which is very drawn out and needs a lot of infrastructure to be carried out properly, or you've got to destock and that's the only option you can do in our situation. You're forced to do that by the Ag Department but they don't lend you the money to refinance. You've actually got to go to a stock firm and get the money and there's no way known you can get enough money to restock to what breeder numbers you started off with before the destocking order. You've got to get the money off stock firms at their interest rates and they don't give you the full amount straight away. We had to get it in bits and pieces, probably half a dozen bites at that. You've got all these different loans and you're trying to pay the interest rates and borrow money and do interest rate subsidies and claims and it's just never ending. It's hopeless actually' (male 40s).

Funding from the GMS appeared to be an important catalyst for the substantial increase in changes that began to occur around this period. These leaseholders explain how they have used the funding to improve their production systems. Having funds of their own to be able to access the government funding was an important factor. A number of leaseholders commented that they either did not access funds or only accessed limited funds because of this factor. (see Chapter 9, Gascoyne Murchison Strategy).

'We converted to cattle about 8 years ago, slowly converted to cattle.'(1995)  
The Gascoyne Murchison Strategy came along and we were able to access the renewable energy and water funding and to convert to cattle. We have had staff here setting up all the waters and building the yards for the cattle, because we built about 9 sets of yards in the last 8 years, so we've got more watering points' (female 40s).

‘In the last 12 months or so we've just built about 50 TGM yards here. ...Even doing these TGM yards and other work that other people have done through the Gascoyne Murchison Strategy, Ok there's a certain amount of money that we've got through there but it's cost us an awful lot of money of our own. Luckily we had a couple of decent shearings and had some income of some description to virtually plough back into the station’ (couple 50s)

However, the poor seasonal conditions that have occurred over the last 3-4 years have now reduced animal numbers again and therefore the possibilities for maintaining incomes and debt reduction over this period have also been reduced.

‘We were running 8000 sheep and 3 ½ thousand lambs 4 years ago and by Christmas we'll be down to 2000 grown ewes and that's it, so that's been a big change for us’ (female 30s).

Leaseholders explained how the dry seasonal conditions have forced many to sell their animals they would normally have maintained. They have therefore sold their potential income for the immediate future which will leave them with a significant period of time without any source of income. This leaseholder explains the situation.

‘..a lot of individuals are under a lot more stress, we haven't got anything to market anymore, we've got no produce. It's hard to improve a business that's not producing anything. ... I think the drought is just beyond anyone's control and I don't think we'll actually feel the true effect for another 18 months, people are still treading water. ...I think the drought changes everything, everything is put on hold at the moment’ (couple 50s).

These situations create huge financial pressures and stress for both individuals and communities alike and demonstrate that pastoralism and grazing today still retains a boom and bust mentality. Many leaseholders are finding the necessity to continually decrease their expenses is reducing their ability to manage their land effectively. They are also finding it difficult to manage their grazing system efficiently because of the need to reduce labour and this is placing increasing pressures on their income

and lifestyle. This leaseholder also sees little improvement in the situation for the future.

‘We have to scale our needs and employees down as much as we possibly can; we need to be able to do things like building the permanent yards so we have just one man and kids or wife as a family affair running the station. The employees cost us more than they bring, we lose a lot of money with them. We are already pretty economical with our mustering, we use the aeroplane, and we have 3 blokes on the ground. They used to muster the whole station in 6-8 weeks and we’ll now do it in 6-8 days with the aeroplane and motorbike. So everything that you do has to be done as efficiently and as time effectively as you possibly can do it. And I see that being a big issue in the future. I don’t see anybody becoming wealthy pastoralists again, like in the good old days. I think those days are long gone’ (female 30s).

Declining income has had a significant bearing on the ability of some leaseholders to diversify or change with around 70% of leaseholders stating that the financial downturn in wool prices made it difficult to implement change in their production systems. The difficulties of servicing current financial debts during dry seasonal conditions augmented this problem. Around 40% of households interviewed, including wives and children, commented they had chosen to supplement their income from sources off the station. Only 20% of these were in the Upper Gascoyne region and the work involved labouring for other pastoralists in the region. One leaseholder developed a large tourism enterprise on his property providing him with income to expand and improve his grazing system.

Leaseholders in the Mt Magnet region chose to undertake a variety of off-station work including carting grain, labouring for other pastoralists, developing alternative businesses based on personal skills, or living and working in urban centres using relatives to maintain the property. Two leaseholders were utilizing mining

opportunities on their property. The differences in off-station work between the Upper Gascoyne and Mt Magnet leaseholders may be explained by a number of different factors. They suggest there may be a real difference between:

- the viability of stations that currently exists in these areas,
- and/or the limitations for off-station income available for leaseholders because of distance from urban centres,
- the skill base of leaseholders in the areas,
- the influx of leaseholders relatively new to the region with accumulated wealth.

The opportunity to increase income from off-station work remains very limited for people living in these remote areas. The need for women to help with work on the station also restricts their available time. Computers, combined with other skills are being used by a few leaseholders to provide extra income but this currently appears very limited.

Although the change in animals may increase income for some, many leaseholders will continue to struggle in the short-term with a production system with low profitability and little interest from the next generation to enter the industry. As a result the aging population are limited in their willingness and ability to adopt change (Fargher *et al* 2004). This situation is occurring in a background where newspapers across Australia report the growing difficulty farmers and pastoralists are having in producing agricultural products in dry seasonal conditions. As rural interest groups continue to demand government support for rural producers, public empathy and support is declining. Way (2005) informs us arguments are now emerging that suggest public money should no longer be used to support unviable grazing production in marginal areas. The situation is fuelled by a widening gap between

urban and rural communities combined with an emerging public awareness of the declining contribution of pastoralism and grazing to the national economy.

## **GOVERNMENT POLICY AND AGENCY DRIVERS OF CHANGE**

### NEO LIBERAL DEVELOPMENT AND RURAL RESTRUCTURING

Wilcox and Burnside (1994) suggest that during the early days of settlement, Government administration of pastoral land was confined to maintaining existing leaseholder systems of production rather than developing Government objectives and improving administrative methods. They point out that although there was clear evidence of land degradation at the turn of the century, there was no effective policy developed to deal with this problem. The role of government administration of pastoral leases was therefore established as one of assisting lessees and denying the impacts the industry had on the land.

Pritchard (2000) informs us that many western governments, including Australia, have now shifted away from these post-war development policies designed to protect the economy and provide a welfare state. He suggests there is now a greater emphasis on reducing protectionist policies and decreasing government intervention in the economy. The belief is that liberalisation of trade by reducing tariffs and quota systems increases access to markets and creates a more equal playing-field. However, restrictions on market access and subsidies by Australia's competitors, impacts directly on the earning potential of producer production systems (see Robertson 2002). Reforms implemented by the Australian government also create a need for producers to be competitive without assistance from government. As a result of these policies, primary producers have experienced profound changes in their economic and social situations in recent decades.

This neo-liberal drive to increase national competitiveness and productivity has contributed to declining farm incomes, expansion and amalgamations of land, and the out-migration of rural populations. These effects are all a consequence of economic and political restructuring of the agricultural sector. In the Upper Gascoyne and Mt Magnet regions the rich diversity of leaseholders revealed diverse attitudes toward politics and their influence on the industry. Some leaseholders with greater leanings toward the free-market economy suggested that assistance levels are adequate. While others with more traditional welfare attitudes toward politics agreed there was a need for more government assistance and incentive schemes to help pastoralists and graziers. This leaseholder commented:

I think really there's got to be some government input more so than the (GMS) Strategy if they want people on the land. Their lease is for a number of years so they can't just go and kick those people off. And like we say we look after the land so they can't come along and establish that you're not doing the laws of your deal so they can't just kick you off. So people that have been there for generations, there's got to be some incentive or they are going to sell out to CALM and CALM will just close them down or give them back to the Aboriginal people and that's an issue in itself, a major one' (male 40s).

His comment clearly reflects leaseholder values of production and land management that are often at odds with emerging wider community views on rangeland grazing production and sustainable land use. It also reflects the changing community attitudes toward public support of the pastoral industry and the growing insecurity leaseholders feel as a result.

In the past government policy has been to intervene and control market forces that disadvantage producers. Government bought excess wool when prices were low and supply exceeded demand. This was stockpiled and sold off gradually as prices and

demand improved to help support wool producers from waning overseas markets over a number of years. However, the economic benefits of this strategy remain contested by both government and industry observers alike (ABS 2002). The following leaseholder did not agree with government regulation of the industry and believed that the industry should be left to the control of the marketplace. He believes that past government intervention in the wool industry did not benefit producers.

‘What's happened is that it has become too regulated, sure there needs to be a little bit on continuity in the market place, but we've had bodies such as the Wool Corporation that is no longer, thank God, and they put in place the wool packs and the producer was growing his wool and then buying 30% of it back to put into stockpiles for some fool to manage. I couldn't see the sense of that. I believe that the principle of supply and demand actually still works. And that if people don't want to buy something you can't make them and you can't make them pay more than what the marketplace is going to pay for it. ... There was a period there when the wool and meat price was no good and you couldn't give sheep away. The Wool Corporation's policy caused that. There was a floor price that set at around 670 cents a kilo and the market said ‘Sorry, we don't pay that’. I think they should have just let the market take its course, just go to auction or sell privately and let the marketplace take its course. Sure the price would have gone down but there would not have been that stockpile and in due course the marketplace would have recovered by itself. Let's face it, this is not the first time this has happened. Ever since the wool industry started in Australia it's gone like that. And it's like that living up here, the seasons go like that. I believe the Wool Corporation should never have been formed and just let the marketplace do its job’ (male 60s).

The development of national policy is generally a response to globalization which is described by Gerritsen (2000, 124) as ‘a set of international technology and information flows – as well as trade and international power relations’. He suggests this has ‘profound local effects’. It has had a number of impacts on Australian

agriculture. Producers have been forced to continually mechanise their production systems to compete increasingly with overseas markets and improve production. The consequence has been a significant decrease in labour and increasing disparity between rich and poor producers. Australian producers have been able to maintain some of their productive capacity through mechanisation, however unlike their Japanese, USA or European competitors, Australian producers have not been aided by government protection policies. Gerritsen (2000) suggests this is in part because Australian farm elites, organised in producer support groups, have supported national policy designed to deregulate the market and reduce assistance for producers. These elite groups of farmers generally consist of corporations who can benefit from economic efficiency while family farmers have become the rural poor.

According to Gerritsen (2000) Government policies to decentralise services have been combined with a reduction in Commonwealth funding to States. The devolvement of responsibility for service delivery has therefore passed to States who then pass much of it on to Local Government. Declining rural populations and services impact on each other to create a spiralling downturn in rural communities and a growth in rural poor. He points out that at the same time, the increase in responsibility of service delivery to local government agencies has resulted in expansion of regulation activities to replace reduction in funding and services. This reflects a marked shift in power to centralised agency control.

Gerritsen (2000) argues that the emergence of new public management, centred on free market 'user pays' principles and focusing on results, is rapidly replacing the ideal of the welfare state. He suggests that regulation is also a city-based activity causing an increase in urban regulatory departments, the reduction in rural employment and an increasing gap between urban and rural communications. The

consequences of this focus on economic rationalism have produced a significant degree of discontent among rural populations, resulting in the rise of Pauline Hanson's One Nation party in 1998. He suggests the collective rational responses by individual agencies, based on the new methods of public management, augmented this crisis in rural regions.

One leaseholder in the Upper Gascoyne and Mt Magnet study explained how he feels about the fundamental issues that arise in the relations of power between government and leaseholders.

'I think the Pastoral Board is probably the most useless instrument in government, they just sit there and do nothing. I see them as complete and utterly useless because that's the way they want to be. I think they are actually working against us' (male 60s).

He also expressed his frustration with the highly regulated approach that is increasingly becoming more dominant in government and the feeling of disconnection it contains. He suggested a need for change in attitudes and practices of government agencies toward their regulatory and extension work in the rangelands. He also argued for greater participation between government and leaseholders and more equal sharing in the development of strategies to assist production and sustainable land use. His comments were linked to the issue of management strategies that bind leaseholders into government-led processes so as to maintain relations of power and ensure continuation of the institutional processes. As a result these processes then become self-perpetuating and the interests of those in government potentially become more important than the interests of the leaseholder (see Chapter 3, The Development of Pastoral and Grazing Ideology).

Other leaseholders expressed a major concern over the recent changes in government agency strategies to reduce service delivery and the replacement by private companies. They considered that the reduction in the number of people employed as agricultural research and advisory officers was reducing communication with them. This leaseholder expressed a similar opinion to others about the changing emphasis government is placing on assistance to leaseholders and the loss that leaseholders feel as a result of these changes.

‘Years ago if you mentioned Agriculture Department, people were anti but in the last 10 years we’ve had some good people come and work with us and there was good co-operation there and now they have changed all the system and shifted the people out, and we are losing the contact and it was good contact. ..Private companies are taking over the role (of the Agriculture Department) but I don’t agree with it myself. I see some issues are pushed a bit far, we will do this for you and we will do that whereas with the Agriculture Department we worked as a group. And I think the communications were a lot better. When it is private, people don’t want to be involved, they just say they are doing this because they are making money, it’s their job. I think we have lost some very good people in the Agriculture Department that people related to, and opened up something, and we got a lot of information out of it, as much as they got from us, it was good, it was a workable thing, whereas now it has gone dead. This is in the last 10 years it’s been very good. In the last 2 years it has gone. They have put off a lot of their staff in the Agriculture Department or shifted them or something. The information is not coming out. We are not having contact, field days and things like that; it’s a big thing, communication out here’ (female 60s).

It was not until the 1930’s that Governments began to develop policy to provide assistance to primary producers in difficult financial situations. Later these policies evolved to also assist them to leave the industry. During the 1970’s and 1980’s, in line with the economic rationalism that supported contemporary neo-liberal

development of rural industries, government developed a 'range of strategies designed to help rural and regional people to help themselves within the 'deregulated' market environment' (Lockie 2000, 22). A shift from the traditional 'hands off' approach now involved government intervention that attempted to influence producer decisions. This included providing policies to encourage leaseholders to develop alternative forms of income and strategies to assess the viability of their production systems.

As part of this process re-establishment grants were set up to assist them to leave the industry. This policy was based on the assumption that those leaseholders who are less economically viable will leave the industry allowing viable industries to purchase their leases for expansion, thereby providing a more efficient and competitive pastoral and grazing industry (Webb, Cary & Geldens 2002). However, this concept was also based on the premise that leaseholders would leave the industry for economic reasons, but Webb, Cary & Geldens (2002) suggest that leaseholders' reasons for adoption of change are influenced by a wide variety of factors, although financial considerations are an important factor in their decision-making process. These factors were a key influence in the failure of the voluntary lease adjustment in the Gascoyne Murchison Strategy (see Chapter 9, Gascoyne-Murchison Strategy).

Berkhout, Leach & Scoones (2003) suggest the complex nature of our natural and social systems characterized by variety, uncertainty and sometimes chaos are increasingly problematic to conventional planning and policy frameworks based on equilibrium and stability. They point out that increasing demands from a wide range of interest groups is placing pressure on bureaucratic inertia and the dominance of pastoralism that has occurred in the past. The advent of political processes such as the Gascoyne-Murchison Strategy and the Gascoyne Muster demonstrate the

increasing role that rangeland stakeholders are having on influencing government policy development. These authors recommend new ways of thinking about approaches to planning and policy that are focused on learning, flexibility and adaptation. The CIE (1997) also suggests that the implementation of these policies is poor and often not well communicated to pastoralists and other stakeholders. As a result policies are not fully comprehended or used by those they are created to assist.

Stafford Smith, Morton & Ash (2000, 198) suggest that the tendency of public policy to treat rangelands as a homogenous whole constrains policy development, 'because appropriate action in certain areas is unsuitable in others, it becomes easier not to initiate change anywhere'. They raise questions such as; 'Why does policy legislation appear to be based on assumptions that pastoralism provides viable economic production without creating species loss or land degradation?' And 'Why does policy avoid dealing with the conflicts between public good and private benefits?' They argue that regional differences in susceptibility to degradation due to pastoralism have discouraged effective industry and government examination and reporting. As a result, policy to reduce primary land use in less resilient areas has not developed and these areas continue to experience serious decline. These scientists recommend changes in policy that provide specific targeting of public funding to reduce support for grazing in marginal areas of production, and more opportunity for funding of public land purchases in these areas as well as funding to assist leaseholders with conservation on their property.

Australia's heavy reliance on exports increases risks for producers and also contributes to environmental problems. Competing on overseas markets means producers are subject to the volatility of international commodity prices. Rangeland producers' battle to maintain a steady supply of produce demanded by international

markets in an environment of erratic, unreliable climate conditions. Increasing input costs and low commodity prices serve to reduce producer profitability which in turn encourages some producers to increase animal numbers and reduce maintenance or improvements of infrastructure on the land. The end result is decline in production and incomes and increasing pressure being put on the land. Yet many social commentators and political officials argue this is just an unfortunate side effect of the neo-liberal drive for increased competition and productivity (Tonts 2000). These two leaseholders comment on the difficulties of increasing costs.

World markets are a big issue. ...Remaining viable. I think that the disadvantage is the huge costs that we have. ...Socially we're not isolated but economically we are. Costs of fuel and freight. We have to generate our own power and find our own water and then pump our own water at great expense. So economics is a worry because it's very expensive to live here' (female 40s).

'The costs have risen and yet our prices really haven't kept pace with the CPI. Everybody wants more wages, everybody wants more money, and fuel prices get higher. The fuel costs of production gets higher. The only thing wrong with the price of wool is that your costs of production are higher than its revenue. ...Obviously the decline in real income revenue is pushing more emphasis on productivity to be able to survive. The lack of income will relate to keeping the infrastructure in a useable state on a pastoral lease that will help to keep the costs down i.e. a catch 22' (male 50s).

Tonts (2000) suggests that rangeland producers and their communities may also be adversely affected by policies aimed at assisting agriculture as they do not always apply to them, or do not assist those involved in the pastoral and grazing industries because of a number of differences between these two industries. He argues that dry seasonal conditions have a greater economic impact on animal producers than crop producers and this is probably one of the reasons why there has been an increase in

mixed farming in recent years. When farmers sell their crop because of dry conditions, the price of their crop increases due to the increasing scarcity of the product. At the same time animal prices dramatically decrease as all producers attempt to sell animals at the same time. This remains a benefit for wool producers, however, who benefit when wool prices increase during periods of decreased periods of supply.

Leaseholders who change from wool to meat production need to take these factors into account when they develop their management plans. The Farm Management Deposit Scheme introduced by the government in 1999 (Australian Taxation Office 2004) is a useful tool for some leaseholders in this respect. However, according to Tonts (2000) this type of scheme also has limited benefits. Poorer leaseholders are still forced to use a greater percentage of this working capital than wealthier leaseholders. As a result poorer leaseholders become more vulnerable when the next dry seasonal conditions occur creating a downward cycle that is difficult to break. The level of difference between poorer and wealthier leaseholders also increases, resulting in growing social and economic stratification within communities. Recovery time after dry seasons also takes longer for animal producers than grain producers, making many leaseholders who are not able to diversify into cropping, more vulnerable to trade fluctuations than farmers (Tonts 2000).

Restocking livestock after periods of dry seasons is the responsibility of leaseholders and although government agencies and supporting organizations may suggest appropriate methods and strategies, there is no external intervention in this process. As a result the potential exists for leaseholders to maximize their economic benefits to the detriment of their long term resource base. The costs of restocking livestock are often relatively high and the economic recovery rate is slower compared to crops

and it is sometimes difficult to buy relatively low cost, good quality animals that can be adapted to rangeland conditions (FAO 2001). This encourages leaseholders to hold on to breeding stock, sometimes to the disadvantage of both the natural resource and the stock. However, the growing practice of agisting animals during periods of dry seasonal conditions is an important improvement to this situation. Leaseholders commented on their reasons why they decide to agist their stock or sell them and the financial costs involved in these decisions.

‘..we have pretty well ploughed everything we have made out of cattle into improvements and surviving the drought. Huge massive feed bills, costs for agistment, huge, just huge. That’s just been in the last year really and the reason we did that is because we’ve got our cattle up to a standard, not probably where we really want them but they are going that way. We didn’t want to sell all of them because then at the end of the drought what do you do? You buy other people’s culls that they don’t want and it sets you back 10 years. So we bit the bullet, kept them...’ (female 50s).

Government policies developed to improve conditions for rural producers generally do not take all these factors into account. Policy aimed at increasing competition and productivity in agriculture has also worked against pastoralism and grazing because they have not been able to correspondingly increase their productivity. Instead they have reduced expenditure by reducing investment in infrastructure and shedding paid labourers and other services that are important to the efficient functioning of their production and social systems. The result has been significant reductions in the labour force employed on stations. Consequently there is now a greater reliance on family labour and an increase in stress within the family. This leaseholder discusses how he saw the situation.

‘I guess management has got to about as far as it can go purely and simply because of the way the wool market went. I won’t say the efficiency level

hasn't increased but there has certainly needed to be a rationalization of management practice, like cutting staff, that's the first thing that everyone did. You look back before the wool crisis which started in the early 1990's there was always, depending on the size of the operation, 2 or 3 permanent people around, and of course as soon as it got to the point where things started to happen, the first thing that happened was 'goodbye all you people'. Probably started around the mid 1990's depending on how different individuals saw what was happening, how long they thought this was going to last, and I don't think anyone really knew, they were just taking guesses. 'Oh well, back in the 1970's when there was a bit of a thing that lasted for 2 years and that wasn't too bad so this might be 5 years and it will be all over'. Of course the 10 year mark came and it was a whole lot worse. The first thing that happened was that staff went and of course that increased the personal workload so that Mum and the kids were all out there doing something' (male 60s).

Land is also increasingly being amalgamated to improve productivity and young people are becoming more discouraged from joining the industry. The result is an aging population in decline. This leaseholder believed these factors would result in the end of the pastoral industry.

'With the changes that are happening, I can't see the pastoral industry lasting. Some places are getting bigger and some places are just being left and I can't see that the industry will survive. We are not getting young people back into the bush, we're going to have labour problems and with the small amount of stock people can't afford labour so I think it is just going to get worse and worse until there is nothing to keep people around. It's a bit of a worry, you can see the age of the people on the land, there are no young ones coming in and it's going to get too hard and they may just walk off. I think they will just get bigger and bigger until they can't handle it. This is what is happening now' (female 60s).

Those within the industry also suggest that government policies have eroded profits to beef producers in recent decades by discouraging community saving, maintaining

high real interest rates and applying high taxation rates to exports. They also suggest that processing and transport handling sectors of the economy, along with services supplied by the Government, have not kept pace with the reform and efficiency required to compete with Australia's major overseas competitors. They argue this has resulted in increased costs to consumers and lowered real prices to cattle producers. 'The producer's share of the retail beef dollar in 1995 was only 47% compared to 58% in 1988' (Cattle Council n.d.).

Trade policies with overseas countries are not always beneficial for the industry. Unequal access to markets and agricultural subsidies paid to overseas competitors has a significant influence on producers' ability to maintain economic efficiency. According to Pritchard (2000) debate on agricultural trade policy suggests it is politically constructed to discourage critical argument about the distribution and size of the benefits and costs of these policies. He argues that benefits often accrue at the top end of the market with few advantages for the smaller, family-sized enterprises and arguments against free trade policies are discounted because they are not in the 'national interest'. Australia's ability to sustain liberalisation of trade internationally is also founded on the removal of their own subsidies and tariffs, a factor which many rural producers in Australia do not support. This has fuelled scepticism about trade liberalization and encouraged political dispute amongst rural communities. One leaseholder from the Upper Gascoyne and Mt Magnet study suggested the wool industry of Australia was inefficient and not working for the benefit of producers.

'Our problem is that we are dealing with forces beyond our control. There's been a lot of manipulation of markets by people who may actually prefer to keep a depressed price on the wool. In NZ they have been far more effective at marketing and working with the product. I don't know what is wrong with Australia but it seems as though too many people have been in too much of a

comfort zone too long and have actually forgotten about marketing' (female 40s).

She also maintained that control of the markets by overseas firms was allowing them to manipulate prices and reduce the profit for producers. The future will tell what effects the current free trade agreement being implemented with America will have on leaseholders and their production systems.

Government policies to provide funding for relief during difficult seasonal conditions are also being questioned by the wider community. Webb Cary & Geldens (2002) suggest that media reports are inclined to perpetuate conceptions of pastoralism and grazing as existing in an overall stable environment with intermittent disturbances such as dry seasons or floods that create a need for leaseholders to adjust to the circumstances. However, the complex factors that influence these adjustments vary with the different changes in pressure experienced by leaseholders. When these changes in pressure occur over a significant percentage of the industry it is often interpreted as a crisis, thereby encouraging the myth of a stable industry. As a result there is a cultural expectation that leaseholders will be supported by government funding in the form of drought or flood relief during these periods of crisis. In the present dry seasonal conditions, for example, the government declared drought relief would be offered to farmers in Australia, including leaseholders in the Southern rangelands, who are eligible for Exceptional Circumstances drought relief for two years (Karvelas 2004). Under this scheme leaseholders were also able to receive loans with 5 percent interest rate subsidies that will allow them to restock when seasonal conditions improve (Jensen 2004b). However, growing public opposition to this form of subsidy may remove this safety net in the future, creating even more

pressure on leaseholders for change (see Socio-economic Indicators of Change above).

Government policy resulting in rural restructuring has had huge social impacts on rangeland communities. This leaseholder comments on the effects policy has on rural populations and explains why he considers they are declining.

‘My second issue is basically because of the government’s lack of incentive to have people live outside of the main area. It’s a lot easier for governments to have everyone live in the city because it’s a lot cheaper to build schools and hospitals in cities. So the government has really had no desire to have anyone living in the bush because it costs too much. So without infrastructure of schools and hospitals and what have you, you can’t expect young families, or anyone to live in the bush if the chance of dying is too great. These days of course, mothers expect the best for their kids and the only place they can get that is in the city; because Governments won’t spend the money in the country, because the people won’t live there, and vice versa’ (male 40s).

The final comment reflects how many leaseholders may feel about government policy. He implies that if they do consider they need a pastoral industry, they need to be prepared to develop policies that will benefit those in the industry and not make it more difficult for them to continue production.

‘The bottom line is that governments, both State and Federal, need to actually sit down and say to themselves ‘well do we actually need a pastoral industry or do we not?’ Politicians say ‘oh yes we need an industry’, but at the end of the day I think they say one thing and mean another’ (male 60’s).

Leaseholders are continually responding to pressures exerted on them by complex external and internal factors. They actively respond to these changes and whatever decision they make involves high levels of risk because of this constantly changing environment. Mackenzie (2000, 101) points out that many of the issues arising from

land use are a direct result of political factors; the result of which has significant consequences for future production in the region. This increases the role of regulatory management and monitoring to ensure that the land is managed within the limits prescribed by current ecosystem models. He suggests the contest will remain to see ‘how the limits of the social activity of grazing can be creatively reconciled with the ‘facts’ that regulatory activity and research administer’.

#### LEASE TENURE AS A DRIVER OF CHANGE

Holmes & Knight (1994) inform us that leases originally evolved because colonial authorities were concerned that squatter settlements were outpacing administration. Lease tenure was developed to provide legal recognition of squatter occupation, while reserving future allocation to the Crown. In recent decades the objective of controlling land management has shifted and the focus is now on the ecological sustainability of land uses. The Productivity Commission (2002) report points out that the rights of traditional Aboriginal owners were formally recognised in the 1990’s. The 1996 *Wik* judgement in the High Court found that pastoral leases did not give lessees exclusive rights and did not necessarily extinguish native title. However property rights conferred by pastoral leases remain unclear. The report also suggests that some lessees consider their lease gives them similar rights to freehold land while some people in the wider community believe leasehold land is public land containing values which need to be maintained in the public interest.

Lease tenure and access rights are important because they play a central role in providing options for alternative land use in the rangelands.

‘Tenure and rights of access form an essential component of the analysis of alternative land uses for pastoralists ...especially in non-equilibrium

environments where the availability of grazing and water varies (FAO 2001, 54).

Non-pastoral land uses potentially improve the efficient use of resources, contribute to ecological sustainability and provide greater opportunities for development of rural communities. However, the Productivity Commission (2002) report suggests a major impediment to change has been that government policy emphasis for land use in the rangelands remains on pastoralism and grazing. Lease conditions provide ways for the state to control the ways leaseholders use the land. They provide a more restricted range of property rights than freehold land. These include:

- the length of the lease and rate of rental,
- controls on level of stocking, infrastructure and land management practices and the rights of public access,
- the rights of government to the natural resources, and the rights of government to resume the land (Productivity Commission 2002).

State and Local Government Departments or agencies dealing with public utilities, planning or land conservation can undertake compulsory land acquisition under the Land Administration Act (LAA) when pastoral leases expire in 2015. This has provided an opportunity for the State to excise areas that are required for 'public purposes' from the lease renewal offers. Leaseholders were notified before 7 December 2002 of the land to be excluded for these purposes. Leaseholders had the option to accept the conditions of exclusion, withdraw from the lease offer or enter into negotiation with the Minister for a statutory period of two years. Leaseholders are entitled to compensation at market value on the expiry date. If the land to be excluded results in the lease not being economically or ecologically sustainable on its own and the opportunity for amalgamation does not exist, the leaseholder may

withdraw from the lease renewal offer and the leaseholder will be compensated (DPI 2003a).

The Act was updated in 1997 to provide greater flexibility for setting terms and conditions for development and to increase the responsibilities of the Pastoral Lands Board (DPI 2003a). Holmes (1994b, 106) informs us the advantage of leasehold tenure for the public is that it provides the state with 'a greater degree of specificity and flexibility in determining how a particular area of land can be used than is practicable under freehold tenure'. He reports that lessees and their Pastoralists & Graziers Association (PGA) lobby group have been pushing for greater security of tenure and changes to lease constraints for non-pastoral land use. This has been met by increased interest by community groups such as conservationists, who want lease conditions reviewed and many of the constraints enhanced to protect public interests. He also raises questions concerning whether lease conditions can provide efficient land management outcomes or whether they have the capacity to meet multiple land use goals.

Submissions to a Select Committee in 1991 found that pastoral lease tenure was the most important issue of concern to pastoralists (House 1991). During the recent Gascoyne Muster (see Chapter 9, The Gascoyne Muster) the most contentious issue was whether leaseholders were granted a perpetual lease or a self-renewing/rolling pastoral lease with periodical reviews. This issue was hotly debated by leaseholders and conservationists and was one of the few issues stakeholders within the established working groups were unable to come to agreement on. Proponents for longer lease terms argue that freehold or perpetual title would encourage leaseholders to adopt a longer term view of their production system and resource management.

The National Land & Water Resources Audit (2001, 15) report found that ‘The effect of tenure on the adoption of management practice is not clear, however the terms and conditions of the leases will influence financial and long term planning decisions’. It is now recognised that efficient land management practices are generally influenced by many factors other than lease tenure. The Centre for International Economics (1997, 19) report points out that although leaseholders may consider there are a number of reasons for changing to perpetual or freehold titles, it is difficult to prove the advantages. ‘..it is difficult to demonstrate that the difference between leasehold and freehold leads to better land management, less degradation and/or more land rehabilitation’. The extensive number of environmental issues faced by freehold land under agriculture production today does not support this argument (Department of Environmental Protection 1998; Department of Environment, Sport and Territories 1996).

The study of leaseholders in the Upper Gascoyne and Mt Magnet also found that security of tenure remains a major issue of concern for most leaseholders. Seventy two percent of leaseholders interviewed in the Upper Gascoyne and Mt magnet regions commented land tenure was a major issue of concern. Reasons given were that the uncertainties surrounding the lease may discourage buyers and affect the resale value or provide disincentives for succession by their children in taking over the lease. One of the main arguments for longer lease terms is the incentive it provides to invest in infrastructure on the property.

A number of leaseholders commented on how current lease arrangements reduced their feeling of security and their incentive for investment in station infrastructure. Native Title is also a major concern for leaseholders and a determining factor in pastoral lease arrangements. ‘Where native title is applicable, diversification and/or a

change in the primary land use on a pastoral lease must be consistent with the Native Title Act 1993 (Commonwealth)' (Productivity Commission 2002, xii). Future court decisions will continue to influence the relationship between leaseholder tenure and native title and this produces a real sense of unease amongst some leaseholders. This leaseholder explains how he feels about the situation.

'The main one (issue) as a leaseholder is security of tenure. That is number one without a shadow of a doubt. What the Minister for Planning and Infrastructure is going to do is anyone's guess. I believe there should be a perpetual lease. There are a lot of little insidious things tied up in this. With the Mabo court case there was on one hand the granting of a pastoral lease which extinguished Native Title, but on the other hand that wasn't the case, so that's still an issue that wasn't resolved, whether it actually extinguishes Native Title. That's too hard at the moment and at this point in time a lease cannot be granted because of Native Title for any longer than what the previous lease was. So that to my mind is not something that is really going to tell me that I'm terribly secure in spending money on infrastructure every year, not knowing full well that in 50 years time when the lease expires that I'm going to get it back again' (male 60s).

There appears to be a lot of uncertainty surrounding Native Title claims over leasehold property. Edmunds (1994) suggests that much of this concern and misconception arises from traditional attitudes of Western Australians toward Aboriginal land rights and extensive media campaigns in the past linking economic productivity negatively with land rights. This conflict where people aligned themselves to particular interest groups arose because of competition over, and access to, the rangeland resources. An Aboriginal leaseholder interviewed during this Upper Gascoyne and Mt Magnet study also believes there has been a lot of negative publicity by those in the pastoral industry and explains how he sees the need for improved education on the issue.

'I've been on the Land Council for 7 years and I think it is a matter of not having access to the land in a traditional sense. I think the pastoralists themselves have got to be better educated to the effects of Native Title as far as access to the land goes. The rednecks of the Pastoral Industry seem to send a message out to dumb people in towns that if Native Title comes in they'll wipe the white fellows out and take over completely themselves. So what I'm saying is that 85% of mainstream has to be educated to the proper effects of Native Title and even the pastoralists have got to be more educated about it'.

He also believes that even though there is not a strong connection with place in the region for Aboriginals, past associations leaseholders have had with Aboriginals provide them with the ability to understand why access to the land is important for Aboriginals. He also suggests that the scale of access being requested by Aboriginals in this region is negligible.

'If pastoralists go through their archives they will understand what Aboriginals are associated to their particular pastoral leases. Their indication would put them old black fellows back into their traditional land, for access for traditional reasons and it's so simple. The traditional ways of Aboriginal people in the Gascoyne Region don't exist anymore, like initiation and corroborees taking place every 3 months and things like that and I suppose having access back to their traditional areas wouldn't mean much without the other stuff too, they go hand in hand. But I think that even if the traditional sense of the initiation and such are not there, at least they can have access to where their ancestors came from. That still remains in the area, you can't wipe that out. That's where they belong. ...Even the pastoralists can go back to the time of their Grandads and they know the old black fellows are supposed to be there. ...The access that is being discussed is really small compared to the size of a pastoral lease. So there shouldn't be any problem with access in the Upper Gascoyne region' (male 40s).

The influence that lease tenure has on bankability is also a key argument for proponents of longer leases. This leaseholder discusses how he believes lease tenure affects his ability to get affordable credit.

‘Because of the tenure, it's not a secure asset for a traditional financial institution to take out a mortgage against. Which means that we can't access reasonable interest rates for carry on finance and/or finance for purchase and/or expansion. For example, in the metropolitan area if you want to go and buy a house you can borrow 80%. In the pastoral area you can borrow about 30% of the value. Your interest rate to buy a metropolitan property will be somewhere in the vicinity of 6 ½ %. Your interest rate to purchase a pastoral rate at the moment will be in the vicinity of 12%, because your traditional lenders don't want to go near it due to the form of tenure that's there. If it was a perpetual lease or had an area of freehold that the principal infrastructure was on, I think you would find that it would be more attractive to traditional lending institutions’ (male 40s).

However, the idea that insecurity of lease tenure reduces bankability for leaseholders is not universally agreed among all leaseholders. This leaseholder believes that the production potential from the land (and therefore the ability of the leaseholder to repay the loan) needs to determine credit limits and that this factor is not influenced by land tenure.

‘Land tenure is not an issue for me because they are saying they want to borrow on it, but I am saying that if you have to borrow too much you shouldn't be doing it. If you are not getting the money off the land to survive, then land tenure is not going to help you’ (female 60s).

Holmes (1994b) argues that financial institutions cannot be blamed for being reluctant to invest in pastoralism because they have lost money in the past. The higher risk is therefore the probable reason for the higher interest rates to pastoral enterprises. He suggests that lending institutions today are generally based on the

client's ability to repay a loan and this is potentially the barrier to them lending money rather than the insecurity of lease tenure.

But it appears one of the main problems for leaseholders is the general uncertainty of the lease tenure situation. This issue was also seen as a major challenge facing pastoralists in the Rangeland NRM Co-Ordinating Group (2005) report. The changing tenure system is undermining the social cohesion and resilience in the region. It is proving to be very unsettling for leaseholders and producing potential real or imagined fears about future excisions of part or all of their land by government agencies. This creates fears for the possible loss not only of an economic income but also a way of life that is in some cases generational. The Centre for International Economics (1997, 47) study also found that 'conditions on leases were not seen as an institutional impediment to the way pastoralists want to manage their land. The overwhelming problem of leasehold was that it resulted in a feeling of insecurity and this became the impediment'. This leaseholder was able to clearly enunciate how this feeling of insecurity affected her.

'So lease security is an issue because you invest your entire self and money and you like to feel that in 20 years time you will have something to pass on or to sell that is secured; to firm up your position on your lease. Everything is in the melting pot at the moment and none of us know when it all comes out of the melting pot, exactly the form it's going to be in. There's other issues like access feeding in, because it's a lease situation so therefore your home is in a lease situation and it's like even if you have your inspection of your infrastructure, even your home block is part of it. You feel as if you're lifting off from the earth because you're not secured there and yet you're the ones who are out there doing the hard yards and living in a difficult situation and contributing significantly in how you are looking after the land and community issues. You feel as if something is coming from underneath you and disconnecting you from your rights. I felt like it's an invasion of your

private space and it was almost as though they are taking away all of your rights and you have nothing' (female 40s).

Government land acquisitions raise arguments about property rights and public versus private goods. Holmes (1994b, 119) argues that once property rights are distributed, it is a difficult process to recapture these rights. 'Regulation and recapture face the formidable barriers of compensation and the entrenched philosophy of the sanctity of private property'. Leasehold land provides government with the power to achieve their goals much more easily than freehold systems. Proponents of private property argue that public compensation covers a variety of factors. This leaseholder believes leaseholders should be compensated not only for their capital assets, but also for their future potential income as well.

'...those stations that do have land excised, there needs to be a clear and reasonable approach to make sure they can still be viable or are adequately compensated if they can't be viable. When land is excised it's being taken for the whole community, the whole nation so it's not right that a property owner has their living removed and is supporting the community interest. So the community should be responsible for making sure that person will still have income that they have been accustomed to and have actually committed their work on their property with a foresight for years. They have an idea of why they're working because they're looking at 10 or 20 years ahead or they're looking at the kids taking over, their interests should be protected and compensation should be paid' (female 40s).

It seems unlikely under the current circumstances the public would consider this. The length of time leaseholders have known about the acquisitions may assist them to adjust to these changes. Pastoralists were made aware of Government intentions to excise various areas at lease renewal for conservation purposes over a decade ago (CALM 2002).

However, along with agreed rights, leasehold tenure contains responsibilities for efficient natural resource management. One of the main problems for government policy in granting long term leases is the inability of government authorities to enforce regulations requiring control or reduction of stock where serious degradation is apparent. Producers are unlikely to remove stock if they are already in a situation of declining profitability and therefore developing sustainable land use practices is not feasible. Attempts to change this situation by enforcing destocking regulations have failed in the past. 'Attempts at enforced destocking by government agencies have failed because the social infrastructure is based on protection of the rights of the individual and in the past attempts to enforce destocking has failed' (Morrisey 1984, 292). Some leaseholders in the Upper Gascoyne and Mt Magnet raised this issue. This leaseholder explained:

'The lessee should have the responsibility of looking after the land and looking after areas that have problems in most cases. But I'll qualify that by saying, that in some cases there are people who come into this industry who see it as a quick fire way of making a quid and they overstock the joint for a few years, make a few bob and sell out because stock numbers are going down and don't do that particular lease any good whatsoever. How that is actually controlled ... I guess the Pastoral Board should be the ones to do this because they are the landlords and they should have some power to be able to control these sorts of things' (male 60s).

Attempted prosecutions in the past have also rarely stood up in a court of law. Latest government moves to overcome this problem have been to create a Pastoral Lands Board position on the Pastoral Land Management team with responsibility for investigating lease management issues with the aim of improving this situation using dialogue and policy development (Pastoral Lands Board 2003). This appointment is

an important component of the move to change to more sustainable land use practices.

A key issue for non-pastoral use of rangelands is that leases have traditionally been solely for pastoralism. Current lease arrangements are subject to the Western Australian Land Administration Act 1997 which states that pastoral land cannot be used for purposes other than pastoral without a permit (s106) (Productivity Commission 2002, 33). Legislation has limited recognition of non-pastoral uses for the land as well as the capacity to allow such uses to occur (see Chapter 8, Leaseholder Attitudes Toward Diversification Potentials). Leases provide lessees with exclusive rights to conduct pastoral activities such as raising stock and developing the necessary infrastructure but activities such as forestry, ecotourism and conservation are subject to government approval. Leaseholder production systems have therefore been affected somewhat by the lack of flexibility in lease conditions to allow them to diversify or develop more economically effective ways of producing an income.

A permit is independent of the lease conditions and must specify the use and area of activity and any facility that needs to be constructed. The Pastoral Board currently has the discretionary powers over the time and conditions of approval and in Western Australia this is also subject to Native Title approval. Under the current lease arrangements the capacity for permits to assist non-pastoral land use is limited for a number of reasons. Permits are generally issued for short time frames - currently they cannot exceed five years. The permits are also personal to the lessee that holds the permit so they are not transferable with the lease title. The number of government agencies involved in granting permits also makes the process more onerous for leaseholders. This couple from the Upper Gascoyne and Mt Magnet

study had previously been in horticulture production and recently bought their station lease. They explain the difficulties they have gone through to get their permit to diversify into horticulture.

‘We had to have a management plan for what we were doing with cover notes and things had to say the area you wanted. There were certain areas you are allowed to have so you choose whichever area suits your plan and what you want to do with it and what you want to grow and then you have to go through all the relevant bodies. The Pastoral Board has to agree with it. They increase your rates as soon as they give it to you. You do the improvement and they get paid for it and the other thing is if you ever sell the property the improvement isn’t allowed to be sold as part of it. So they get it both ways. They’ve increased the rates by about \$400 or more. But then it is not transferable and you have to get Aboriginals to come and survey the area and decide that nobody is buried there or whatever, and send it into the mining to see if there are any mining claims that are going to be affected by it. They have to approve it. Rivers and Waters have to approve it, you have to get well licenses and tell them how much water you are going to use and that all has to pass the approved standard. The Ag Department has to come out and decide whether you are going to cause any erosion or runoff into the creeks or whatever, so it is quite a lot you have to get through to be approved to do it’ (couple 40s).

Permits allow clearing of land, sowing of non-indigenous species, agricultural use of land under a lease, use of land under a lease for tourism and non-pastoral use of enclosed or improved land. The advantage with a permit system rather than inclusion in the lease is that the conditions and terms of the permit are more transparent which encourages investment (Price 1999). Several reports suggest there need to be improvements in the existing permit system as well as the overall pastoral lease arrangements. The recent Western Australian Sustainability Strategy (Department of Premier and Cabinet 2003) recommends that the existing system under which

permits are issued needs reviewing to support enterprise diversification in rangelands. However, diversification into enterprises such as tourism also raises other problems such as whether leaseholders have the motivation or skills required to operate a tourism venture successfully, or whether the land has features suitable for tourism (see Chapter 8, Leaseholder Attitudes Toward Diversification Potentials).

The Productivity Commission's report (2002) recommends a comprehensive review of net public benefits for retaining pastoral lease arrangements. If this is found to be appropriate, they suggest leasing arrangements focus more on performance or outcome, and that lease arrangements need to include greater opportunities for non-pastoral land uses in the future. Holmes (2003) suggests that tenure reform should include greater powers for government over non-pastoral land use, an expansion of opportunities for leaseholder diversification, changes in the use of land in areas of marginal land use as well as reallocation of strategic areas for public use. The Centre for International Economics (1997) report recommended that more research was required on how uncertainty over lease title for investment, or lack of investment, influenced sustainable land use practices.

Current restrictions in lease arrangements, along with the difficulties of dealing with the permit system and Native Title issues, appear to be placing constraints on some leaseholders in their attempts to diversify or change. However, the limited opportunities available to leaseholders and other rangeland stakeholders appear to be the greatest obstacles to change. Most people concerned about the future of rangeland industries would be pleased to know the government is currently reviewing tenure arrangements. They would also agree that past inertia has constrained the rate of change and diversification and that policy review to assist is well overdue. Holmes (2003) suggests that trying to accommodate the complex

interests of the diverse groups of rangeland stakeholders will continue to slow the pace of change, especially when proposed changes appear to disadvantage the interests of leaseholders. He argues that lease tenure remains a useful instrument for delivery of new policies and programmes and is a more appropriate tenure than freehold in areas with limited development potential and low levels of private investment. He questions whether lease tenure arrangements remain a useful policy tool in the rangeland situation today.

### **TECHNOLOGICAL DRIVERS OF CHANGE**

Mechanisation of agriculture intensified during the 1950s and has been a continuous process of evolution ever since. During the 1980's the evolutionary process increased, contributing to the continued decline in population and the environment in rural and regional Australia (Gerritsen 2000). The pastoral and grazing industries have followed a similar pattern of technology adoption and change. However this has only happened to a limited degree compared with agriculture because of the constraints on development in semi-arid conditions. This long-term leaseholder explains the factors he considers are positive improvements to his production system and lifestyle.

'There's been a whole heap of different things. The techniques of mustering to start with. Thirty years ago you had 10-15 blokes on horses and you camped in the scrub for six to eight weeks and mustered up stock and brought them home and shored them and pulled out whatever you wanted to sell. Then they took them all back out in the scrub and settled them down and 3 months later the job was finished. Whereas today you get one bloke in an aeroplane and a few blokes on motorbikes and out you go and in 3 weeks the jobs over. Transport has been another really big issue. Things get a bit tight; you want to sell some stock so you jump on the telephone.

When I first came up here we didn't even have a telephone. Today you just get on the telephone and ring your local stock carrier and say 'Be out here tomorrow morning to take stock to so and so', and they're gone. Whereas in the old days you got on the radio network and sent a telegram to the drover in Nullarbor and he walked his horses and brought his blokes up and got the mob of sheep and six months later they were back in Nullarbor to go into the saleyards or put on a train to be sent to Midland. We have better control of things now. We can turnover more animals now because we don't have to carry stock for so long. Improved pest control products, whereas in the old days you threw the sheep into a bath of arsenic and pulled them out and you and the sheep and everybody was covered in arsenic. There is animal husbandry technology like that, that has certainly improved things and made life a lot easier' (male 60s).

Declining economic conditions prevailing over the last three decades have reduced the ability of leaseholders to employ labour to help on the station or around the homestead. Fortunately many of these technology innovations have reduced the time required for completing tasks such as domestic duties and mustering and decreased the need for employing workers from outside the family. Leaseholders mentioned a number of other technologies they considered beneficial for their production systems such as GPS used on motorbikes for mustering, gridlock and electric fencing to contain Damara sheep and goats and electric winches on vehicles which reduce the workload. A number of leaseholders also mentioned trapyards as important improvements in technology because they reduced the need to muster (Chapter 6, Total Grazing Management Systems). Other technology such as solar-based infrastructure and electric fencing were only considered partially beneficial because they are not as reliable, require too much maintenance or are too expensive.

However, many technologies may not be adopted by leaseholders or may not be beneficial in the long term. In the past, attitudes toward the communication of

science involved a top-down approach focused on the use of the linear transfer of technology from scientist to users of the land. This approach was based on the assumption that the user would understand and accept these new technologies or management strategies and be willing to adopt them based on the scientists' recommendations and those involved in their implementation (Stockmayer 2003).

Little attempt was made to ensure that the scientific 'solutions' were fully understood or even whether the research was suitable for adoption. It is now widely recognized that sometimes these government-led approaches resulted in the adoption of new technologies or practices that have been socially and/or ecologically detrimental (Curry *et al* 1994; Keen & Stockmayer 1999). 'A study of the effectiveness of this model showed that research results were adopted by only a specific minority of farmers and that for the majority, it was not a viable strategy for agricultural improvement' (Ison and Russell 2000, 19). This leaseholder explains how adoption has been a disadvantage for them.

'...we also brought in wool testing. We computer tested the fleece of all our sheep but in a way it's a big investment come to nothing in our case. I think if there was confidence in where we were going in wool and keeping our sheep you'd invest that sort of money and keep that going but at this stage I don't know that it's going anywhere' (female 40s).

Time and experience has also provided these older leaseholders with recognition of some of the disadvantages that technology adoption often brings to the economic, environmental and social sustainability of an industry.

'Some of the chemicals for lice, they did away with the old dips, they were hard work. That's why the number of people aren't out there anymore because the machines take their work' (male 70s).

'Mustering with motorbikes. In my youth mustering was done on pushbikes, believe it or not. Solar and TGM yards, communications like 2 way radios,

better vehicles, motorbikes, different types of windmill columns, ploy-columns rather than steel. There's a lot of things that have changed in the 41 years I've been here. Everything moves a lot faster now too and people are under a lot more pressure. Labour used to be a lot cheaper so now we use technology more. Which is not so good for the country' (male 60s).

Technology is often considered beneficial and accepted more readily by younger people than those of the older generations. The following leaseholder's comment reflects his attitude toward how he sees the impacts of technology on production systems and lifestyles. When compared with the comments by the older leaseholders above it mirrors the overall differences between the more positive attitude of the younger leaseholders and the holistic, but often more negative attitude of many of the older, long-term leaseholders.

'I think it's a whole package of new technology, machinery and tools and whatever you use that makes the job that much quicker. There are places that have one bloke working on them but if you go back to the 1960's they had five or six, but the one bloke is more or less doing the same amount of work as the five were. He's got better vehicles, better machinery, better power tools; he doesn't dig holes with a crowbar he's got post-hole diggers, so it's a whole technology thing and we've just changed with it. We've grown up with it so you just change and what they used to take a week to do what you can probably do in a couple of days' (male 40s).

Technological innovations for improved lifestyles have had an equally important impact for leaseholders. There have been many innovations that have resulted in improvements in the lifestyle of rangeland residents. These include electric generators and appliances, refrigerators, radio, television and videos, private telephone connections, two-way radios as well as the Flying Doctor Service and school-of-the-air. More recently computers, the internet and improvements in private vehicles enable people to readily connect with the outside world. Solar power, using

photovoltaic cells, is also making life much more comfortable and less costly for those who can afford it. Some leaseholders now have 24 hour power and one has air conditioning.

Many leaseholders now use the internet and find it beneficial for their lifestyle. They use it for banking and accounting, which benefits their interaction with the tax department. However, using their credit card over the internet for financial transactions is considered unsafe by some people and the weekly mail system used for paying bills often results in overdue accounts. This leaseholder was one of the most progressive leaseholders in the study and his use of the computer and internet was extensive, revealing the considerable potential for computer use in the future.

‘I’ll give you two examples of how I have used the internet for my grazing system. When I bought my last truck I searched Australia, I went on the websearch and worked out where the best truck was for the price I wanted to buy it at and I got it in South Australia. I bought a big dozer not too long ago, but I got that in Western Australia and it was all on the internet. I could find out what the price of everything was in Australia. If you went to Perth, before the internet the price of everything was dictated by what was going on in Perth. The internet now actually gives you access to the real price. So it is a major tool for my business’ (male 40s).

Ison (2000, 59) suggests that a significant problem that leaseholders face is the adoption of technology with ‘designed-in dependence’. Increasing reliance on technology containing electronics they are not able to fix with tools from the workshop, results in a growing dependence on markets in distant localities. Leaseholders rely on the ability of themselves as well as others to correctly identify what the problem is, what parts are required and where they are located. They are therefore highly dependent on the assistance of others in a variety of dispersed

localities. These leaseholders discuss the difficult processes they have to go through to get services, parts or vehicles and the high costs involved.

‘We’re a bit off the track. We do have access but we’re 84 kilometres out of town so it's very expensive to have someone come out. When I had a gas stove problem by the time the fellow came out once to have a look at the problem and go back and then come out and put in the part I could have bought half the stove, and that was on travel alone, the part was \$35. I have got really tired of dealing with some of those difficulties. I joined one of those groups where they sent you stuff out and I actually found, because of breakages on one occasion and things disappearing on another occasion, you think it's just another problem and I’ll do it when I go to Perth or do it another way. We have to do another muster on these native cattle at some time soon and just getting a truck for that purpose is difficult. The shire has to do it by law but they have now found a way that they don’t have to and they say they can't afford the cost. But I don’t know how we can afford the cost anymore. One of the things was they didn’t have a truck to access them and they didn’t have the yards. So accessing things is problematic. At the moment we've got this problem with our email system and it seems to be a power issue and it's like we’re just going around in circles and it's still not resolved. So you just put it behind you because you can't face it for a while until you get the energy to deal with it again. Then when your phone goes out it's like you're in a black hole’ (female 40s).

‘The information you receive through things like internet or telephone or fax machine, they're all very good and verbal, but if you are actually trying to access a product you still have to rely on road or air transport to get it and that sometimes is pretty bloody frustrating. Like the actual physical mail service is once a week and if you're expecting a part to be delivered through the mail and it's the wrong one when it gets there, you send that back and you're talking weeks before you get it back again and that’s pretty damn hard. Whereas if you're living in a town area you can take it straight back to town, or ring the bloke up and abuse him and you'll get some form of response. Unfortunately living in the isolated area that we do, you make a phone call to

the bloke to say you've sent the wrong part and he says 'Oh well send it back and we'll send the right one'. So you pay again because you pay the freight in and the freight out, you pay the freight of the new one up again, so it's frustrating and costly in every way' (male 40s).

However, responses to this issue varied and while some leaseholders agreed with Ison (2000), the majority considered they had no significant problems associated with the supply of technology and services. The reason many pastoralists do not see this as a problem may be due to their acceptance of the way things are.

Few leaseholders appear to use the internet for information about their production system. Those that do appeared to be the younger and/or relatively new leaseholders and only a small number appeared to use it to help them with marketing their product. Several leaseholders used it for ordering machinery or personal products but the most significant purpose seems to be for education of their children. There appears to be a big potential for increased use of the computer and internet in these isolated regions that is not currently being used. A number of factors may be influencing this including age and education, as well as lack of time, computer skills and motivation.

It also appeared quite clear from leaseholder comments that despite the advances in technology providing potential for improved communications, there is a reduction in the work-related and social interaction between stations. A study of leaseholders in NSW by Epps (1996) found that with the elimination of telephone party lines, radio schedules and use of UHF transceivers the opportunities for engaging in spontaneous communication with others has been reduced. Telephone communication has played an important role in remote areas. In the past homesteads were connected to manual exchanges and many shared a single 'party line'. Although some people disliked the lack of privacy, these exchanges performed an important community role. Besides providing social interaction for people in isolated regions, they engendered a strong

sense of community. It was used to exchange local news, organise community functions and in times of emergency. He suggests that decreased populations and labour as well as the provision of entertainment through television and videos have also reduced communication.

Leaseholders in my study, especially in Mt Magnet, also suggested that with the improvement of motor vehicles they now often went to Geraldton or Perth to socialise. Interestingly, younger leaseholders may bring with them knowledge and experience with new technology that may help to slowly change lifestyles and production systems in these remote regions. This relatively new leaseholder explains how their innovative use of computers and digital cameras has allowed them to overcome the problem of ordering parts commented on by other leaseholders. The youth and experience of this couple probably influences their perceptions of technology use.

We are very lucky to have the speed we have for the satellite internet, we were lucky to get government support for that – broadband, so if you do need information you can easily find it right there and then. Ordering parts with digital cameras and things like that now, the guys want to order a part on a motor, we just go out there and take a shot and the boys are pointing to what they want. I think technology these days – if you've got a digital camera of course, you can get what you want no problems at all' (female 30s).

Ison and Russell (2000) suggest that a dilemma for the future of the rangelands is the difficulty of the diverse range of people involved in the industry to participate in the networks that give rise to new technologies, including things, practices or policies. Leasehold changes that include younger people or those who have been involved in other industries, bring people to the industry who generally have greater awareness and experience of adopting new technologies. In this way others in the industry may

also be influenced to adopt technologies that benefit their lifestyle and production capabilities. This may help to hasten the process of change. However, this may also tend to increase the separation between those who are more willing to adopt changes and those who are not, which will also influence the social interaction of these rangeland communities.

### **Summary**

Low economic profitability for many leaseholders suggests they will continue to struggle financially in the short-term and their ability to improve their land and infrastructure for long-term sustainability will be severely limited. Political decisions will remain a major influence on development and lease arrangements will prolong leaseholder anxieties in the short-term at least. Technology adoption will continue to provide a variety of advantages and disadvantages for leaseholder production and lifestyle as well as their rangeland communities.

## **CHAPTER 5**

### **CULTURAL DRIVERS OF CHANGE**

This chapter discusses the value systems driving changes that affect leaseholders and other stakeholders in the regions under study. It builds on The Development of Pastoral and Grazing Ideology in Chapter 3 by providing a discussion on what happens when changing value systems of the wider community come into contact with leaseholder value systems. Current literature on these value systems is used as a background to discuss leaseholder attitudes toward their role and how their cultural history influences their sense of place. This chapter draws out important attitudes and behaviours that reveal how leaseholder and wider community values differ and how traditional leaseholder values and behaviours are being forced to change to meet government strategies and associated community demands. The relationship between European pastoralists and Aboriginals is also an important component of the cultural value systems that drive change and a key factor in determining multiple land use in the future. However, an in-depth discussion of this issue was beyond the scope of this thesis.

### **CHANGING VALUE SYSTEMS AND THE DIFFICULTIES FOR LEASEHOLDERS**

The former importance of agricultural produce to the economy of Australia and the relative success of pastoralism in assisting this national goal elevated the role of pastoralists and helped to establish the relations of power between pastoralists, government and the wider community. Burnside & Boladeras (2002) suggest that pastoralists were seen as *de facto* owners of the land they were leasing for grazing and the role of government was to support the pastoral industry. They also point out that since the 1990's the rate of change to these underlying assumptions has rapidly increased. There is now a pastoral industry view that lessees remain *de facto* owners

of their leasehold land and that grazing is the only enduring use of the rangelands. This attitude was revealed by many comments made by leaseholders in the Upper Gascoyne and Mt Magnet regions. However, a contrasting wider community view is that the principal role of pastoral lessees is to manage the land for public good and that other land uses, apart from grazing, are also legitimate.

Today we recognise the role these changing values play in development. In recent decades the decline in commodity values and growth in amenity values are reducing the traditional emphasis on production values resulting in the increased complexity and pace of rural change. Holmes (2004a, 2) suggests this can be 'conceptualized as a multifunctional transition, in which a variable mix of consumption and protection values has emerged, contesting the former dominance of production values, and leading to greater heterogeneity in rural occupance at all scales'. He postulates that multifunctional values rather than production values are now the central dynamic driving rural change. These values are currently being driven by three forces.

List 2. **Multifunctional Value Systems Driving Change in the Rangelands.**

- **Production** values are driven by ‘agricultural overcapacity’, described as the continual push to increase production using technological advances and government policies that encourage production in areas of high productivity and force land users in marginalized regions to exit or diversify and/or amalgamate to remain viable.
- **Consumption** values are driven by urban interests, influenced by markets and focused on amenity uses such as recreation or lifestyle options that are not dependent on income from the property.
- **Protection** values are driven by the growing values of the wider community for environmental protection, sustainable land use and Aboriginal self-sufficiency. Negative impacts of agricultural overcapacity can contribute to a greater recognition of these values and conversion to this type of land use. Currently this land is located on areas of negligible production value in areas that were formerly under marginalized pastoral occupancy. These areas have low market value and are often adjoining vacant crown land or areas with tourist features that make them attractive. (Holmes 2004a, 4).

Discussing the growing contrast between agriculture and pastoralism, Holmes (2004a) argues that rangeland transition is currently being driven by the powerful force of changing urban values. Yet the forces driving agricultural change, i.e. agricultural overcapacity and amenity-oriented uses, are not currently strong enough to be major drivers of change in the rangelands. In his 1994 report on pastoral lease tenure in Australia, Holmes suggests that changing urban values for rangeland resources also create a paradox for pastoralism. As ‘resource values, tied to the land are being enhanced’, the ‘income streams to leaseholders are being diminished’. He argues that as a result of this change, land values are separated from traditional

leasehold title (Holmes 1994b, 109). Therefore lease rentals do not reflect the value of the land for pastoral purposes.

In his 2004b report, Holmes also argues that although these new values are driving future directions in the rangelands, leaseholders are not able to take advantage of the income streams and job opportunities arising from these changes. He comments that the economic benefits of the new 'income-generating activities are being captured by cities with few benefits to outback landholders or remote communities' (Holmes 2004b, 235). In his 2004a report, Holmes suggests that as we move to a new era of multiple goals, pastoralism and grazing remains focused on the production values of the past, but they now have to include protection values of sustainable land use.

The changing face of Australia's rural and regional areas shows a continuing trend in population movement towards coastal and agricultural areas of higher rainfall with a decline in the dryer, more remote farming and pastoral regions of inland Australia. This is resulting in a growing spatial unevenness of agricultural production within Australia. This movement is the result of complex environmental, social and cultural aspects along with government policy. Holmes (2004a) suggests that the dominance of pastoralism and grazing has remained intact until recent years partly because of the spatial occupance of the industry and the socio-political attitudes that supported it. However, recent changes in land use, such as conservation reserves and Aboriginal land, favour protection and consumption values and this is leading to increased appreciation of those values, thereby placing greater pressure on leaseholders.

A dilemma for those involved in resource allocation is the spatial prioritisation of the land. Regions where productivity is low, such as in the Gascoyne-Murchison, have areas suitable for grazing that are concentrated on a limited number of nutrient rich

areas, although these areas may be expanded during better seasons. The problem for multiple use management is that the emerging values are also concentrated in these same areas, leading to potential for compounding problems of land degradation as well as competition and conflict between users. These demands for different regional areas are linked to important factors such as pastoral productivity, mining activity, Aboriginal self-sufficiency, tourism features, recreational requirements and biodiversity values. They are also areas with accessibility. This comment by the Aboriginal leaseholder clearly expressed the conflict that is occurring between the various interest groups over access to rangeland resources.

‘A lot of the stations are also bringing in this ecotourism into the area. From an Aboriginal perspective I suppose there is potential for us to go into that area but there are a couple of things that are holding us up there, because we’ve actually looked into it. ...We feel there is potential for tourism but to do it the people who run the tourism in the Gascoyne region are the pastoralists themselves and they sit on those boards, so it's not so much as going to the board to get permission. They way I look at it is, we are going to go to this board to step on their toes. ...they run the Kennedy Ranges as far as tourism goes. So when we apply for a licence to do something up there, we are stepping on their toes, and the question is ‘Are they going to say that we can have this in preference to themselves?’ I don’t think so. The A class reserve that exists over at Mt Augustus, that’s another thing in itself. The pastoralists and CALM are all working together. So for us to come in from the cold, it doesn’t work like that’ (male 40s).

According to Holmes (1996), it is essential for development strategies to understand the potential of these areas for the different activities and to have effective regulation and management strategies established at property, local and regional levels.

Holmes (1994a) argues the process of change in rangeland regions of Australia is creating a need for new definitions for rangelands. In the past rangelands were

defined in terms of the productive output from grazing of the natural landscape. Today the focus on production has shifted and the definition avoids mentioning grazing animals, describing it in more general terms of climate, vegetation and land use factors. Holmes points out this shift in definition shows recognition of the emerging multiple uses of the land and demonstrates the changing attitudes that are more inclusive of all other uses of the rangelands, rather than the restrictive use of pastoralism as the defining criteria. It therefore encompasses the multiple values we now hold for the region. Previous definitions, based on production values, were founded on notions of land as being either productive or wasteland that was ‘useless’ or ‘empty’. Emerging values include a greater appreciation for Aboriginal culture, animal welfare and the natural landscape.

In his 2004a report Holmes suggests that new definitions encompassing multiple uses and values signify a shift from the domination of production values to a mix of production, consumption and protection values. This is having an effect on the attitudes of leaseholders in the Upper Gascoyne and Mt Magnet and their values and definitions toward land use now appear to contain a greater complexity than in past decades. Leaseholders commented on recent land acquisitions by CALM for native reserves (see Chapter 9, Gascoyne Murchison Strategy), and many found the changes occurring because of emerging community values were difficult to understand and their comments reflect this dilemma.

‘...those great tracts of land being taken and locked up, you are talking about roughly 2 million acres; I can’t see the benefit of it. What are they going to do with it? ...I just can’t figure out what they are going to do with all the land. Eventually they could lease it; we don’t have any trouble with that. ... Why do they want so much land?’ (couple 40s).

Newer members of the leaseholder community appeared more ready to accept the changes that are occurring. These relatively new leaseholders even envisaged benefits for themselves. They implied the conservation areas may be useful to use as a benchmark for land regeneration in the region.

‘We've actually asked if we can go to the CALM property in the region to just go and have a look to see what the country is like with all the stock removed, but we haven't actually done it yet. But it would be very interesting to see what the country can come back to, because that would've been a fairly intensely stocked place with similar sorts of country to this (couple, 50's).

The changing perceptions of the wider community about land use were an obvious concern to leaseholders in the Upper Gascoyne and Mt Magnet who see their role as caretakers of the rangelands. However the evidence about urban perceptions of rangeland use is limited. One study that has improved our knowledge and awareness in this area is a study undertaken by Nicholls (2000) that investigated Western Australia urban community perceptions and future aspirations for their rangelands. This study surveyed urban knowledge about the rangelands and ascertained the importance of the rangelands to those who lived in both urban and rangeland communities. Future urban aspirations for the rangelands were also surveyed, as well as who they considered should be involved in making decisions about land use. The study found the following attitudes within the urban community.

### List 3. **Urban Community Attitudes.**

The urban community:

- generally considered, were only moderately knowledgeable about the rangelands.
- perceived the rangelands as being highly relevant to the Australian identity and rated its intrinsic values higher than its productive value.
- accurately assessed the importance of most issues facing pastoralists and graziers but overestimated the importance of environmental issues to both leaseholders and Aboriginal people.
- considered the rangelands were in a moderate environmental condition and that the pastoral industry had caused a lot of change to the environment.
- considered nature conservation, education and scientific usage and tourism were the most preferred ways to use the rangelands with the traditional mining and pastoralism industries only moderately desired.
- preferred groups with specific rangeland interests, such as conservation groups and the Rangeland Society to have the highest involvement in future decision making about the rangelands and involvement of the Federal government to have the least. Source: Nicholls (2000).

There were, however, a number of factors that influenced these attitudes and results including, the level of respondent access to the rangelands, education and values. As the author suggested, the study was also based on limited data about pastoral community concerns. My experience as a researcher also suggests that the reliance on mailed surveys influences the randomness of respondents. I suggest those respondents who were not interested in the subject and knew little about it would be highly unlikely to respond to such a lengthy survey and may have produced some potential bias in the results.

When asked what their three main issues of concern were, leaseholders in the Upper Gascoyne and Mt Magnet study listed the security of their land most often. Their issues are listed in order of frequency in which they were mentioned.

**List 4. Upper Gascoyne and Mt Magnet Leaseholder Issues of Concern**

The concerns of the Upper Gascoyne and Mt Magnet leaseholders included:

- Lease tenure, Native Title and government land acquisitions.
- Economic issues and the long-term viability of the industry including levels of debt being carried by some leaseholders, and concern about future commodity prices and increasing costs and rates. Concern about future markets for their products and the continuing problem of the live export trade were also listed as concerns.
- The weather and future seasonal viability for grazing animals. Many leaseholders were concerned about the impacts of the current dry seasonal conditions and how much longer it would last.
- Animal control, including the control of wild dog numbers as well as the control of Damara sheep in the area.
- These three issues were listed an equal number of times: Access issues including both tourist and Aboriginal access; Government Policy including one vote one value; the social and economic impacts of rural restructure and the social sustainability of their industry including the aging population and issues of succession.
- Urban pressures were listed by three leaseholders as an issue of concern for them although others had spoken of this earlier in the interview.

Overall their comments about their issues of concern generally reflect similar trends to urban attitudes in Nicholls' study. Their comments included statements about the ignorance of the general public about the rangelands and themselves. However, they had a wide variance in ideas about how they felt about the threat of urban pressures

to their way of life in the future. This leaseholder suggested the disproportionate size of urban and rural populations will disadvantage rural sectors in the future.

‘With the tenure issue, I just think the greenies will win in the end. There are that many restrictions on the thing that will make it impossible to do anything. They're talking about these rolling leases. We start off with this rolling lease in 2015 and then it'll be 15 years before the first review so whatever is put in place now, all that review process could quite easily get hijacked by the greenies or they might even be the total government by then, they might go to the election on the policy of saving the rangelands like they did with the timber industry, and out the door we'll go. 250 families. How important are they compared to 3-4 million people living in Perth that want this land saved. I suppose it won't really concern me in 30 years time but that's the way I think it's going to go, but I'll still go for a long time. There will be a lot of little negative stories that will come on TV in the next 25 years about this environment and how the cows are ruining this and that. They are very patient these people, they are not going to do it overnight, but they'll get there. And there's another generation of people that's further removed from outside the urban areas, they don't know which way is up as far as the country goes so they will believe anything. They'll vote to 'save the rangelands'. I'd say that's the way it's going anyway' (male 60s).

Another leaseholder suggested future leasehold land may all be under Aboriginal ownership and leaseholders would have to answer to Aboriginal land owners. Many leaseholders believed the demands from the public for greater accountability of their land management was going to be a key threat to their viability in the future. Some leaseholders believe conservationists are the group placing most pressure on their industry and believe they are often misinformed. One leaseholder commented that most of the general public still want leaseholders to be in the rangelands and it is only conservationists who want to shut down their industry. The following comment

explained how some leaseholders were attempting to deal with the situation by working with ecologists and how this was an added economic burden for them.

‘We’ve got 30 odd sites around the station that we monitor. We’re trying to document the fact that we’re conservationists .... we know we are preserving this place for the next generation, but we've now got to prove it to the outside world and have evidence of what we've been doing. .. I think now we work with the conservationists and I think now we've got to convince them that we do, and economically we’ve got to get as streamlined as we possibly can. And it's hard because you're talking about streamlining and then with the conservation side of things you’ve got to pick up on a lot more work to prove that you're a conservationist’ (female 30s).

The following leaseholder believed the industry needs to take more responsibility for this process.

And unless the industry starts doing it themselves, the conditions that someone else will put on them is going to be a problem’ (couple 50s).

Many leaseholders in the Upper Gascoyne and Mt Magnet considered the general public also had limited understanding or respect for their roles and responsibilities. Leaseholders were asked whether they considered there was a need for the public to recognize the value of the contribution of pastoralists and graziers as caretakers of the inland areas and over 60% of pastoralists agreed. Besides the role of custodians or caretakers of the land, leaseholders also considered their responsibilities and role in the rangelands included national security, roadside assistance for tourists or visitors who had lost their way or when their vehicle was incapacitated or as first aid or fire officers if there is spillage with transport or accidents on the road. They were also used by visitors as sources for petrol and other vehicle components and as postal outlets for those people who were staying in the area. Others thought that leaseholders had a role in the care and maintenance of natural features and man-

made artefacts in the area. This leaseholder considered they had an overseeing role for tourists. Other leaseholders were also concerned about the safety aspect of public access for leaseholders.

'I think that the pastoralists already carries out a role of checking on whether people have moved through or left rubbish or cleaning up after, or advising the police or wildlife people if there are strange happenings, animals affected or drugs on properties; there's a lot of issues with drugs. So in a way they already have an overseeing role. And in a way we do it for the public. There's also the role of being the local tourist bureau because you advise people of where the roads are or what there is to see as they drive past or they've got lost or whatever. Also pulling people out of bogs so you become a sort of carer, and this is often at your own expense too, it's just something that you do. I think in terms of regularity, it is a bit difficult. On the one hand the pastoralist can advise the people of what they can and can't do but at the end of the day you are generally there by yourself and you're pretty vulnerable if there's a car load of people, so you would just advise the local police. I think this is more difficult. I think they need to be better recognized for their caretaker role' (female 40s)

The remaining leaseholders had a wide variance in attitudes toward this issue. Many thought their equipment and skills were considered to be community assets available for public use when required and that this was just part of being a leaseholder in these remote areas. They did not feel there was any need for public recognition. This leaseholder appeared to sum the situation up well with his rather pragmatic attitude toward the role of leaseholders in the rangelands.

'I don't think you actually need them but I think one of the advantages would be that there are people in the area and I guess they're basically being paid to look after that bit of country, that's their place... So they have a role in what's going on in that locality. It's not a big monetary gain to the State having pastoralists in the Southern Rangelands but you've got to look at more than just the monetary gain that the State gets' (male 50s).

Access to information about each other for both leaseholders and the urban public is generally from portrayals on television screens. This is often the best method pastoralists have to learn about urban values for the rangelands and the only way urban residents learn of the 'outback' and the people who live and work in it. It is easy to see how this results in each group developing negative images and stereotypes which limits potential for finding appropriate solutions to a difficult and complex situation (Centre for International Economics 1997). Nicholls' (2000) study found that most urban people in Western Australia got their information from non-fictional TV and personal experience. Of notable concern was that urban people considered they did not learn very much about the rangelands during their school education. However, as the author noted, the survey contained only a small percentage of younger respondents and changes in education in recent decades may be producing a different perception amongst younger age groups.

Leaseholders made a number of suggestions about how to improve the urban community's awareness of leaseholder roles and responsibilities in the rangelands. These included information stalls provided by government agencies at events such as the Royal Show, or field days to educate the public or increased media publicity such as news articles in newspapers or magazines or television programs. This leaseholder considered the old white male squatter image still remains for many people and that there needs to be a greater public and leaseholder awareness of women's contribution and what it means to be a modern pastoralist or grazier today. She maintains there is also a need for the public to become more aware and considerate when accessing leasehold land. She believes they need to;

'Get up to speed, catch up with what's going on, where things are at, where people are moving, what the impetus is and also the issue that pastoralism has

always been a man's domain when in fact some of the women have been innovators who've brought in their new ideas or are actively involved in it. So I would really like to see a credible understanding of what a pastoralist today is all about and build on that so that when people come out here they have an automatic respect that the person has a multifaceted role and they know about those trees that you may pull out for your camp. It's just being more aware of the role of pastoralists in the place and that there's a need to ask permission or to make people aware that you are on the road going through. It probably worked in the past but time has moved on and a lot of new people have moved in and the pastoralists have to better articulate their place in the modern society and show their place in it and bring them up to speed, and maybe bring the pastoralists up to speed as well' (female 40s).

Others suggested that people need to become involved more rather than just receiving information and considered an increase in ecotourism or farm stays that inform the public about station life would be more beneficial. Their responses reflected the fact that even amongst people involved in the same industry, the belief in the importance of the role of leaseholders in the rangelands and the need for greater public awareness differs. Leaseholders today appear to be taking a far greater role in environmental protection than in past decades. However, as Nicholls (2000, 174) suggested, 'it appears that this may not be widely appreciated within the urban community'. This leaseholder perhaps sums up the problem of trying to change public awareness about rural issues.

'If you walked down to St Georges Terrace and asked the people a few questions he wouldn't know a lot about what is happening. The gap between the country and the city has always been there but I think it may be widening a little bit. ...I think it's probably beneficial that half the population knows what the other half are actually doing and why they're doing it. There should be more public awareness. They do have something at the Royal Show but what is the Royal Show, it is nothing really. A lot of people in the city go to take the kids and buy show bags and go on the rides. Apart from that, do

they actually look at the animals? I suspect not. Does the average citizen want to know? Probably not. He is too busy doing his own thing and that's it. I'm sure he doesn't really care what's happening elsewhere. People in cities are getting more and more leisure time and they are preoccupied with that and I'm sure that what happens outside of Perth, they don't care about' (male 60s).

Overall leaseholders believed they had a definite role to play in managing the rangeland environment to the best of their ability as well as maintaining infrastructure and services for the public. But, whatever the role that leaseholders or urban communities perceive they have in these regions, the large numbers of feral and native animals indicate this land cannot simply be managed with benign neglect. It requires active management to control the impact of these animals whether it's by pastoralists, Indigenous owners or CALM (Pringle 2005). This leaseholder had his own thoughts on how this issue might be solved.

We're looking quite a way down the track and you don't know what might happen in the meantime. They might make us all rangers. They could say 'Well we're going to pay you to be there' (male 30s).

Many leaseholders appeared very concerned about the low level of awareness and attitude of the public toward them and made a number of varied suggestions about how they considered public awareness could be improved. However, as the above comment suggests the growing gap between urban and rural values and the general unconcern many urban people have for rural issues will potentially make this very difficult. But, emerging urban attitudes for greater consumption and protection values in the use of rangelands will continue to place increasing pressure on leaseholder production values in the future. Therefore as urban community demands for multiple-use of rangelands continues to grow, the task of integrating these widely differing values will remain a significant challenge for all those involved.

## LEASEHOLDER CULTURAL ISSUES AND PERCEPTIONS THAT INFLUENCE CHANGE

Leaseholders' attitudes toward their roles as caretakers emerge from their cultural value system. They are embedded in the culture of pastoralism, the ideology of which gives them a strong sense of belonging. It also provides them with a sense of distinctive identity and a deep attachment to their property. A study by Webb, Cary & Geldens (2002) of graziers in NSW found that these strong attachments to people, place and culture make it very difficult for graziers to leave and reduce the likelihood of them exiting the industry of their own accord. This also explains the reasons why many leaseholders continue to remain on their property even when it continues to produce very little income for them. Interestingly the study also found that most graziers who had left the industry considered they had an improved quality of life since leaving their properties.

The recent government GMS Voluntary Lease Adjustment (VLA) scheme to assist leaseholders to exit the industry also found that few leaseholders took advantage of the opportunity to leave the industry. The URS Australia PTY Ltd (URS) (2004, vi) report found that 'the GMS was not able to meet its full objectives in structural adjustment' and that the principle remaining challenge was 'to deal with businesses that are clearly in need of adjustment.' During my interview experience it also appeared that further lease adjustment was necessary. The Gascoyne Murchison Strategy Annual Report 2003-2004 also suggested that leaseholders were influenced in their lease adjustment decision because the process began at a period when seasons were reasonable and commodity prices had just begun to recover. They were therefore offered hope for increased income in the future and were reluctant to sell and leave the industry. There were also complex socio-psychological reasons why this did not occur. (Gascoyne Murchison Strategy Board 2004). Leaseholders in the

Upper Gascoyne and Mt Magnet commented on their long association with the region, their sense of belonging and their strong connection with the country and the lifestyle of pastoralism. Long-term leaseholders generally discussed their leasehold land in terms of property belonging to them and those who had inherited land from previous generations had a particularly strong bond with their land.

‘I was brought up here, I wasn’t born on the place but my mother went to Geraldton to have me and brought me back here as an infant. We have always owned this station since it was taken up. I can understand those black fellows love of their bit of country because that’s the way it is for me. I couldn’t stand not to be here’ (male 60s).

(K) likes being here because this is where his great great grandfather took up the land back in 1888, and he knows every windmill on the place. Everything here was done by one of his ancestors’ (female 30s).

This strong dynastic ideology makes it especially difficult for them to exit the industry despite the declining financial viability of these properties. The comment below reflects this ideological lifestyle of their forebears when Aboriginal labour was cheap and there was plenty of time for leisure.

‘When (J) was a young man, or maybe when Pa and Gran were here, they had cheap Aboriginal labour and there used to be yardmen, house girls, there’d be 20 or 30 stockmen out there, and they’d have time to go and play tennis, there’s our old tennis court there but we don’t use that anymore. But every station had a tennis court and we had a nine hole golf course here and you can still see the greens’ (female 30s).

This historical legacy is an important element of the special culture of pastoralism and grazing that created the unique identity of the Australian pastoralist, however there is little acknowledgement of the important role that Aboriginals played in this development. Some leaseholder comments also suggested they would like to sell

their property when the current seasonal conditions improve. This may reflect the sustainability of some grazing enterprises in these regions today.

Historical events in the development of pastoralism and grazing have also created a strong sense of place for leaseholders in these regions. Some of them discussed places on their properties or within the community that mark cultural or family events that occurred in the past and remain areas of significance to them today. As Webb, Cary & Geldens (2002, vii) discovered in a study of graziers of New South Wales their properties are not just 'biophysical assemblages' they are also 'cultural landscapes that have been socially constructed' and are 'imbued with individually, socially and culturally relevant meanings and symbols'.

The deep appreciation leaseholders feel for their cultural landscape may provide them with greater opportunities for income in the future. The growth in tourism in the rangelands is already encouraging an increasing number of leaseholders to diversify into this field of income production. It was suggested by leaseholders that the socially constructed places of significance to them may also be of interest to tourists. This would provide opportunities for leaseholders to develop tourism that incorporates local cultural icons to produce an added income. However, besides the practical reasons of needing to have time available or skills to undertake tourism ventures, this raised complex issues involving the independent character of leaseholders and their desire to protect their lifestyle and sense of place.

'We could go into tourism, we've got a good setup here, we've built a brand new setup with quarters with solar power; we've spent a lot of money here. So that's an alternative if it comes to that. But my point of view is you live in the bush for peace and quiet; if you like that sort of life. After 38 years of it I'm getting used to it. But if it was a good thing, we've got a lot to offer tourism here; ...we've got the accommodation, it would be good but you've

got to put up with the public. ...we would have the history side if we wanted it which we would push more than anything' (male 30's).

This strong sense of belonging also carries with it a sense of responsibility or stewardship and many leaseholders feel protective toward the cultural icons of importance in their local area. They commented on the areas and artefacts of significance that are sometimes stolen or vandalized by the public in these remote areas where security is difficult or impossible to maintain. The following leaseholders' comments demonstrate the frustration they feel about their lack of ability to control access to these areas of importance and to ensure that they are not stolen or vandalised by the public.

'Yes I have got a problem with that (public access). There's a dam up on this place where the railway line went through and the dam was put in for water for the steam trains and it's quite a beautiful area. But no-one knew it was there, it was too far out of town. Then lo and behold without saying anything to me the local shire graded a road into it and gave the public access... People are just going to go there. Nice people go there and always ask me. I always say yes, because you know they are going to look after it. But then you get the ratbags up there. It was pristine, it was all covered in asbestos and they've smashed nearly every piece of asbestos with rocks. They even set fire to the pillars holding the thing up and tried to burn it down; they stole a motor car and drove that into it' (male 60s).

'These access issues are going to get worse. We've got an issue at the moment with a fellow whose pegged a mine to mine fossils, and can take up to 20,000 tons on a temporary permit. Under the mining act you can do this. How would it be if they mined those dinosaur fossils in Broome? So you try and protect things by yourself and you're not able to' (male 50s).

'I'm a great believer in not opening things up to tourism without being present while they're there because things go missing. Everybody takes this and that and you end up with nothing. So I think leaseholders have a policing role in the rangelands to some extent. We don't show too many people the

grave because the headstone will go and then it's finished. So with tourism, that's where you've got to put a presence in with the people or else they're going to take things. It's a shame that you can't trust everyone' (male 40s).

These comments demonstrate the changing values, driven by urban interests, which are increasingly placing pressures on leaseholders' lifestyle. However, as leaseholder incomes decline and public accessibility improves, this may provide a useful way for leaseholders to diversify their incomes in the future. If public access to sites of interest is increased, leaseholders may also require greater government assistance in the future. As one leaseholder suggested this may take the form of a paid ranger position accompanied with some form of authoritative power and improved back-up from police in the region.

'I think there could be government schemes to help leaseholders in the policing role for looking after things within the lease. If you were to get something for doing that then of course you'd have to have annual or quarterly reports for doing things like that. But that really would acknowledge your responsibilities. By doing that as well it would open it up a lot and bring it to the attention of people what really is in the rangelands for tourism and for the future as well. There's a lot of secret sites in the bush that people know about and no-one ever says anything. I suppose they're scared to let them go in because it's their resource if they ever need it, to let that be known. But some of these things are significant and if it did get known and you were like a ranger, that you were the leaseholder and you also had an incentive by the government to look after that, then you could go right into tourism, because you would have government backing for the policing of the place. I reckon it is something they should look at in the future to open it up, to get into the hidden little spots in the bush. ...So I think there should be government incentives that help pastoralists to look after the rangelands in this respect because we do it anyway and if there was an incentive there you would do it better' (male 40s).

However leaseholders remain wary about this type of development because of their concern for both themselves and the rangeland features of interest, for which they have a sense of belonging and protection. Pastoral communities in the Nicholls (2000) study indicated they were also averse to increasing access for educational and scientific purposes. Nicholls argues this may be because they perceive it could lead to government intervention resulting in loss of access and control over their land. Comments from leaseholders in the Upper Gascoyne and Mt Magnet appear to confirm that idea. The complex nature of this issue and difficulties involved reduce leaseholders' ability and willingness to diversify into this type enterprise. The current situation may also be limiting public access to this knowledge, reducing their awareness and appreciation of the region, and increasing the urban/rural gap.

The overall issue of access to pastoral properties by tourists, recreation enthusiasts, miners and Aboriginals is a major concern for all stakeholders. It is the front line of conflict between the emerging values of the wider community and the traditional dominance of leaseholder production values. Holmes (2003, 235) suggests there is a need for greater public access to pastoral properties. He also recommended a need to 'enhance the opportunity spectrum for footloose visitors, while minimising negative impacts'. However this is proving to be a difficult adjustment for some leaseholders, who generally consider their property as their own private domain. This situation reflects the need for greater engagement by all stakeholders and the development of effective policy for multiple use of rangelands.

Many other leaseholder comments revealed that activities and attitudes of the wider community are placing increasing pressure on their lifestyle and the sustainability of their traditional ideology of property rights. However, a greater discussion on the significance and complexity of this issue was beyond the scope of this thesis.

## **Summary**

Leaseholders' comments revealed their anxiety over the replacement of dominant production values of the past by changing values of the wider community. Their strong attachment to cultural identity and sense of 'ownership' constrains the ability of many leaseholders to effectively cope with the changing demands for greater public access and multiple use of rangelands. The general acknowledgement of the growing gap between those within the industry and the wider community by both leaseholders and the general public demonstrates the complex nature of the issues involved and the difficulties in developing effective strategies for change.

## **CHAPTER 6**

### **THE CHALLENGES FOR SUSTAINABLE LAND USE**

The Western Australian State Sustainability Strategy (2003) explains that sustainable use of rangelands is based on the maintenance of ecological health, productive capacity and social capital of the region. It also informs us that much of the region has been severely degraded from pastoral activity; therefore the productive capacity has been greatly reduced. The social capital has also been severely eroded. Sustainability is therefore both a challenge to the traditional methods and ideology of pastoralism and an opportunity to envision and change management strategies so land use becomes more sustainable. This chapter discusses how the complex environment of production in the region and leaseholder attitudes create barriers for sustainable land use. It also explores sustainable land use issues arising from recent changes in grazing management and how leaseholders are attempting to meet the challenges to growing community demands for sustainable land use. The challenges posed by future threats to sustainable land use in these regions and the issues affecting social sustainability are also examined in this chapter.

### **RANGELAND USE AND BARRIERS THAT ARISE FOR SUSTAINABILITY**

As described in Chapter 1 (Sustainability as a Driver of Change), the National Principles and Guidelines for Rangeland Management, 1999, are for:

1. Conservation and management of the natural environment,
2. Sustainable economic activity,
3. Recognition and support for social, aesthetic, cultural and heritage values, diversity and development (Australian & New Zealand Environment & Conservation Council (ANZECC and Agriculture &

Resource Management Council of Australia & New Zealand  
(ARMCANZ) 1999, 11).

Rangelands are important because they are a reservoir for Australia's biodiversity and contain much of the most distinctive plant and animal groups. Effective management of the rangelands is vital to retain biodiversity for both current and potential rangeland users for reasons such as: it offers possibilities for diversification of rangeland enterprises and economic self-reliance, it supports a major tourism industry, it is an important aspect of life for many residents of the rangelands, especially leaseholders and Aboriginal people, and it also provides ecosystem services such as soil maintenance, shade, reproduction and weed and pest control. It is also important for Australia in world terms as many rangelands overseas have been destroyed and we therefore have an opportunity to maintain this important asset (Woinarski & Fisher 2002).

However, the complexity and extreme variability of the rangeland environment create major barriers for sustainable land use for many leaseholders. Stafford Smith, Morton & Ash (2000, 198) point out this variability will never allow us to predict all circumstances that may occur in these regions and suggest we need to acknowledge that mistakes in management will inevitably happen. They inform us that some areas of rangelands are less resilient than others and are therefore more susceptible to damage through management mistakes than others. They recommend the key to sustainable land use therefore is to 'recognise the spectrum between resilient and non-resilient regions under pastoral use' and to use this knowledge to develop public policy that maximises the public benefits in rangelands.

The highly variable rangeland environment also reduces a leaseholder's ability to enhance production to keep up with increasing cost/price pressures. Advances in

agricultural technology such as information technology, aerial mustering, vehicles, and infrastructure development have improved leaseholder incomes in the past. However, these forms of technology only allowed moderate gains in productivity. The pressure to increase production using these forms of investment places greater reliance on capital investments and reduces the contribution of the land to production outcomes. Consequently there is greater pressure to amalgamate land or reduce costs by disinvestment, resulting in increased potential for unsustainable land use practices. This inevitably leads to lowered productive potential, creating increased economic and social stress and continued deterioration of the land (Bryant 1992).

House (1991, 59) stated that the gross loss of production due to vegetation decline is low in pastoral regions compared to agricultural regions but 'is significant in terms of the value of production from the pastoral region'. Stafford Smith, Morton & Ash (2000, 191) argue that proof of lowered production potential remains limited and suggest this may be because in some cases 'grazing is sustainable in the strict sense; in others, change has occurred but the spatial and temporal variability of the rangelands renders it hard to detect'. This wide variability in the rangeland environment constrains current understanding of the extent of the issue and creates difficulties for effective strategy and policy development for sustainable land use.

Pringle & Landsberg (2004) inform us that accumulated grazing pressure is one of the primary threats to rangeland biodiversity. Monitoring and management that takes account of the spatial distribution of grazing, and the intensity and timing of grazing pressure, are therefore the most important activities for preventing degradation and encouraging rehabilitation. Recent grazing research based on this premise appears to be providing an effective method for improving grazing outcomes. Norton (2005a) informs us that rotational grazing has proved to be more financially efficient and

ecologically sustainable. This grazing system has a more holistic approach to production by spreading stock over a larger area of land for shorter periods of time. Norton suggests that the grazing behaviour of large numbers of animals that are moved frequently is different from small numbers that are held in one large paddock all the time. By controlling where and when livestock graze, rotational grazing 'reduces selective grazing on palatable species and avoids degradation on preferred grazing areas' (Norton 2005b, 6).

This system controls the frequency at which desirable plants are grazed, providing them with adequate periods of rest. It also aids leaseholders in their primary management goal of matching total stocking numbers to the station's feed resources. It allows them to readily assess the availability of feed and to use areas of their own property for agistment when required. Norton (2005a) suggests it also reduces costs because leaseholders only have to maintain infrastructure and husband stock in one area of their property at a time. The huge costs of undertaking daily 'mill runs' are therefore reduced. However, Norton (2005b) also advises that the success of this system relies on the interest and skills of the leaseholder. Therefore, leaseholder motivation and their ability to implement this system effectively, appear to be the greatest barriers to adoption of this system of grazing management.

Strategies to improve sustainability are generally influenced by leaseholder attitudes toward adoption of change (Marsh 1998; Pannell 1998). The Centre for International Economics (1997) report argues that one of the key problems for sustainability in the rangelands is that leaseholders may not see short-term profitability and ecological sustainability as the same thing, making it difficult to develop strategies for ecologically sustainable development. A study involving pastoralists in Queensland undertaken by the Centre for International Economics (1997) found that all

pastoralists believed they were managing their property on a sustainable basis and land degradation was not a major problem. This showed that the concept of sustainable land use was very different between pastoralists and many people in the wider community.

Two other important points to come out of this study were that pastoralists believed the decline in productivity of their land was purely a grazing management or weed problem that could be controlled and, second, they did not associate the economic viability of their production systems with environmental degradation and the subsequent decline of their natural resource base. Hence, they did not believe there was a need to change their attitude toward management of the rangelands. The report suggested that the greatest obstacle to sustainable land use for many leaseholders is therefore, the awareness and ownership of the problem (Centre for International Economics 1997). The URS (2004, 4-19) report also found that when asked about changes in management strategies, very few pastoralists and graziers who had been involved with the Gascoyne Murchison Strategy commented on their involvement with the EMU process (Chapter 9, The EMU Process). The report suggested this may have occurred because of the 'disconnect between productivity and environmental activities/performance'.

However, a more recent study commissioned by Land, Water & Wool (2003, 3) of wool producers throughout Australia, shows a trend toward greater understanding of the importance of sustainable natural resource management to production. This study found that Australian wool producers 'strongly believed that natural resource management results in productivity, profitability and sustainability gains' and that 'good natural resource management can significantly improve their business bottom line and doesn't necessarily come at a cost' (Flanery, Lovett & Hogan 2003, 3). The

study also found relatively high rates of adoption of sustainable natural resource management practices among wool producers in pastoral zones. However the benefits of sustainable natural resource management were mostly seen by producers as the availability and sustainability of feed for livestock. Only a small percentage of respondents listed the benefits to the natural environment. Interestingly the survey also found that 'awareness and adoption of natural resource management is usually higher among wool growers who are tertiary educated, female, younger than 60 and members of a natural resource management or producer group'. These studies undertaken six years apart, may have been influenced by survey design and/or differences in attitudes between producers in Queensland and the rest of Australia. However, they may also reveal the changing importance society is placing on sustainable land use and the pressure this is placing on leaseholder attitudes.

Ward and Stafford Smith (2004) suggest that living sustainably while creating wealth is the key to social sustainability in rangeland regions. It is unlikely, they argue, that leaseholders will want to live in these harsh conditions if they are not able to make a living. Globalisation, combined with State and Federal policies continue to place mounting pressure on leaseholder incomes. Leaseholder adjustment strategies are resulting in aging and rapidly declining populations, Government policies designed to improve efficiency reduce the level of services in rangeland regions. Consequently, those leaseholders remaining are forced to become increasingly more efficient with their time and income. These changes are creating growing pressure on the social sustainability of pastoral and grazing communities in these regions.

## **LEASEHOLDER ATTITUDES TOWARD ADOPTION OF CHANGE FOR SUSTAINABILITY**

Marsh (1998) listed factors that influence adoption of change and Pannell (1998; 1999) discussed the uncertainties, conditions and challenges involved in adoption of new technologies and sustainable farming systems. Factors influencing change in the Upper Gascoyne and Mt Magnet regions were similar to these. A number of leaseholders raised the issue of risk when discussing the difficulties of adopting change. Leaseholders were asked their opinion on the future potential of their grazing system. This leaseholder made a statement about risk that seemed to encapsulate for me what it means to be a leaseholder.

‘We don’t go to the casino but we’re the biggest gamblers in the world’  
(female 50s).

Most leaseholders focussed on the economic viability of their production systems. This leaseholder’s comment reflected a point of view about conservation and sustainability that underpinned many comments made by other leaseholders.

‘But I just think the carry on about sustainability to some extent is something that interests pastoralists more than anyone else. There are lots of people that have got an interest in it that looks at a snapshot in a short time. Most of the people involved in the pastoral industry were there, even myself, I know exactly what it was like 15 years ago and there's a good chance I'll still have an interest in it 15 years from now. If it's unsustainable and I do it in an unsustainable manner I will be the one that will wither and shrivel and die on the vine, so it has a greater impact on me than any other individual in the whole world’ (male 40s).

His comment reflects those in the two studies above suggesting that sustainability for production purposes may be very different from sustainability for biodiversity. Woinarski & Fisher (2002) argue that the mathematics of defining and trading-off conservation value versus economic production has been achieved in some instances,

but that much of the problem remains unresolved. Many of these issues are centred on the philosophical debate of public good versus private benefit. In an article focussed on mining in the rangelands, Read (2002) calls for all rangeland users who gain financially from significant biodiversity loss to use some of their profit to improve biodiversity outcomes elsewhere. However, under current economic conditions, this would not be feasible for most pastoral properties.

Leaseholders had a wide variance of views on the future of their production system as well as the pastoral industry (Chapter 7, Animal Changes in the Upper Gascoyne and Mt Magnet). Overall the younger leaseholders had a more positive outlook than the older leaseholders. These attitudes may be influencing future production and the sustainable land use in the region. A study by Cary, Webb & Barr (2002) found that leaseholders who felt secure about their future financial situation were more likely to invest resources in the adoption of new natural resource management practices. This leaseholder from the Upper Gascoyne and Mt Magnet study suggests sustainable land use is becoming increasingly difficult for leaseholders.

‘But I think management of pastoral leases has become more difficult because there isn’t money available to improve the fencing to improve the condition of the land’ (male 50s).

Cary, Webb & Barr (2002) also suggest that investment in innovations that do not have advantages for the short-medium-term production and profit of leaseholders, will not be adopted, regardless of their environmental benefits. This has enormous significance for the future as practices with environmental benefits are often those which also have long-term benefits for the wider community.

## **CHANGES IN MANAGEMENT THAT IMPACT ON THE SUSTAINABILITY OF LAND USE**

### **CHANGES IN LAND AND ANIMAL MANAGEMENT**

The Gascoyne Muster, Sustainability of the Pastoral Rangeland working group argued that grazing and animal management has improved significantly over the last decade. They suggest this is due to ‘greater controls over grazing and water points, the introduction of genetically superior animals and improved weaner management turn-off’ (Pastoral Lands Board & DPI 2003, 17). Leaseholder comments in the Upper Gascoyne and Mt Magnet also identify a number of changes with mixed benefits and disadvantages for leaseholders and the environment.

Changes in animal production in the regions have resulted in different types of animals that produce different impacts on the natural resource from traditional Merino sheep. Cattle, goats and Damara tend to graze further distances away from water sources than Merino sheep, increasing the spread of grazing over the area (see above). Pringle & Landsberg (2004) point out that these animals all have different grazing preferences and therefore exert pressure on different plant species. They suggest that the age structure of herds and flocks also differs with the changing animal mixtures and market demands. This is therefore placing new pressures on the land. However, new technology and management practices have allowed leaseholders to invest in new infrastructure and adapt their management practices to better suit these changing circumstances. This leaseholder explained how the change from wool production to meat has resulted in different management practices. She suggests this provides potential for more sustainable grazing production.

‘The emphasis is more on quantity, being the number of sheep you can raise and turn off the property for meat, and with more emphasis on quantity of wool, with less emphasis on the quality (i.e. finer wool). In this situation, sheep can be moved onto the property and off in a way, which would not

have been possible in traditional management. What this potentially allows – is the possibility to be far more fluid with emptying the property of stock in drier times and restocking during better seasons. In the traditional management style – sheep are being held on to, because within that flock nucleus is perhaps sixty years of breeding of a wool type to rangeland and local property conditions. What this shift in management may enable, is a better grazing management system – however, if miscalculated, could still potentially damage the rangelands. Like anything on the rangelands – the process, type of stock etc. needs to be well managed to maintain the rangeland resource. But possibly, the breaking with traditional management and allowing the total de-stocking during certain periods of time may provide the best solution both economically and environmentally in the longer term’ (female 40s).

Agistment of stock to southern farming areas has become an important strategy in leaseholder dry seasonal management plans. It also allows leaseholders to preserve their breeding animals during dry seasons. However, as this leaseholder points out, the economic and environmental benefits of this practice rely on the knowledge and motivation of leaseholders to transfer stock off their property when conditions deteriorate. The high economic costs of this practice may also discourage some leaseholders from using it or may encourage them to bring stock back to the property too early. This leaseholder explains why this is a problem.

‘...we have a memo newsletter come out and that is full of up-to-date issues and animal care. One recently by Ben Norton from the Arid Lands Group was for people who had agisted stock and then if it rains and they bring stock back quickly, you can end up losing a lot of your plants that are there because in the dry the roots shrink back as the leaves fall. With the first rain the leaves start coming out but the roots are still having to work to produce the leaf. If the sheep comes along and eats it and the roots can't develop you can actually lose your plant. That's really valuable information to help people decide when to bring their stock back’ (female 40s).

Some leaseholders commented they had brought their stock back from agistment because of the costs and were hoping for rain the next season to produce vegetation for feed. Many leaseholders commented that now there are dry seasonal conditions, the few sheep they had left were in good condition and this is probably due to the agistment practices undertaken during recent years.

Supplement feeding of animals during dry seasons has also become popular. However, the high costs of buying feed currently limits the extensive use of this practice. A number of leaseholders suggested that being able to grow limited amounts of supplementary feed would be a great benefit to their production systems and some leaseholders with accessible water on their property are currently investigating this potential. This would have significant advantages for leaseholders in these regions if stock numbers were contained at levels that did not increase impacts on the natural resources. A permit can be obtained to clear small areas of land for horticulture purposes. However, current regulations in lease tenure arrangements do not allow clearing of large areas of land for growing crops in these rangeland regions. Some leaseholders believe there should be special compensation to allow this practice to be undertaken when seasons are appropriate.

‘I’m sure, if we were allowed to, there are opportunities sometimes out there where you would be able to grow something which would make you more sustainable. If you had an area, it doesn’t have to be all that big even if it’s one or two hundred acres where in certain years you could grow an oat crop or something as a stock supplement, so you’ve got fodder on hand. There are times that you could do that. I can’t see why there can’t be some areas on places where you can have a special lease to do something different. It might only be one year in five that you’re able to grow that crop, but you could probably grow a good crop in that one year and it could really help you in the dry times’ (male 40s).

However, supplementary feeding has the potential to increase stocking rates resulting in flock or herd numbers maintained at artificially high numbers. This has occurred in rangeland regions overseas in countries such as Africa and Jordan. 'The forage resources cannot support herds of this size, and the desert is increasingly used to store animals while sacks of feed are trucked in' (FAO 2001, 16). Under current conditions extensive use of supplement feeding is not a viable option for leaseholders and it appears unlikely, given growing community concerns about the environment, that policy changes will allow this to occur.

Around 70% of leaseholders interviewed stated they accessed the GMS funding to increase watering points, TGM yards and/or fencing on their property. The percentage of leaseholders who accessed funding for these purposes was similar in both areas suggesting the relative advantage of adopting this technology. Many leaseholders commented they had used this funding to pay for the drilling of new bores to increase water available for stock. This had occurred more in the Upper Gascoyne because the change to cattle had resulted in a need for more water because they drink more than sheep. One leaseholder explained:

'You don't need fences for cattle, you just need a tank and a trough and the cattle will come back to them to get a drink. ...that's why they're putting all these bores in. Cattle also drink a lot more water so you've got to have more watering points' (male 60s).

The change to cattle has also produced a need to alter infrastructure and leaseholders accessed funding to take out existing fences that were previously used for sheep production and erect new fences (mostly holding yards) to manage cattle. However, there have also been a number of new lessees who have brought wealth acquired from outside the industry and these leaseholders were also developing infrastructure necessary for the expansion of their production system once the seasons improve.

Many of these properties are in poor condition and this relatively new leaseholder commented on the difficulties of regenerating property for improved production.

‘There is lot of this country that is really degraded and we have set about fencing a lot of it to keep stock where there is better country, where the animals want to be, so it naturally gets flogged anyway, and its very hard to keep animals off somewhere where they want to be, so the only way you can do it is to close waters down and put mock fences up to try and hold them out, which we have done a fair bit of. But it hasn’t rained since we’ve been here, which hasn’t helped in any way as far as the regeneration of the country goes. We’ve done a lot of regeneration work with the plough, putting a lot of seed out (couple 40s).

This leaseholder also explained how they were expanding their grazing area by restarting watering points that had not been used for a decade or more. This enabled them to use land that has had time to regenerate. Some leaseholders are also placing watering points in previously ungrazed areas. One leaseholder commented on what he experienced when land that had not previously been subject to grazing, was developed.

‘The top end of (station), we actually have books, the old records that the pastoral board inspectors had back in the 1960’s, and in it, it says that the top end of (station) should never have been developed. We developed it ...in 1991-92. It was pristine or pretty close, and again we stocked it lightly, but the environment has changed, as soon as you put cattle there it changes, some of the softer types of plants have fallen out’ (male 50s).

However, this land proved too expensive to hire staff for mustering the cattle and it was ultimately sold to the government under the National Reserve System. The FAO (2001) report argues that in the past increases in watering points, especially when it was associated with seeding, encouraged animal numbers to be increased well beyond the long-term carrying capacity of the land to support them. They inform us

that this practice remained a problem as recently as 1996-98 when droughts in Australia forced producers out of business.

The use of watering points to manage animal grazing pressures may help to control this problem, however. This practice is a financially viable option for many leaseholders and provides greater controls over grazing. Watering points can readily be shut down to discourage grazing in areas requiring regeneration or opened to increase the spread of grazing over the property. It has therefore become a widespread practice amongst leaseholders. However, Walker & Hodgkinson (n.d.) suggest that to effectively preserve the natural resource, this system of managing stock requires fencing to land system type to control unequal grazing pressure. This is because 'livestock exert their preference for particular environmental units, with the result that some units are overgrazed while the potential of others is not realised' (Morrisey 1984, 291). Therefore when combined with fencing to specific land types this practice provides potential for protection or regeneration of overgrazed or degraded sections of the property.

A major problem for effective fencing in these regions is that it needs to be constructed to protect different land types. To ensure that biodiversity is maintained regionally, leaseholders involved in the EMU project are encouraged to understand this concept. One of these participants explained that fences in these regions were originally erected for access to water and are therefore not fenced to land type. She suggests that this type of fencing needs to be undertaken to help preserve palatable plant species.

'One of the problems with pastoral property across the board is that in the early days you found your water and you fenced your paddocks and they were usually rectangles and squares. So they weren't fenced to land type and

it has been found quite clearly that the type of vegetation is really quite important if you're going to manage the movement of stock around your property, so you need to fence to land type otherwise you might have a big paddock that has a small area of saltbush or favourite food and another area that is less favoured and the stock will go straight to the saltbush and it will disappear' (female 40s).

The obstacle to fencing to land type however, is that the size of the different environmental units is often too small to make it viable for development of infrastructure to control stock. 'the scale of this mosaic is often too small for the effective strategic location of watering points and fencings' (Morrisey 1984, 291).

Pringle & Landsberg (2004) also inform us that the size and shape of paddocks have a strong influence on grazing pressure. However, it appears the finance and motivation to undertake fencing in these regions is limited. Leaseholders commented high fencing costs often make it prohibitive to do this effectively. Therefore, the current move by many leaseholders to increase watering points in areas formerly inaccessible to stock, may in the long-term result in the loss of palatable species and decreased biodiversity in the region. It may also increase numbers of feral and native animals in the regions. Comments from leaseholders imply that funding and fencing activities for environmental preservation associated with the LCDC groups is also limited and it was suggested by one leaseholder that very few are prepared to self-fund this type of work, especially under the current dry seasonal conditions. Another leaseholder expressed the belief that even when economic conditions were better in the past, little was done in the way of fencing to manage the impact of grazing on the natural vegetation.

Although infrastructure was developed and maintained by many leaseholders when wool prices were high, industry analysts suggest that declining incomes in recent

decades have limited the ability of leaseholders to develop or adequately maintain infrastructure. The result has been an overall deterioration in fences and windmills leading to wide scale selective grazing and limited potential for control of grazing pressure and improving land management in the region (Pringle & Landsberg 2004). The following leaseholder suggested that investment in fencing infrastructure had not been undertaken in past decades because pastoralists were unwilling to invest in fencing (see Chapter 4, Economic Drivers of Change).

‘I feel it is really important for pastoralists to have good boundary fences and the cost to do this isn’t too much for leaseholders. In the past they made very good incomes but they didn’t bother to maintain their fences, so the fences that we have today are often the original fences that were made in the 1920’s or 1930’s and they haven’t been maintained’ (male 60s).

This leaseholder comments on the overall lack of fencing and suggests there is therefore no control of grazing animals in her region today.

‘Nothing is being done. You can go from here right up to Mt Augustus and there would be no fences. There isn’t any control of fencing or animals so what is it going to be like in 10 years time. Control of the animals is going to be a problem. They talk about the total grazing, if you have a good rain in one spot, every animal goes there and eats that out so how is that total grazing? It doesn’t make sense to me. It needs the fences to control the animals’ (female 60s).

One leaseholder suggested that investment in station infrastructure is sometimes replaced by investment in other areas where economic returns are potentially greater, such as real estate property in Perth. These comments link into the issue of infrastructure development and rising land values and the extent to which this drives unsustainable practices. Ilich (2000) informs us that the size, condition, and use of the land and vegetation generally determine the viability of a lease and that rising

land values may not reflect lease viability for grazing purposes. This leaseholder expresses how he feels about this situation. He questions the changing value of rangeland resources that leaseholders are now paying more for, and the way these values are arrived at.

‘I guess the bottom line is that for long term sustainability government policy needs to change a bit by things like keeping charges at a reasonable rate. For instance, the year before last these leases were traditionally handled by the Pastoral Board. That was handed over to the Valuer General and immediately, well in my case they went up 126%, so everything went up by that amount. ...As time goes by fees and charges are going to increase, that’s just the natural progression, but when people that don’t know anything about valuations and operations on this type of country are actually charged with reviewing and making changes to UCV’s and that sort of thing, they might as well farm it out to an overseas country to do. These people don’t know, in essence, what the values are and how they should be arrived at’ (male 60s).

Another issue concerning sustainable land use is that new leaseholders may not always investigate the production potential of the land before buying and may sometimes borrow money to buy leases that are overpriced. They are consequently not able to produce enough to pay their interest rates as well as create an efficient production system. The GMS Annual report in 2003-4 commented that ‘In the past, such leases have continued to be bought and sold in the market place as whole leases, so successive owners have suffered from the low productive capacity of the leases. In many cases range condition has continued to deteriorate’ (Gascoyne Murchison Strategy Board 2004, 40). This leaseholder explains why new leaseholders have little understanding of the potential of the land to produce, and the frustration he feels about the problems that arise due to overvalued land.

‘...the sheep just die in thousands because the country can't carry them. You feel for them and the families, especially when neighbours get involved and

do things that make the situation worse. They sell stations that really there's no way a family can get a living off them. We know, we've seen them being sold 3 or 4 times and sometimes more, and no-one's ever made a living off them and yet they've still sold. ...It depends on who buys these properties, because sometimes people buy a property with the wrong idea or they don't understand the situation. To see this country in a good season, you'd think you could run a hundred thousand sheep on it, and you would, once you see it when it's really good. But that's only for a few months, and that's all, and that's really when you've got to do your conservation bit; when you get that sort of growth with summer rain. If you don't you suffer for it afterwards, if you just increase stock numbers immediately straight away, that has the effect of, with the next dry spell you've lost that, and you don't have it as a back up' (male 60s).

The Productivity Commission (2002) informs us that today the control of stock numbers remains the basic lease condition designed to preserve the land resources. Western Australia is the only state in Australia that has a specific legislative provision to directly control the level and type of stocking rates to occur on the lease. However Ilich (2000, 5), suggests that the appropriate carrying capacities of each land type are contested because the meaning of 'carrying capacity' is not a common currency and varies with the view of the person doing the estimation. Other reports suggest there is disagreement amongst scientists and government agencies about the carrying capacities of different regions (FAO 2001; House 1991).

Ilich (2000, 6) points out that this affects lease rentals, the number of stock that can be sustainably carried on each station and the value that real estate agents set for the sale of the land. He suggests that the traditional system of using carrying capacity to sell property 'has contributed to the degeneration of its rangelands'. He recommends that real estate agents change from selling land using average animal numbers to a mixture of average and recommended carrying capacity figures. Holmes & Day

(1995) point out that farmers are generally prepared to pay higher property prices and receive lower incomes than investing their money elsewhere. They suggest this is due to their values associated with family farming as well as the lack of knowledge of opportunities outside the farming sector. Leaseholder comments suggest that in some instances, land is still being overvalued compared to the production potential of the land and that institutional structures remain that support these practices. As a result the goal of environmental, economic and social sustainability will continue to be affected by these practices.

Nevertheless, leaseholder comments also suggest significant changes have been made in both land and animal management practices in recent years, many of which provide potential for both long and short-term advantages to grazing production and natural resource systems. However, our understanding of the impacts of many of these changes is very limited and it appears likely that for many leaseholders these changes may not be economically, environmentally and socially sustainable in the long term. Programs such as EMU (see Chapter 9, The EMU Process) are improving leaseholder knowledge and understanding of the ecosystems on their property. They are also encouraging some leaseholders to undertake restoration work and to place fencing and watering points in areas to retain or restore the biodiversity of the natural vegetation. If public demands for accountability in land management practices continue to increase, more leaseholders will be faced with growing pressure to undertake these changes. However, the high financial costs, along with the lack of labour and motivation, will continue to limit the adoption of many important sustainable land use practises for most leaseholders. These demands may therefore become an even greater catalyst for change within these regions.

Climate also has a major influence on sustainable land use and leaseholders in the Upper Gascoyne and Mt Magnet survey were asked their opinion of the effectiveness of climate forecasting and the need for improvements in this technology to assist leaseholders. Almost all leaseholders considered this would be an important tool for pastoralists and graziers if the forecasts were more accurate. Attitudes varied about the current level of scientific knowledge and accuracy of forecasts and some leaseholders find the technology more useful than others. It appears that this technology will need to substantially improve its accuracy before leaseholders consider it reliable enough to place their trust in it to act on the information. Scientists suggest climate forecasting technology is 'a long way off becoming operational for use in the region' (Watson 2004, 20).

A recent Land, Water & Wool survey also found that if a seasonal forecast predicted double the chance the next season would be dry, only 60% of wool producers suggest they would be likely to take precautions (Flanery, Lovett & Hogan 2003). Therefore, even when it does provide them with greater knowledge about future climate events, the will and capability to do something about it may still remain an issue for some leaseholders. Dry seasonal conditions are especially difficult periods of decision-making for leaseholders. Even with the best intentions, when faced with the choice between keeping their livestock alive or reducing further impacts on their land systems, their concern for their animals and income often encourages them to discount the sustainability of their resource base. This leaseholder explained his thinking process.

'We did have good plans. At the end of last year we were going to keep all the sheep off the fragile breakaway areas, but this is the fourth dry winter in a row we thought it was better to have the sheep alive than to have them dead in the paddock, the last 1000. So for that reason we've had to open all the

gates and give them the run of the place and they're still alive, so that'll help' (couple 50s).

As people feel more dispossessed and socially marginalized by the changes that are happening, there is an increasing need to develop fresh approaches and strategies that incorporate the discourse of sustainability to form new and innovative ways to bring about change. McCosker, Bartle & Carney (2004) suggest the challenge for leaseholders is to improve ecological systems, while at the same time maximising animal productivity and looking after the people resource by maximising business profitability. They argue this is possible by increasing productivity while containing overheads. However they also suggest this is not easy and this was reflected by this leaseholder's comment.

'We have to scale our needs and employees down as much as we possibly can; we need to be able to do things like building the permanent yards so we have just one man and kids or wife as a family affair running the station. ...everything that you do has to be done as efficiently and as time effectively as you possibly can do it. And I see that being a big issue in the future. I don't see anybody becoming wealthy pastoralists again, like in the good old days. ...economically we've got to get as streamlined as we possibly can' (female 30s).

A decade ago Morrisey (1996, 239) suggested the Landcare model for sustainable land use had been successful in parts of rural Australia but lacked 'an appropriate policy framework from which to work'. The Centre for International Economics (1997) report argued the Landcare model needs to be based more on public benefits and cost to achieve specific outcomes. The report recommends more specific work is done on assessing what and where sustainability issues are and the need to involve pastoralists themselves, designing approaches to this measurement. It also suggests there needs to be better understanding of how to communicate with pastoralists. The

recent EMU process (Chapter 9, The EMU Process) in the Gascoyne Murchison region is based on these factors and has therefore proved to be an important program developed to meet this challenge.

A major issue forecast to place greater pressures on sustainable rangeland production in the future will be the effects of climate change in the region<sup>1</sup>. Only one leaseholder considered this was one of the three most important issues of concern. Interestingly, only two leaseholders mentioned this as something they considered will affect their future production. Scientists suggest past degradation episodes have been caused by the failure of both government departments and the pastoral industry to understand climate variability. They point out that increasing temperatures due to climate change will have serious implications for future rangeland production. They suggest it is essential to develop more proactive use of vegetation monitoring and seasonal climate forecasts to improve carrying capacity in the future (Howden, Crimp and Ash 2004; McKeon *et al* 2004). Robertson (2002) also suggests methane emissions from grazing animals are higher in rangeland regions due to the lower digestibility of feed. He argues that rangeland meat producers may therefore find it difficult to respond to greenhouse targets in the future.

The impact of future world prices on oil will also have a significant impact on the sustainability of pastoralism and grazing<sup>2</sup>. However, like much of the wider public, leaseholders continue to believe this is not a finite resource and should be priced to suit their use. One leaseholder suggested fuel used by primary producers should not be taxed which raises the interesting argument about per capita use of fuel. Literature

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<sup>1</sup> Websites information: <http://www.greenhouse.gov.au/science/guide/> and <http://agspsrv34.agric.wa.gov.au/environment/global/http://www.abc.net.au/lateline/content/2004/s1249211.htm>.

<sup>2</sup> Website information: <http://www.hubbertpeak.com/news/article.asp?id=8228> and <http://www.abc.net.au/lateline/content/2004/s1249211.htm>.

on the future oil situation in the world and the possible impacts for agriculture are rapidly increasing. It is difficult to know exactly how this will affect leaseholders but as the cost of fuel is a significant portion of leaseholder expenses, the rising cost of this resource is sure to have an impact. The reason the oil situation and climate change were not mentioned by leaseholders as issues that concern them is probably due to the same reason most people in the wider community do not seem overly concerned about them. The general uncertainties surrounding these issues, the global scale of the problem and their long-term impacts discourage media publicity and political action. However, these two factors will potentially have significant impacts on the sustainability of leaseholder's lifestyle and production systems in the future.

#### TOTAL GRAZING MANAGEMENT SYSTEMS

As Pringle & Landsberg (2004) suggest above, controlling the spatial distribution of grazing and the intensity and timing of grazing pressure are of primary importance to preventing land degradation and encouraging regeneration. It therefore appears that the single most effective change for improvement of both grazing and environmental management systems in recent decades has been the development and implementation of Total Grazing Management (TGM) systems. Permanent fencing has been traditionally used to control animals, but increased costs and lack of time and motivation have resulted in deterioration of much of this infrastructure in recent decades. Grazing control is generally now being achieved through the use of TGM yards, providing effective distribution of watering points and control of access to water.

TGM yards (or trapyards) can be any shape, but are generally circular fence structures. This makes for easier management, but not easier construction. They are placed around water points such as troughs and dams and are designed using one

way gates that enable leaseholders to manage or control animals. The gates are left open all the time except when mustering. The exit spear gate is then closed to prevent animals from leaving the yard. Trapyards can be placed on areas on the station where animals are most dependent on artificial water points, where the best grazing areas are, or where goat numbers are high. They are used by leaseholders to control the use of water by all animals on the property and are therefore a useful tool to control total grazing pressure (Underwood 2002).

#### CIRCULAR SELF-MUSTERING YARDS FOR SHEEP AND GOATS.



Source: White, K. (2002).

A built-in loading race erected alongside TGM yards provides an efficient method for transporting animals for sale or animal husbandry activities. They have provided potential to control feral goats and improve management of sheep and cattle and therefore the potential to enhance management of the land (White 2002). Nearly \$4M of government and leaseholder dollars have been spent on establishing TGM and stock handling yards in the last 6 years since the GMS began (Gascoyne Murchison Strategy Board 2004). Trapyards have been used by pastoralists for a number of years, many of which were portable. However, the establishment of

permanent structures and an improvement in the technology of this infrastructure now provides a better method of control. Around 65% of leaseholders commented they had improved or increased TGM yards in recent years. Those who have not are located on the river system which provides animal access to water, eliminating their need to use watering points, or they do not have feral goats on their property.

Technology improvements and the accessibility of government funding have aided its rapid adoption by leaseholders. TGM technology was affordable to most leaseholders, there was existing knowledge and established social practice with the use of this infrastructure, it had financial benefits and it improved time management. These factors reduced the risks and provided a strong advantage for adoption (Marsh 1998). Underwood (n.d.) suggests that strategic placement of these yards provides a whole-of-station approach to management and opportunity for new grazing systems such as rotational grazing or fencing to land systems to occur. Stock can readily be trapped out of one area and moved into another to rest pasture so it can regenerate, and produce a more even grazing pressure over the station. He also points out these systems have been shown to improve productivity as well as carrying capacity. Leaseholders commented that trapyards enable them to reduce labour costs as well as provide potential to control the feral goat problem. This leaseholder explains why trapping animals is more cost-effective than the aerial mustering that has traditionally been used on many stations in recent decades to muster animals.

‘We had to use the aerial mustering to get the bulk of the sheep in a hurry, especially if you were trapping before a storm to take them away from water. We only use aerial mustering where we have to. ...Aerial mustering got to the bulk of your sheep but then again whether they seem to be getting more cunning and not taking much notice of it, or whether the planes can't see them, you finish up with a terrible lot of stragglers however. And for the cost

of it, you might pay \$130 an hour plus fuel and there could be a couple of hundred sheep left in the paddock. We could trap them within a week and get the lot. It's a lot easier and cheaper. But we had to do a lot of driving because we had no yards, everything you've got to drive to, but if you've got yards, you've just got them in yards and do one drive' (male 70s).

According to White (2002) the establishment of trapyards around windmill watering points has the advantages of improving the number of animals mustered, reducing the stress on animals and providing easy access to animals for husbandry practices. It also provides an effective tool for managing grazing pressure because it allows pastoralists to destock or partially destock areas for a length of time, so vegetation can regenerate and grow. They also reduce the financial costs of mustering by providing large savings in wear and tear on vehicles and equipment. She also informs us that studies completed have also shown that TGM yards have increased the cash flow to pastoralists. Leaseholders commented that trapyards have been found on some stations in a variety of different forms for a number of years. Trapyards in a more basic form appear to have been used successfully to a limited degree by leaseholders for over a decade showing that pastoralists and graziers are also researchers and experimenters themselves. It also suggests this is an example of technology that has been developed by pastoralists and improved on by scientists, reinforcing their role and power within the industry (see Chapter 4, Technological Drivers of Change). This leaseholder explains these changes and why he considers they are a benefit to the management of their animals.

'In the last couple of years we've been building these trapyards, which is making a big difference. We always had a few but these were more makeshift and not as effective as these new ones. We started using trapyards more than 10 years ago but it was a different setup. We used to use ramps for them to jump over and then they got this idea of making spears and they've

improved on them now. It's the same type of system but more effective with the spring-load assimilated hinge. One is fixed and the other one is sprung so they can adjust them into whatever you want to trap, whether it be a goat or a big woolly sheep. Just for the moment we've decided to trap goats so we set them for the goats. A few sheep got in at the same time but a lot of your sheep remain out because they are too close. So as soon as we finished with the goats we spread them out wider and the sheep can go in and stay in there. They have a drink of water so you don't have to rush there tomorrow to pick them up, you can go the next day. So they are quite effective. We have got these on quite a lot of our watering points but we haven't finished, but we are also building really good yards. We've made a start on that with drafting races in them so you can handle your sheep or draft off what you want for whatever the occasion might be, lamb tailing or selling sheep or taking off woollies' (male 70s).

However the following leaseholder pointed out that trapyards are only part of the solution to improvements in animal and land management. She explained that fencing is also required to control animals for effective resource management.

'TGM's, they are good but they don't control, they control your stock and your trapping but they don't control. You have to have fencing for control. Improved fencing has had a big impact' (female 60s).

This view is also shared by the Pastoral Lands Board who suggest that trapyards should be closed to reduce grazing pressure in areas where regeneration of vegetation is required and to be effective this practice should be combined with the use of fenced holding paddocks to contain stock (see discussion in Changes in Land and Animal Management above) (Pastoral Lands Board 2002).

Trapyards provide the potential for an efficient method of controlling feral goat numbers, however kangaroos are more difficult. They sometimes become stressed while confined in trapyards and are vulnerable to injury during the process of releasing them. The aim of trapyard research and development now is to create

systems that effectively control grazing pressure while treating all species humanely (Pearce, Elliott & Rouda 1998). The fact that this technology was already in use by leaseholders was probably a significant factor in government decisions to fund this infrastructure and the rapid adoption by leaseholders. However, like most technology, it appeared to need a culmination of factors to encourage extensive adoption and use. These factors occurred in recent years in the form of good prices for feral goats, the availability of government funding, increasing labour and production costs and in all likelihood the rising pressures from the wider community for greater accountability in land management.

Trapyards therefore provide an effective potential for leaseholders to reduce production costs, improve the genetics and management of their animals and increase the sustainability of their systems by improving the natural resource base. However, the effectiveness of TGM systems to improve land management relies heavily on the ability and willingness of leaseholders to maintain appropriate carrying capacities for all herbivores grazing in these regions as well as the development of fencing to land types. Worthwhile prices for feral goats are also an important element of this practice. Therefore current changes by leaseholders to develop TGM systems appear to provide important potential for improvement in production systems and land management but like all technology, there are limits to what it is able to achieve. Its overall effectiveness will ultimately rely on the understanding and awareness of its capabilities and the ability and willingness of those who are using it to implement it effectively.

#### LAND MONITORING SYSTEMS

Land monitoring, once the sole domain of scientists, is now undertaken by individuals, community groups, and governments. It is generally undertaken either

to inform management or to show accountability for natural resource management practices (James 2004). Rangeland Condition Assessments are undertaken by the Department of Agriculture Western Australia (DAWA) on an annual cyclic basis. Feedback from these assessments provides information on changes in the condition of the land (Pastoral Lands Board 2004). Rangeland Resource Condition Surveys have also been undertaken in rangeland regions over the past three decades. These provide mapping of landforms, soils and vegetation types at the leasehold scale and were a precursor to the Western Australian Rangeland Monitoring System (WARMS) (Pastoral Lands Board & DPI 2003). This consists of a network of rangeland condition monitoring sites which are used to report on the regional condition of specific types of land. The Department of Agriculture is responsible for maintaining this system. WARMS has almost 1,600 fixed sites located on representative areas of pastoral leases. Most leases have at least one WARMS site and maintain records and photos to confirm changes in vegetation on their land (National Land & Water Resources Audit 2001).

The Department of Agriculture (2003) report informs us that WARMS data analyses in 2002 found an increase in shrub density on most sites. They suggest the results show improvement in the northern part of the Gascoyne Murchison. However, studies completed in these regions in recent years by Landsberg *et al* (1997) and Watson & Thomas (2003) have found that a significant percentage of species are potentially at risk of declining substantially throughout these regions. Watson and Thomas also found that the WARMS monitoring system had limited ability to assist leaseholders with land management. They suggest that while it may provide information on the ability of degraded vegetation to recover when grazing and seasonal conditions are suitable, it does not provide pastoralists with a tool for the

use of pasture management on a seasonal basis. They also suggested it does not provide information that will enable pastoralists to measure the impacts of grazing on the trends in the condition of the vegetation or on when or if there is a potential for soil erosion to occur.

The Gascoyne Muster, Pastoralism for Sustainability working group (Pastoral Lands Board & DPI 2003, 26) also agreed that WARMS is not intensive enough to provide information on range condition for individual leaseholders. However they suggested that it does offer leaseholders a greater understanding and awareness of the overall biodiversity of their land, providing potential to achieve a better balance between production and conservation goals. They also inform us that the measurement of biodiversity on grazing land is by no means an exact science and is generally biased because of grazing impacts. 'It is notoriously difficult to establish broad-scale biodiversity indicators that are readily measurable and comparable but not biased to grazing indicators'. This raises extensive arguments about the use of WARMS to measure biodiversity.

There is also debate over biodiversity conservation for production and protection values between conservationists and producers. Comments from leaseholders in the Upper Gascoyne and Mt Magnet suggest a strong belief by most that, either introduced or native vegetation that is good for producing animals, is worthwhile. On the other hand, conservationists believe that many introduced species reduce the biodiversity of the native vegetation and that maintaining native biodiversity is what is important. This debate also results in differences of opinion between leaseholders and scientists about the long-term changes in the condition of the land. The study by Ison and Russell (2000) of graziers in NSW found there was a difference in opinion between the pastoralists and graziers view of improvements in the overall condition

of the land and that of scientists. This study found that many long-term graziers considered the condition of the land had improved in recent decades and that the land was now in better condition than in their father's time. In contrast, they found that the dominant scientific viewpoint was that the land was continually deteriorating. Landsberg *et al* (1997) concluded there was a need for more research to improve monitoring and surveying of rangeland biodiversity.

The Sustainability of the Pastoral Rangelands report (Pastoral Lands Board & DPI 2003) suggests there are few voluntary leasehold monitoring sites and there is a need for incentives to encourage greater monitoring activities. The Braddick (2005) survey found that the EMU process was in fact encouraging leaseholders to increase their use of monitoring systems, such as WARMS, to develop more efficient grazing management systems. Leaseholders believed monitoring was a useful tool for land management and accountability of sustainable rangeland land use. (see Chapter 9, The EMU Process). This survey indicated that around half the land managers who had been involved in the EMU process were now monitoring the changes they had made to their management. Most of these were undertaking photo monitoring of the response of their land to changes.

One leaseholder in the Upper Gascoyne and Mt Magnet study suggested WARMS was important for research on the impacts of recently introduced animals to these regions. Others said they believed that WARMS was worthwhile and has assisted improvements in land management. They also consider monitoring systems will become a vital tool for land management in the future.

'I believe monitoring sites will become more widespread and very important in the future' (male 50s).

Although the EMU process has made considerable progress in encouraging leaseholders to undertake these activities, the State of the Environment Report (Draft) (2006) recommends a need to develop a more community-based photo monitoring process to better capture regional changes over time. However, while different attitudes toward biodiversity remain, the use of monitoring systems as a tool to manage the natural resource for biodiversity appears limited.

#### KANGAROOS

The increasing numbers of kangaroos are also a major problem for leaseholders trying to regenerate land and maintain biodiversity. As a public, we seem to give leaseholders total responsibility for ensuring that further land degradation does not occur yet we also expect them to maintain and preserve populations of native animals. The Sustainability working group for the Gascoyne Muster (Pastoral Lands Board & DPI 2003, 98) point out that leaseholders have a statutory responsibility under a number of Acts such as the *Land Administration Act of Australia (LAA) 1997*, to manage the natural resource sustainably. Kangaroos are managed by government under the *Wildlife Conservation Act 1950* and *Agriculture and Related Resources Protection Act 1976*. But there is no mechanism for the management of native wildlife on pastoral leases within the *LAA (1997)*.

The report suggests the problem for leaseholders is that kangaroos, emus and feral goats often constitute a large proportion of the grazing pressure, thus reducing carrying capacity for domestic stock. The removal of dingoes in most areas has also resulted in the potential for large increases in the numbers of these animals when conditions are favourable. Leaseholders from the Upper Gascoyne and Mt Magnet pointed out that the huge increase in numbers of kangaroos in the rangelands has occurred because of the abundance of watering points provided by pastoralism. One

leaseholder in the Braddick (2005) report suggested the high kangaroo populations were a major contributor to the loss of perennial grasses that formed a significant part of the original landscape.

A survey of 33 leaseholders in Western Australia completed in 1953 by the Bureau of Agricultural Economics (1954, 8) found that 26 of the properties surveyed reported trouble with high numbers of kangaroos. Some estimated their carrying capacity was reduced by up to 60% -70% as a direct result of kangaroos. Kangaroos have therefore been an issue for leaseholders for a long time. Leaseholders in the Upper Gascoyne and Mt Magnet suggested that increasing numbers of kangaroo populations in the rangelands are still making resource management very difficult today and in some cases it was impossible for areas of vegetation to be spelled and allowed to revegetate. They explained that areas set aside from livestock grazing for spelling or regeneration purposes are preferential pasture for kangaroos. They are nearly always the first to get to any early growth in the area, and usually impede regeneration of vegetation after hot, dry periods. This was significant at times when short bursts of rainfall in specific areas produce spurts of vegetative growth that are very quickly consumed by hungry mobs of kangaroos or emus immigrating from surrounding areas.

Organising kangaroo shooters to reduce populations at these times is also difficult. This leaseholder discusses this problem and also raises the interesting conundrum many leaseholders have with shooting kangaroos which are considered by many people to be 'cute and furry' and are a national symbol.

'And of course the other grazing pressure is roos and Emus. We got ourselves organized for a shooter but it hasn't been very effective. Because there's not big enough numbers for him to be effective and when there's rain on the

place, the roos just come in their thousands. It's not very nice and people don't like it, I don't like it, but the trouble is the population is just out of control. And the emus were migrating in packs. I don't think we've got big enough numbers for a roo shoot. We do at times, we have huge numbers come on and then they move on to somewhere else. In that time they've absolutely wrecked anything that's grown. So yes, I think we do need a bit of help, or support or encouragement to deal with the roo and Emu problem. It would be good if you could just say 'Right the roos are here, come on boys and do it now' (couple 50s).

Scientists inform us that kangaroos are highly competitive with sheep for water and limited feed and during dry periods leaseholders need to remove or reduce kangaroo populations to control the total number of grazing animals on the property (Caughley, Shepherd & Short 1987; Gibson & Young 1987). James (2002, 16) argues that uncontrolled animals make up a significant percentage of grazing pressure and leaseholder stocking rates do not generally include feral and native animals as well as domestic stock numbers. 'Uncontrolled grazing animals are responsible for about 50-60% of the grazing impact in the rangeland, yet are rarely considered by pastoralists when assessing stocked areas for carrying capacity'. He points out that leaseholders are now being informed about the need to match stocking rates with the carrying capacity of their land if they wish to increase their production rates.

The potential to resolve the problem may be to simply reduce kangaroo populations in the rangelands. However, leaseholders may find this difficult because of cultural attitudes toward kangaroos. Added to this, a growing percentage of urban people are focused on the ethics of animal liberation and many seem unaware or do not want to acknowledge the problem of large populations of kangaroos grazing on the natural resource. An alternative suggestion to control kangaroo populations in the rangelands

has been proposed by Professor Gordon Grigg of Queensland University. He suggested that leaseholders be included in the income gained from kangaroo harvesting and thereby provide potential for them to replace sheep or cattle with kangaroos, with all animals being recognized as a resource (Grigg, Hale & Lunney 1995).

This change would potentially reduce the high numbers of grazing animals on fragile rangelands, as well as provide an alternative income for leaseholders. It may also provide potential for the introduction of a sustainable method of food production. However a number of factors, including the Australian attitudes toward the consumption of kangaroo meat for humans, constrain the growth of this industry (see Braddick 2002). The control of kangaroo grazing pressure is a problematic issue for leaseholders and Government agencies alike and it is unlikely that leaseholders will become part of the kangaroo meat industry in the near future. Under current conditions kangaroo populations are placing increasing pressure on rangeland resources as well as on the ability of leaseholders to control the numbers of grazing animals on their properties. However, the complex nature of the issue constrains any short-term solutions to the problems that exist.

#### BUFFEL GRASS

The extensive spread of Buffel grass, *Cenchrus ciliaris*, in rangeland regions has also created another controversial issue. Graham & Pegler (2005) inform us it is a native of India and Africa and was introduced into Western Australia by camel traders between 1870 and 1880. Leaseholders in the Upper Gascoyne commented it was able to become well established in the Gascoyne region because it grows well on the large areas of river banks and creek beds and the spread of Buffel Grass has assisted them to change from sheep to cattle production. They considered it to be a very useful

fodder as it is nutritious and readily produces growth after light rainfalls and in some areas it also helped to control erosion. This leaseholder describes how the increased cattle numbers in the Gascoyne region are providing potential for the increased spread of seeds and are contributing to the current spread into new areas.

‘We've thrown Buffel grass seed out in areas where there is no Buffel already, but I don't really think it's necessary because there's so much here now that it's just naturally spreading at a pretty rapid rate. The cattle tend to plough the ground a little bit and this encourages the spread of it a fair bit more, and gives somewhere for the seed to get a hold of. There are a lot of bare areas now that are becoming quite well covered with Buffel and there's a lot less dust blowing around now than there used to be’ (male 40s).

However, it is also detrimental to the natural environment. Wright (2002) informs us that Buffel grass reduces the growth and pollination of native grasses and perennials. It also crowds out palatable perennials that provide a buffer for animals during periods of dry seasonal conditions and generates hot fires that kill native flora and fauna. The availability of this grass during dry periods is also thought to encourage higher cattle numbers to be maintained (FAO n.d.). Buffel grass therefore raises a dilemma between the pastoralist's need for a useful fodder plant to maintain their animal production and the need to preserve native vegetation and the native fauna that it sustains. Leaseholders have sown it in the past and continue to encourage its growth because of the benefit it has for cattle production. This leaseholder explains how he sees the situation.

‘I believe that the change to cattle certainly improves the vegetation situation. If we get a shower of rain the Buffel grass shoots off quick and is a very quick responding source of fodder that gives the perennial type plants a lot of leeway, they go and consume all the feed down the creeks, and it gives the perennial plants space to get into good recovery mode and lets them fire up again. It helps other plants regenerate. In some quarters Buffel grass is a

dirty word. I believe that CALM think it needs to be got rid of. Yes, there was a natural grass in the creek systems that was similar to Buffel grass which you don't see much of now because Buffel grass is pretty aggressive and has taken over this natural grass but I still believe that the natural and Buffel grass had the same sort of protein level anyway and it doesn't really matter. The Buffel grass is certainly more aggressive and grew quicker, and gives the perennial grass a very good opportunity to regenerate' (male 60s).

In the Mt Magnet region, landholders have also attempted to establish Buffel grass in the past but unlike the Gascoyne region they have so far been largely unsuccessful because of the lack of a large river system and the different soil and climate conditions. This makes a considerable difference to the ability of leaseholders in this region to produce cattle. These conflicting attitudes make it difficult to develop strategies for change. In a report by Finnane (2000) industry representatives suggest there is little in the way of formal strategies to keep Buffel grass under control, and declaring it a noxious weed would create an emotive issue and cost the community added expense it can ill afford.

One of the major challenges for sustainable land use is to better control the pest species that are placing increasing pressure on the natural resources in these regions. This includes the growing infestations of weeds such as Buffel grass, as well as the increasing numbers of pest species such as feral goats and wild dogs and native kangaroos. There is therefore an urgent need for substantial research to determine areas most at risk from pest and weed species so that priorities for management strategies can be established that protect and improve the natural resource.

#### **CHANGES IMPACTING ON THE SOCIAL SUSTAINABILITY OF PASTORALISM AND GRAZING**

Recent impacts of dry seasons and reduction of income have created a difficult time for leaseholders which has affected the social sustainability of their communities.

They have responded and adapted their lifestyles to the change in circumstances in a variety of different ways. Innovations in technology now allow instant information and access to the outside world. The computer has encouraged some leaseholders to increase their knowledge base, but the most significant advantage for many is the accessibility to friends and family. On the other hand improved technology in telecommunications and transport has augmented the decline in contact amongst people within their own community. Improved telephone systems, roads and vehicles as well as email have all changed the way people communicate and allowed greater travel to urban centres for family contact, business and entertainment. This has reduced the necessity for interaction between neighbours along with the capacity for effective community business and leisure groups.

Leaseholder attitudes revealed a real concern about the social decline within their community and a wide variety of different perspectives toward these changes. The following leaseholders had both grown up in the region. They describe how technological advances have influenced community interaction and their comments demonstrate their different attitudes toward change.

‘I think one of the worst things about contact for people one on one is the telephone. When we used to have pedal radio sets, we used to know what everyone was doing. There was a common chat channel and the ladies were always talking and at the end of the day you'd come home and they'd say ‘such and such is doing this or going to town’. But with the telephone we very rarely speak to each other unless we have something important to say like ‘There's a mob of cattle on the boundary, come and get them’, or something like that. You'd have to say there's a lot of ways we've gone backwards as far as the social structure goes with the advent of all these new technical things. I wouldn't talk to my neighbours once in a year. It's terrible!’ (male 40s).

‘Another factor is that people have better motor cars now and you can travel, you can leave at lunchtime and be in Perth tonight and doing something in Perth tomorrow, whereas going back 20 years ago with beat-up old Holden Utes and things you're flat out getting to Carnarvon let alone going to Perth. So it's a different ball game now. People travel much bigger distances to go to other functions and it's probably at the expense of a lot of the little local functions that used to be done. People are a lot less interested in going to local shows where they might prefer to go anywhere else. We shot up to Kununurra and back the other day. It's a lot easier to go and do that today; they were marathon trips 20 years ago. It definitely makes it hard to keep those local groups and local functions ticking over. But the telephone probably makes up for the shortfalls a bit because everyone talks a lot more on the telephone to each other instead of going to see each other’ (male 40s).

Both leaseholders agreed there is a continuing decline in social events in the community, although their attitudes toward these events also varied.

‘I think we struggle nowadays to get enough people together to do things community based. There are some things with a genuine collective interest that you'll get a lot of people along to like the local race meeting, the Landor races. We have a fantastic community input into that sort of thing. But you try and get somebody along to a community dog baiting or that sort of thing, it's a real struggle. It's hard to get people along to things’ (male 40s).

‘There did use to be a lot of sporting events that don't happen much anymore. There used to be regular cricket matches down at the Gascoyne Junction and we used to go to those all the time once years ago. The shearing gangs used to put up a team and they'd get all the locals to contest but that's finished now. The local race club and gymkhana club is still an annual event although racing is on a serious decline so I don't know how much longer the racing program is going to hold up for. It's getting harder and harder to get horses to the bush races. At the moment it's races one day and gymkhana the next day but it's probably going to end up being a 2 day gymkhana the way things are going’ (male 40s).

Changes that improve our lifestyle often include some disadvantages also. The following leaseholder points out the negative aspects of improvements in wages and household technology that now constrain leaseholder activities and tie them to their station.

‘ But I think things have tightened up so much financially, and the fact that we haven’t got the staff we can’t get away, we can’t leave the place. We can’t leave the animals to fend for themselves and your motors, such as your fridges and freezers, so it has made the social aspect very different’ (female 50s).

Overall, leaseholders’ comments indicated there are major changes occurring within these communities, but they also revealed the wide variety of leaseholders and attitudes toward change. They emphasised the serious decline in social interaction occurring within most rural communities today and the increasing prominence of contact with urban areas, encouraged by technology. The economic decline has also resulted in the necessity to increase efficiency by reducing staff and costs. This also includes expenditure on lifestyle. Rising costs of labour and inputs such as fuel and insurance have resulted in significant changes to lifestyles and reduced interaction of people in the community. Leaseholders also discussed how the decline and aging of the population has reduced social interaction and the ability of leaseholders to take part in community organisations. This leaseholder suggests that the younger generation may cope with these changes more easily.

‘But I suspect that the young people handle it differently. I think they have probably got a better handle on that. I think we’ve become staid and we can’t see the trees for the forest’ (female 50s).

To some extent this appeared to be true. Younger leaseholders had appeared to integrate technology into their lifestyles more than many older leaseholders and

leaseholders with school-aged families seemed to frequent and associate with people in urban areas more readily, especially in the Mt Magnet region. However, younger leaseholders also expressed considerable concern for the lack of social interaction and sense of community in their regions. This leaseholder had recently shifted from a farming region. She suggests the financial difficulties of hiring labour and the decline in population make it difficult for them and their children to attend meetings and interact with others.

‘Even though you should all get together every now and then just for support with each other, it doesn’t seem to work like that. I find with community things like LCDC have just about faded away. Even like craft groups for women, we’ll be battling next year to keep it going. I just find that everyone is really quite reclusive and don’t go out and do anything. Well we’re all trying to cut down on staff. Years ago they used to have a gardener and a maid and it would be nothing for a station to have 20 staff, but now most people just try and do it on their own, and maybe one single person. So the wives and husbands are doing the mill runs and mustering, you are all trying to cut costs, so it hasn’t made the community come together much, everyone is trying to cut costs. Just with superannuation and workers comp and everything it just gets so expensive so you try and cut back. The closest children for us are 200 kilometres away .... I find it hard because I’ve always been a community based sort of person’ (female 30s).

However, the development of producer alliance groups and courses assisted by the Agriculture Department has provided some opportunities for leaseholders to come together. One leaseholder gave an interesting account of how the formation of the local producer group had drawn people together for mutual support at a difficult time. Other leaseholders also made similar comments. She also discussed how this process created an atmosphere of equity amongst members as people realised they were all in the same situation. She suggested the strong community culture emerged

during this process and this reaffirmed her belief in the benefits of being a leaseholder in these regions.

Amalgamation of land due to cattle production, as well as CALM and ILC land acquisitions have all had a significant impact on the community in the Upper Gascoyne region.. This leaseholder notes her concern:

‘Socially the amalgamation of stations in this area has had a huge effect. Not only because of the drop in the number of actual people but also because of the drop in staff that the people had. ...It is a huge worry for the general social fabric of the area’ (female 50s).

When properties are bought by the ILC there is also a loss of European leaseholders to the community. This has the same effect as CALM acquisitions which generally reduce the land area under production, fragment the European community and increase the social isolation for neighbouring leaseholders. Leaseholders commented on their attitudes toward Aboriginal land acquisitions and the increase of Aboriginal communities within the region which had also changed the social dynamics of the region. However, this is a very complex issue and one that requires further research.

The following leaseholder stated the lack of social interaction and young people in the region were the aspects of being a leaseholder he disliked the most. Other leaseholders also mentioned the impact of government policies on rural communities. This leaseholder suggested industry policy toward accommodation for workers had greatly affected the town.

‘The lack of people in the area. Mt Magnet used to be pretty good with the mines, but with the fly-in-fly-out everyone wants to live in the city, there's basically no-one left. The township has gone down, it's basically a male-dominated town, which most mining towns are, but it's worse now because there's no social interaction other than contractors, there are less families in the bush, so there's no younger people left, it's just dying’ (40s).

This leaseholder reveals how government policies on equal opportunities in employment have also reduced rural populations. The consequences of this are closures of many facilities and amenities vital to the health of a community.

‘The government policy was to always employ people with children but with equal opportunity that went out the door, no families and of course now there's no school there. They wouldn't take policemen with families, shire clerks with families or school teachers with families so that reduced the community. That used to keep the little community population up' (male 50s).

Government decisions to close important social facilities such as schools and hospitals in rural areas are generally controversial and create major concerns for the future of the region. Important social factors such as health and education are then taken out of the control of local people, reducing the power of the community as well as its unique culture and way of life. In this way young people are educated and experienced in different value systems, resulting in a further gradual breakdown in traditional rural cultures. Leaseholders also discussed other social issues such as the financial and emotional difficulties they have with sending their children away to boarding schools for their education. They also spoke of their concern that many children will not wish to return to the region to live because of the lack of financial incentive for them to return to work in the industry. Difficulties of succession were also raised by leaseholders as an important issue of concern they considered was not being addressed. They suggested those involved were reluctant to openly discuss this topic which is fraught with emotions.

### **Summary**

Leaseholder comments demonstrated the significant social impacts that are occurring in these communities due to the continuing loss of people and the serious economic

decline in recent decades. The social sustainability of their community is threatened not only by external forces, such as globalisation, national policies and shifting public attitudes, but also by the adjustment strategies undertaken by leaseholders themselves. Technological advances and the rapid pace of change in urban environments are creating major pressures for these communities based on longer-term natural environments. Their comments reinforce the overriding message of the recent Australian Rangeland Society's annual conference: '...the greatest threat to the rangeland is the loss of people' (Alchin 2004, 14).

The increasing global, national and wider community pressures discussed by leaseholders suggest that both individuals and communities are finding it increasingly more difficult to adapt to the rapid pace of change. The region's social fabric is fragmenting and becoming incapable of supporting its traditional human communities. These once strong, well established pastoral communities appear to lack the diversity necessary to adapt to the growing demands for multiple use of rangelands. As people leave the industry and pressures force increasing changes on those who are left, they find it increasingly more difficult to sustain a viable community. Growing wider community demands for use of these regions is adding to the pressures for change. As Holmes (2004a, 15) suggests, as these pressures increase in the future, the challenge will be to balance the 'thrust of these contests, the goals of participants and the power relations and outcomes'.

Burnside and Boladeras (2002) point out that principal management tools are no longer concentrated on carrying capacities and timing of grazing use. Scientists working with leaseholders suggest that 'in many cases the level of degradation or degree of catchment dysfunction will not be fixed by adjusting stocking rate alone - that is... they (*leaseholders*) will need to undertake some kind of active

intervention/restoration to reverse the erosion and start healing the degradation' (Bushell pers. comm. 2005). However, leaseholder comments support many industry analysts' reports mentioned, suggesting management strategies required to meet environmental economic and social goals are not always feasible, and often require unrealistic personal deprivation or impossibly complex management. Much of the reason is due to the challenge to management because the complexity and variability of native pastures makes some areas more prone to degradation than others. It is therefore difficult to predict what the long-term consequences of leaseholder activities may be.

It appears that in many cases sustainable land use is not being achieved because the long-term productivity of the land for the given land use is not being maintained and necessary rehabilitation may not be occurring. It is therefore essential that management strategies now incorporate the development of practices and technology that help leaseholders to better understand the ecosystems of their properties and manage these with a more holistic approach to grazing and sustainable land use (Burnside and Boladeras (2002). (see Chapter 9, The EMU Process). Leaseholders also need to be encouraged to improve their business skills and develop new and alternative ways of producing an income in these regions. Therefore more effective policy arrangements designed to support these changes are required. The State of the Environment Report (Draft) (2006) points out that the complex nature of the institutional, legislative and policy arrangements in the pastoral rangelands makes it very difficult to effectively coordinate management strategies. They also suggest that the implementation and communication of policies to pastoralists and graziers remains poor. They recommend the development of more holistic rangeland policy

based on sustainability principles that better coordinates and integrates management of natural resources.

## **CHAPTER 7**

### **RECENT CHANGES IN PRODUCTION SYSTEMS IN THE UPPER GASCOYNE AND MT MAGNET REGIONS AND LEASEHOLDER ATTITUDES INFLUENCING THESE CHANGES.**

The previous chapters have analysed many of the complex factors driving change in pastoralism and grazing in Western Australia today. In response to these factors, leaseholders in the Upper Gascoyne and Mt Magnet regions have made significant changes to their animal production systems in recent years. This chapter builds on Chapter 6, The Challenges for Sustainable Land Use, and using leaseholders' comments, it reveals the changes that are occurring. It describes the factors influencing their changes, what they are doing to adjust to the current situation, the challenges and conflicts arising from these changes and how they are dealing with these, or not. Comments concerning the sustainability of these changes are also discussed in this chapter.

### **CHANGES IN THE TYPE OF ANIMAL PRODUCED IN THE TWO REGIONS**

Responses by leaseholders in the Upper Gascoyne and Mt Magnet regions to the pressures to adjust have been to change the type of animal they produce and to develop infrastructure to enable improvements in management to be undertaken. Differences in environmental conditions and perceptions of risk management have resulted in some leaseholders choosing to remain with the same type of animal production while others have chosen to change or diversify the type of animal they produce. Some leaseholders have chosen to improve the genetics of their animals and/or spent extensive time and effort developing the production and management of their grazing system in order to improve their financial income. There has also been a greater integration between rangeland and agricultural properties incorporating

farm purchases, agistment practices and feed supplies in recent years. The changes in the type of animal being produced between the two regions varied.

**Cattle:** (see Box 1). In the Upper Gascoyne 70% of the leaseholders interviewed had stopped or reduced sheep production and changed to cattle production. Table 7 shows the significant change in animal production in the Gascoyne region as a whole between 1983-2001 (see Map 2).

Table 7.

**Sheep, Lamb and Cattle Numbers in the Gascoyne Region ('000 head)**

<b>Year</b>	<b>1983</b>	<b>1993</b>	<b>2001</b>
Sheep and Lamb	533	693	480
Cattle	20.8	29	70.2

Source: Pastoral Lands Board & DPI 2003, Pastoralism for Sustainability, App.3

Some of these leaseholders also harvest or manage feral and Boer goats. Many have changed to Brahman type cattle such as Droughtmaster, a cross between Shorthorn and Brahman cattle, within the last decade. Others have bought farms near Geraldton and Perth to fatten and sell cattle to domestic and overseas markets.

**Merino Sheep:** (see Box 2). Leaseholders now produce Merino sheep for both meat and wool, selling ram lambs to the live export trade, and one producer in Mt Magnet is now producing Merino stud sheep for wool and selling to other producers. He is also the only producer interviewed in Mt Magnet who remains in cattle production.

**Damara Sheep and Boer Goats:** (see Box 3 & 5). Two leaseholders have changed production systems to animals introduced from South Africa. One leaseholder in each region has developed a production system based on Boer goats and one of these producers in Mt Magnet is also producing Damara Sheep.

**Feral Goat Management:** (see Box 4). One leaseholder has sold all his Merino sheep, upgraded his infrastructure and his entire production is the management of feral goats, or 'Rangeland' goats as they are now described, and four other leaseholders have diversified into the management of these animals.

**Feral Goat Harvest:** The increase in price of feral goats in recent years has resulted in all leaseholders who have feral goats on their property, harvesting or managing these animals, resulting in a huge benefit to their income during the recent period of dry seasons.

## **ANIMAL CHANGES IN THE UPPER GASCOYNE AND MT MAGNET**

### **BOS INDICUS CATTLE**

#### **BOX 1. BOS INDICUS TYPE CATTLE**

##### **History**

European breeds of cattle such as Shorthorn and Hereford (*Bos taurus*) were the traditional breeds for most of the last 100 years of cattle production in Australia and have not always suited the more arid conditions of rangelands in Australia. The introduction of *Bos indicus* from India first began in the early days of European settlement but it was not until 1941 that they began to spread across the country as pastoralists cross-bred these animals with traditional breeds resulting in cattle such as Droughtmaster, a cross between Brahman and Shorthorn cattle. These cattle survive and produce better under adverse conditions of heat and poor quality pastures (Gilruth 2000). Droughtmaster are now found in most states of Australia and can be either red or a golden honey colour and either polled or horned, although the majority of them are polled. They are well suited to the arid conditions of the rangelands because they have good fertility capabilities, have little problems calving, are good mothers and are more tolerant to hot temperatures than the European breeds. They have more sweat glands and an oily skin which helps repel pest insects and are also more resistant to parasites and disease. They have a quieter temperament than European breeds, making them a popular breed for management (NSW Department of Agriculture 2004). There was a significant increase in *Bos indicus* cattle breeds in northern Australia, which began in the 1970's, when improvements in animal and land management were encouraged by a government decision to eradicate brucellosis and tuberculosis. This required improvements in management of animals and land which resulted in significant infrastructure development such as fences and watering points (Ash & Stafford Smith 2002).

One of the reasons why most leaseholders in the Upper Gascoyne region have changed from a production system predominantly based on wool production to the

production of *Bos indicus* cattle in recent years is because of the changes in market demands to live export. Leaseholders consider the recent improvements in genetic breeding and increased handling of cattle now provide a much quieter animal without horns that is easier to handle and survives the ship voyage to overseas markets better than the traditional shorthorn breeds, thereby reducing their risk of loss.

Most leaseholders stated they now produce Droughtmaster while a few have chosen to produce similar cross-bred cattle and pure Brahman cattle. Leaseholders have also improved their management and production of weaner animals, mostly for the live export market. A small number of leaseholders have remained in Shorthorn cattle production which is sold to the domestic markets at Midlands. Their reasons for remaining in this market are both ideological and economic. Some are buying a farm near Geraldton to fatten the cattle and sell the animals to the local domestic market, because they cannot do this on their station. Other leaseholders also mentioned they would like to purchase a farm to supplement their station production. One leaseholder was selling Shorthorn cattle to a niche market in Japan. Leaseholders suggest cattle production has benefited them because of the reduced workload.

‘Sheep are a fairly labour intensive pursuit whereas cattle are less, you might muster them twice a year and that’s that. Make a few thousand dollars let them go and that’s that. Whereas with sheep there’s a whole heap of other costs, you’ve got to shear them, plus when you do get a bit of rain, the blowflies come so you’ve got to muster them up again’ (male 60s).

However, change from sheep to cattle production has required major infrastructure adjustments for leaseholders. They have increased watering points to expand grazing into areas where it has been limited in the past because of the accessibility of water. This will increase the spread of grazing over the region. Many leaseholders commented on the extensive job involved in de-fencing because cattle do not need

small paddocks like sheep do, and the problem they had with providing water when they changed to cattle production. Holding yards have also become an important part of cattle management and are an advantage for current agistment practices as well as mustering. Many leaseholders were able to access government funding to help with these changes. These major changes in infrastructure are an important event in these regions.

In the Upper Gascoyne where most stations now produce cattle, there was a general consensus that most of the area is not suited to wool production any longer. However, cattle producers considered that cattle production had a good future in the region. Those that were not in cattle disagreed. This leaseholder explains his point of view.

‘With sheep you have to have fences and their fences go across the rivers and every time the river runs it's a fortnight's work running round fixing them. ...So it was really decided for them because their running costs and what they were getting for their wool just wasn't adding up. So it was the only other thing they could do. You don't need fences for cattle, you just need a tank and a trough and the cattle will come back to them to get a drink. That's basically what they are doing, that's why they're putting in all these bores. Cattle also drink a lot more water so you've got to have more watering points. That's why they've changed because it's not really cattle country, because it doesn't rain regularly enough. If you got a good average rainfall in the year it would be fine but if you added up what we've got in the last 4 years it would probably add up to the average for one year. And cattle find it hard to live without water' (male 60s).

Most cattle stations have traditionally been in the northern regions where rainfall is greater and more reliable. Dover (1992) argues that the introduction of (*Bos indicus*) mixed cattle breeds rapidly increased beef production and placed increased pressure on the northern ecosystems. The low, erratic rainfall in the Upper Gascoyne region

may therefore create even greater risks for this ecosystem as well as leaseholders' economic viability. Unreliable and politically unstable markets also add to this insecurity (Ministerial Taskforce 2003). Leaseholders suggest that cattle production has also contributed to many amalgamations of stations in this region (see Map 6).

The problem with wild dogs attacking young lambs is another major reason why leaseholders in the Upper Gascoyne region have changed from Merino sheep to cattle production. The problem is not new as wild dogs were reported by the Bureau of Agricultural Economics (1954) as causing heavy losses of sheep and lambs. The Agriculture Protection Board is responsible for eradication programs. Ground baiting programs using 1080 baits have been implemented by the Agriculture Department and community groups such as Land Conservation District Committees (LCDC) are encouraged to become involved to ensure effective programs are put into action. Although there is little hard evidence, both leaseholders and industry representatives have suggested the problem of wild dogs has become worse in recent years due to the reduction in State Government spending on 'doggers' who are employed to trap and control the dog populations (Jarvis 2004). Some leaseholders also suggested the dogs have learnt not to eat the baits or that the meat is not fresh enough to attract them.

However there is conflict over who is responsible for wild dog control. The increased area of land controlled by the Crown has grown in recent years and this may be exacerbating the problem as many leaseholders adjacent to these conservation areas complained of increased problems with wild dogs. Leaseholders also suggested good seasons in central and inland regions of Western Australia in the past few years have allowed populations to build up and now the dry seasons are forcing them to expand their territory by migrating westward. They are now reducing feral goat populations

in the area. This may benefit the environment but is a significant disadvantage for some leaseholders because of their reliance on feral goats for income. One leaseholder suggested the elimination of sheep production in their area may be influencing the wild dogs to move further south.

However poor co-operation of parties involved and the uncertain willingness and ability of leaseholders to implement eradication programs present barriers to success. Recently the Agriculture Protection Board has recommended more research to determine the impacts of wild dogs and more effective strategies for change be implemented (Agricultural Protection Board 2003). One leaseholder suggested the control of the numbers of wild dogs by leaseholders in the Upper Gascoyne region is therefore of significant importance to producers of smaller animals such as sheep, goats and Damara in the southern regions. However, doggers suggest there is a misconception among many pastoralists and graziers in WA that wild dogs only target sheep. They now have evidence that wild dogs operating in packs will also badly maul or kill cattle. They point out that local control programs are also relevant to cattle producers and they need to co-operate rather than choosing to ignore them. Western Australia's Dogger Training Course Instructor suggests leaseholders need to actively participate in eradication programs more if these animal numbers are to be controlled in the future (Thomas & Figg 2005).

There are therefore a number of issues surrounding the changes leaseholders in the Upper Gascoyne have undergone from sheep to cattle production. Although cattle have been produced in this region for a number of years the climate and market conditions pose huge risks to their viable production (see Chapter 3, History of Land Use in Western Australian Rangelands and Its Influence on Current Changes). Large investments in infrastructure have been made by both government and leaseholders

in a region greatly affected by decreased production potential. This raises questions about the risks associated with the sustainability of this production. However, the extensive station amalgamations that have occurred in the region, as well as the change to cattle species more suited to the environmental conditions and many overseas markets, may provide an advantage that tips the balance in favour of cattle production in the short-term at least. Longer-term production may rely on further station amalgamations and the ability and willingness of leaseholders to better manage their natural resources.

#### MERINO SHEEP

##### **BOX 2. MEAT AND WOOL MERINO SHEEP**

The overall trend in sheep production today is to rely less on specific breeds of sheep and more on developing generic type sheep focused on increased production of both meat and wool. Sheep in Western Australia are based on breeding Merino with the use of other breeds for increasing meat qualities and quantity. Use of the Merino is unlikely to change because it is well established in the wool industry and it has the advantage of producing fat later in maturity than most other breeds. This fits the consumer demand for large, lean meat. However, the reproduction rate of Merinos is lower than other sheep breeds and this is a focus for current research. Western Australia currently exports more Merino lamb meat than other states in Australia (Milton & Lindsay 2000).

Most Merino wool producers I interviewed were in the Mt Magnet region. After four years of dry seasonal conditions, declining wool prices and increasing costs, sheep numbers in the rangelands have been drastically reduced and subsequently wool production has also decreased. Wool production for one leaseholder in the region under study, previously running around 10,000 sheep, has decreased from 300 bales in 1990-91 to just over 100 in 2003 (Sharman 2004). The following comment reflects the difficult situation wool producers in the rangelands are facing today. It is also the

reason many have changed to the production of meat sheep, goats or cattle. This leaseholder has found that the reduced workload and profits from goat production are a big benefit compared to wool production.

‘The costs have gone up compared to what we’re getting for our produce. They have gone up really high. What it is costing us for producing; we are not getting the returns back. It’s a hard battle. You have people say that wool is good and prices have gone up but if you consider the costs it hasn’t at all. It is just getting behind. That’s with wool. Goats have really picked us up. We did a 4 year program. The goats are really paying their way. Our labour costs are lower than sheep, whereas it is still costing us money to produce wool, because of shearing costs, blowfly problems, labour costs, motorbike and vehicle expenses. Whereas with goats with the trapyards we don’t have those costs. We don’t need motorbikes; we don’t need a lot of labour, no shearing or blowflies. Ongoing costs are a lot less’ (female 60s).

Leaseholders also commented that climate conditions and wool markets generally peak at different times. Consequently they are not able to effectively benefit from either, presenting a major barrier to viable production in these regions. Recent changes in technology and commodity prices have encouraged agistment during dry seasons and the practice appears to provide significant potential for wool producers in particular because of the greater vulnerability of Merino sheep than goats and Damara sheep during these times. Leaseholders suggested there were a small number of leaseholders who continue to have viable wool production systems, demonstrating the wide variance in leaseholders and properties in these regions. Those leaseholders who remained in wool production, and appeared to have a viable production system, were also 2<sup>nd</sup> or 3<sup>rd</sup> generation leaseholders on the same property. This implies their fathers and grandfathers may have been more effective managers than other leaseholders of the time. These leaseholders have therefore not inherited a legacy of mismanagement that affects their current production potential to the same degree as

others, and may also have inherited a better understanding of native pastures and management skills from their fathers.

Most leaseholders have also changed animal management practices to increase productivity and maintain their income. The change to trapyards instead of mustering their sheep means that leaseholders need to change the time of year they do their shearing to the summer months (see Chapter 6, Total Grazing Management Systems). This is because the traditional months for shearing were during the winter when water was available on the ground and the sheep did not need to use the watering points during this time. This technology has been a major benefit by reducing both their time and costs and leaseholders are now structuring their management around this infrastructure. However, it also changes demands on shearers which may be an advantage if this occurs at different periods of the year from farmers.

There are a number of factors that drive and motivate leaseholders to continue in wool production. Quaddus, Islan & Stanton (2003) recently completed a survey for Agriculture Western Australia to determine why producers remain in wool production. They found that although income and sustainable profit were the most important drivers, there were also a number of social factors that kept leaseholders in wool production. These included factors such as lifestyle, challenge, identity as wool producer, interest in product and its potential contribution. These factors were also included in comments about what was important to wool producers in this study of leaseholders in the Upper Gascoyne and Mt Magnet. A number of leaseholders identified very strongly with being a wool producer. They considered the land they lease is most suited to wool production and that wool prices would improve in the

future so they were currently waiting for prices to recover. A survey by Rogers (2001) of leaseholders in these regions also found this attitude.

However, other leaseholders commented on how traditional culture and attitudes toward wool production constrain change. They suggest the large risks and difficulties involved in change mean that leaseholders remain in wool production even when they believe there is not a viable future in it.

‘It takes a long time for people to change their attitudes here. They're very set in their ways. What was good enough for Grandad is good enough for them. First and foremost they are wool producers and nothing else, it's set in stone. Regardless of how bad wool and sheep prices are they are wool producers. They don't want to diversify into anything else’ (male 60s).

The following leaseholder suggests that traditional attitudes toward animal production are changing with the current generation of leaseholders. He suggests younger leaseholders have a greater acceptance of new animals and markets.

‘But I don't know about the future of the wool industry in this area. I think that we're just into a mentality that wool is it. I can imagine that other people probably say ‘We are pastoralists. We grow Merino’ and would probably have blinkers on to anything else. But we're lucky being younger and have a different attitude. Dad's a wool man, he likes his wool, he was brought up with wool, he went through when it was a pound a pound and squatters made zillions. But we don't have that mentality. You've got to be able to change. It comes back to the topic of wool production being a perceived status or something. I've heard of people getting really nasty about these black sheep towards neighbours and it's the old English idea that (Merino) sheep are here and it's that old attitude’ (male 30s).

Other factors that influenced adoption of change included the cost of establishing new infrastructure, generational conflicts (see Rogers 2001), concern about Damara impacts on neighbours and community attitudes toward the impacts of feral goats.

Leaseholders were also asked about the future of their production systems and opinions about the future for the wool industry varied. Some pastoralists who remained in wool production were optimistic about the future of the industry while other pastoralists did not believe there was a viable future for the industry. Others believe there is a viable future for wool production in general, but the difficult climate and increasing costs of wool production in the rangelands will reduce production in these regions in the future. One leaseholder commented on his belief there is potential for improvement in many pastoral wool production systems but he considers the problem lies with the pastoralists themselves. He believes the quality of sheep being produced is low and that pastoralists' attitudes toward developing the genetics of their sheep and management of their enterprise, prevents improvements in sheep production. It is worth mentioning here that this producer is considered one of the most successful in the region. He discussed the results of benchmarking he had undertaken as part of a two-year program providing financial advice to leaseholders funded by the Gascoyne-Murchison Strategy (see Chapter 9, Gascoyne Murchison Strategy).

We've just been through this benchmarking with Rosemary Bartle. All our figures are way up there. Others haven't done it because they think what they are doing is right. They can't see any reason to change' (male 40s).

However the success of this leaseholder's production relies not only on high quality animals but also on a combination of the quality of vegetation on his station, his understanding of the ecosystems on his land, well-developed infrastructure, efficient management, accumulated knowledge and expertise and low debt. His youth may also give him greater physical abilities and potential willingness to change than older leaseholders.

Wool production overall in the Southern Rangelands region appears to be rapidly decreasing. Nearly all of the stations in the Upper Gascoyne have converted to cattle and the small number of sheep producers that remain are in the southern region where the environmental conditions remain better suited to sheep. Leaseholders in Mt Magnet now produce increasing numbers of Merino sheep for meat and rely on supplements to their income from the harvest or management of feral goats. Others have sold their Merino sheep and now produce managed feral goats or Boer goats and Damara Sheep. Although many leaseholders did not believe there was an economically viable future in wool production, some believed the demand for wool is unlikely to disappear. They considered the reduction in sheep production throughout Australia in recent years may therefore be an advantage for the few remaining in the industry. As leaseholders continue to face pressures from global, national and local sources, only time will tell whether their predictions for the future of the industry in these regions come true.

**BOX 3. DAMARA SHEEP**

**History**

Development of the Damara breed only began in South Africa in 1986 (Young 2000). It is a fat-tail meat sheep that has evolved over two thousand years on the African continent and is therefore like other desert breeds of sheep with long legs, a fat tail and short hair. Their fat tail is like a camel's hump and can store fat reserves when seasonal conditions are favourable to be used in times of dry seasons, their long legs help them access feed at the shrub level and the short hair also makes them less vulnerable to attack from insect pests. In addition they are able to survive and breed in arid areas with poor nutritional conditions where water is scarce and shelter is restricted (Peattie & Giles 1999). They were first introduced to Western Australia from South Africa in 1994 with the first trial shipment of Damara and Merino sheep going to markets in the Middle East in 1997. They received \$45 for each Damara sheep compared with only \$28 for purebred Merino sheep (Ibid). It is difficult to know the numbers of these exotic sheep in Western Australia so accurate numbers and rates of increase are not available. This is probably due to the ongoing process of adoption of these new breeds, unplanned cross-mating or the reluctance of rangeland producers to admit to their breeding due to the problem of contamination of neighbouring Merino sheep (see Issues Surrounding Introduction of Exotic Sheep Production). However, Burt, Kilminster & Young (2004) suggest it was estimated that the cross-bred or exotic population, which includes around 5 different breeds, totalled around 750,000 head in 2001, equating to around 3.3% of the State's flock. They note that the average price received for export males in 2003 was around \$63 per head.

## DAMARA SHEEP



Source: Hall Damara 2004.

### **Breeding Advantages of Damara Sheep**

Leaseholders from both Mt Magnet and the Upper Gascoyne regions commented they attended a field trip to South Africa organised by the Carnarvon Agriculture Department in 1997. They were able to obtain first-hand knowledge and understanding of some of the benefits and problems that exist in the production of these sheep. They did not have to trial the animals themselves and this encouraged a number of leaseholders to establish production of Damara sheep and/or Boer goats in the Southern Rangeland region. However, leaseholder attitudes toward Damara varied widely. Damara sheep characteristics make it an ideal animal for production in the Southern Rangelands and producers confirmed many of the following aspects of their production.

## List 5. Damara Sheep Characteristics

### Damara Sheep Characteristics Compared to Merino Sheep

Damara sheep have the following advantages over Merinos.

- They have a higher utilization of food than Merino sheep and are able to convert protein from what they eat more efficiently.
- They are non-selective grazers and consume more roughage so are able to use a wider variety of the rangeland vegetation than Merino sheep. Like goats, they stand on their hind legs to eat a high proportion of trees and shrubs.
- They have a lower water intake than Merinos so are able to feed further away from watering points resulting in reduced degradation of areas surrounding watering points. Therefore they are also able to make more efficient use of shaded areas during periods of excessive heat.
- They have a high resistance to disease which reduces the husbandry required. This also reduces the use of chemicals and helps maintain the 'clean, green' image of rangeland produce.
- They are polyestrus (can breed continually, with no defined season), and appear to produce more offspring than Merino sheep. They are able to produce three lambs within two years while Merino sheep only breed once a year.
- They have a higher average lambing rate (around 70%), than Merino sheep, (40-50%).
- They have a higher rate of reproduction and gain weight faster than traditional Merino sheep.
- Lambs are very mobile at birth and are able to start grazing in the first few days after birth, giving them the advantage of good survival rates.
- Ewes have good mothering abilities and their hardiness allows them to remain productive to an older age than Merino sheep.
- Ram lambs are regularly marketed at 14 weeks of age compared to Merino lambs which are sold around six-nine months depending on their body weight
- They do not have wool like traditional Merino sheep but have hair instead which comes in a variety of colours ranging from black or brown to white. Many animals are multicoloured and flocks are quite pretty. The smooth hair

decreases problems with fly strike or lice unlike Merino sheep which require seasonal control by crutching and dipping.

Damara Sheep have the following disadvantages.

- First cross Damara ewes still retain some wool growth and require shearing and some protection against fly strike
- Their wool is currently of little value.

(Silver Springs 2003; Murphy 2003; Peattie & Giles 1999; Eliot 1998; Young 2003).

The strong growth rate and polyestrus breeding cycle of Damara also provides a more continuous supply to markets and enables leaseholders to take advantage of selling when other meat supplies are low. The inherent survival instincts of Damara sheep are also an advantage. They evolved with predators and have developed a herding instinct to remain in herds for mutual protection. They tend to bunch together in circles when they feel threatened.

#### DAMARA SHEEP IN CIRCULAR HERDING POSITION



Source: Lynda Braddick

The outside circle moves in one direction while the inner circle moves in the opposite direction presenting a mesmerizing affect on their attackers. One leaseholder suggested that this flocking instinct may provide protection against wild

dogs much better than Merino sheep or goats which tend to panic and run when being attacked. This behaviour does not appear to have been proven by research as yet but may be an advantage to producers in areas prone to wild dog attacks. Producers also believe there is a larger expenditure required to manage the traditional wool sheep breeds. The cost factors and management involved in shearing and managing disease and lice or fly strike are virtually eliminated after the first cross. Therefore, although the gross revenue may be higher for Merino sheep they believe the overall profit is greater from Damara production (Silver Springs 2003). However, the cost factors involved in changes to infrastructure are currently making Damara production in the Southern Rangeland regions very expensive. The problem of effective boundary fences and their costs are now becoming a central issue in the conflict surrounding Damara production.

### **Issues Surrounding Introduction of Exotic Sheep Production**

This conflict arises due to the introduction of Damara sheep into areas where Merino sheep are also produced. Shardlow (2003) informs us that contamination of the Merino wool by Damara hair has become a major problem for producers and wool textile companies. Exotic fibres in the wool are not visible to the naked eye and are not discovered until the wool has been dyed and converted to fabric. They consist of medullated fibres which do not take the dye because they have a medullary sheath surrounding the pith that is not porous. Shardlow also reports that the Australian Wool Innovation has invested \$1.4 million to develop technology to remove the fibres. She explains that a contamination test currently exists but costs more than \$150 and takes 5 hours or more per core sample. The industry currently relies on producer honesty to declare they may have contamination in their wool. When exotic fibres are identified in wool, the producer receives from 15-50% less for their wool.

There is currently no mechanical device to remove the hair so this is performed manually, using tweezers. This problem is estimated to be costing the textile industry millions of dollars (Shardlow 2003). This leaseholder's comment reveals the frustration many wool producers feel about the problem of wool contamination.

'We have problems with Damara sheep from the neighbour coming through and this has made a difference to our wool. We've got one paddock that we know was infected by Damara and we had three bales of wool cut from that paddock. We had to sell them as a separate line. We had 109 normal bales of wool that we had no Damara in with and these three bales had to have a black fibre test and we got less money for them. We didn't want the Damara in here, they just came in and they mated with our Merino ewes and in the drought time we've got no Merino rams here at (station name) at all, they are all on agistment elsewhere. We haven't mated for four years now and these Damara came in and mated with our ewes and of course now we've got 2-300 Merino ewes with Damara lambs afoot. They've got to go down on agistment because they'll die if they stay here, they can't support a lamb in this climate, so we have to send them away on agistment. We'll sell the lambs and that will hopefully cover our costs, but it is a situation we'd rather not have happened. If we were going to breed them we would have put a couple of Merino rams over them, not bloody Damara!' (female 30s).

Wool producers in these regions have often spent years and expense establishing a viable flock and the introduction of Damara is now exposing these enterprises to increased risk. This leaseholder explains how this has affected their confidence in their production system.

'The problem is while we appreciate people may choose to make a business decision to have Damara, it has proved fairly difficult to contain them in pastoral areas. We have actually had Damara rams that have come into our flock and after all these decades of breeding the genetics for our fine white wool we now have an infusion of Damara and that actually puts us in a

situation where we've lost confidence in our own capacity to produce a product which can stand up in an international market' (female 40s).

The following leaseholder suggests the problem is also causing real problems for the social cohesion of the community as well as for the future potential of producer alliance groups such as the Rangeland Fibre and Produce group established in Mt Magnet.

'I think that's definitely there between neighbours, definite friction of neighbours that run certain animals and they get into next door's place. So it definitely affects the way they interact. I think it has affected the ability of the community to work together over this last 12 months. So it's more or less finished Rangeland Fibre and Produce' (male 40s).

Although the problem of hair contamination is not entirely new to the industry, the recent introduction of exotic sheep has expanded the problem and some wool producers believe it may even threaten the future production of wool in the rangelands. A common aspect of any conflict is often a need to find someone to blame for your misfortune. Some leaseholders felt this lay with those who had chosen to become Damara producers while others blamed the Agriculture Department for promoting the release of exotic sheep breeds in the rangelands. Jensen (2004a) found that leaseholders believe the Department should have ensured protocols, such as enforced fencing regulations, were put in place to control Damara stock. They also believed that more research should have been undertaken to determine the impact of exotic sheep breeds on existing wool production systems before they were introduced. Comments from leaseholders suggest the problem is greater in the Mt Magnet region because of the higher numbers of wool producers in this region. The rapid change and complex nature of the situation is making it difficult to find effective solutions to the problem and this is resulting in an

increasing sense of frustration as the number of wool producers affected by Damara hair contamination grows. Jensen (2004a) also found that many pastoralists believe the industry, and in particular their Pastoralists and Graziers Association, is currently not doing enough to support them.

The contamination of wool has become a significant issue because of the introduction of a sheep species with hair, that cross-breeds with the Merino. Because sheep and goats do not mate this appears to have been an issue of little significance in the past. Lindsay (1999) suggests contamination of the wool by Damara hair occurs mainly during mating or by the lamb when it is rubbing or suckling from its mother, but adds that contamination can occur if both sheep are shorn in the same shearing shed. Leaseholders commented they were told they would be able to tell if the lamb was a Damara progeny or not. Peattie & Giles (1999) also suggest that Damara would dominate the sheep's appearance with first cross lambs. However, leaseholders stated this was not the case and they were finding it was very difficult to know whether their lambs were Damara cross or not. Some leaseholders commenting on the underlying problems facing the wool industry believe it may ultimately be the low value of wool that may force wool producers to change to Damara production in the future. They believe the future lies with the production of animals for meat.

A recent conference in Mt Magnet brought to the surface the growing discord between Merino wool producers and exotic sheep breeders. Wool producers were concerned that wool processors may be able to use systems that trace back the contamination from exotic fibres. This will allow them to identify where the contamination occurred, making the wool producer liable for the costs involved (Carew-Reid & Jensen 2003). Now it appears the wool industry has chosen to place the responsibility for determining the level of potential hair contamination in their

wool, and therefore their level of income from the wool, back to Merino wool producers. A form for producers to provide information on the degree of contact their Merino sheep have had with exotic sheep became part of the sale process in July 2004 (Australian Wool Testing Authority Ltd 2004). However, this process relies on the honesty of the producer to declare their Merino wool may include hair fibres from Damara. This system presents real problems for leaseholders because they do not always know if they have contaminated fibres in their wool and they may also be reluctant to specify the degree of contact because of the potential loss of income. It will be interesting to find out how effective this scheme is.

The issue is also raising conflict over the need for fencing, the affordability of it for leaseholders and who is responsible for erecting adequate fencing. Some Merino breeders considered it was the obligation of exotic sheep breeders to contain these new breeds they are introducing into the area and prevent them from straying onto neighbouring properties. Others feel Damara producers should not be forced to shoulder all the costs of new fencing to protect the existing Merino flocks. Long & Robley (2004) suggest that suitable fencing to contain Damara can cost from \$3,400/km to \$4,200/km, making it a very expensive and controversial issue for many leaseholders in these extensive regions. Leaseholders in Mt Magnet commented that the Damara producer in their region did appear to be trying to do the right thing, however, and was spending considerable sums of money on erecting effective fences.

‘Even (K) is trying his hardest to have the infrastructure but they're still getting into the neighbours’. Everything just gets eaten over there. The man is trying but the animals are still moving on’ (male 70’s). We can see from this statement by a staunch wool producer that the introduction of Damara presents a real conundrum for

lease-holders. Independence and the right to choose what they do on their own property is a high priority in lease-holder's value system and leaseholders recognize this factor in relation to Damara production. This may be why most people seemed to apportion blame to 'outside' factors such as government agencies or the animals themselves. One of the main problems with erecting fences is that in the past there has been little maintenance of fences so the costs to do this are now often too great for many leaseholders (see Chapter 6, Changes in Land and Animal Management). Although many of the old Mulga posts are still intact, the wires are often sagging or missing and are no longer able to adequately secure the animals.

#### OLD MULGA POSTS IN FENCE IN MT MAGNET REGION



Source: Lynda Braddick

As a result, it is difficult for leaseholders to upgrade existing fencing infrastructure, so they have to start from scratch, making it a very costly exercise. Regulations controlling dividing fences are contained in the Dividing Fences Act 1961.

However, Carew-Reid & Jensen (2003) suggest there is confusion as to what 'adequate' fencing is and whether Damara is a 'sheep' in the traditional sense of the word. They tell us that wool producers are currently arguing that 'adequate fencing' needs to be defined sufficiently to enable the act to be enforced. They are demanding that Damara breeders pay the extra. Carew-Reid & Jensen (2003) also point out the problem with introducing strict regulations, is that it reduces the flexibility of the way they are able to be interpreted. Therefore, binding the industry to stringent fencing regulations may potentially limit new and innovative possibilities for change and diversification. Currently there appears to be an impasse and Mt Magnet conference delegates came to the conclusion that fencing and management are the issue and that the most effective measures to deal with the problem are consideration and good communications between neighbours (Carew-Reid & Jensen 2003). But this is placing some leaseholders with a real conundrum about what to do:

'...a Damara is almost worth about twice as much as a goat; well it was. So the sensible thing would be to go into Damara. But you hesitate with that... because if the Damara gets through the fence into your neighbour's enterprise and it happens to be prime wool, well you mess him up, and you don't want to do that. But they say they're not real bad on fences, if there's a decent fence, they'll stop them. In a lot of cases we haven't got decent fences because our boundaries aren't good' (male 60's).

'If we diversified would we get any straying stock? Would we get that back off neighbours like we do sheep? That's a bother if we want to diversify, because I've heard of threats of people shooting up animals rather than giving them back. That's not good. Regardless of good neighbours and fences, good fences make good neighbours and sometimes you've got a bad fence; what would that mean? At the moment that would probably be an issue because you don't want to spend a lot of money restocking a new line and have stock shot. That would be a bother' (male 40s).

The current dry seasonal and market conditions were also influencing change and a number of pastoralists commented on their intention to change or the possibilities of changing to Damara production when seasons or market conditions improve.

But there are also the issues of land impacts associated with the introduction of this new breed. Damara are a relatively new animal to Australia and little technical research has been undertaken on their physiology and their ability to survive and impact on the natural resource in Australia. As a result there are very mixed reactions to their introduction in the rangelands. These animals eat different vegetation from Merino sheep and are able to survive and continue to impact on the vegetation when conditions are too dry for Merino sheep. Brennan (2004, 37), argues that this gives them 'the capacity to degrade the rangelands further through species-specific grazing unless good grazing management is implemented'. Currently there appear to be few constraints on the introduction of Damara to an area that is already degraded from overgrazing. This raises a number of questions regarding development and use of rangeland resources. Is the increased production of Damara sheep and goats adding to risks of land deterioration? Do we know whether the current use of Dry Sheep Equivalent (DSE) as a stocking rate for exotic sheep and goats provides the potential for sustainable production? Should the lack of research data available encourage us to evoke the precautionary principle and limit the expansion of this type of development? Many leaseholders also had similar concerns about the impact of Damara on the environment.

'The feral goats have been here for about 50 years. ...the Damara come in and eat the grasses and little plants that the sheep eat and then when they're all gone they eat the low bushes. They don't get up and browse into the trees as much as the goats do, but they do more damage to the little plants around. The goats will have a go at the little bushes and when there are not too many

left around they go up into the trees and pick at the trees. The sheep of course don't go up into the trees because they are just about dead by now. So the Damara are, we think, having a very negative impact on the environment. And it's such early days now, but it appears as if potentially they could be more of an environmental disaster than goats because of their degrading habits. They'll just eat everything that they can get on the ground, whereas the goats will have almost everything, but then they go up and eat off the trees' (female 30s).

One project on Damara impacts undertaken by the Department of Agriculture by Walsh (2003) is comparing consumption rates and forage preferences of Damara, Dorpers, Boer goats and Merinos in rangeland conditions. Early results are showing differences in these breeds and if these are found to be typical, inferences may be drawn that over time, these different breeds may have different impacts on the environment. Walsh (2003) recommends that more research is required to help producers gain a better understanding about the potential for this breed and its impact on the rangeland environment.

Another major concern for rangeland stakeholders is the issue of what will occur if Damara become a feral animal in the rangelands. This occurred with goats and camel in the past and these animals have now become a considerable environmental concern in the rangelands. Damara have similar survival characteristics to feral goats and therefore if allowed to become feral, they have potential to significantly increase the impacts on the area and increase the problems of feral animal control. The Pastoral Lands Board has the authority and responsibility to control lessees' activities and is therefore the government authority that deals with the problem. However, the complex nature of the problem means there is no easy solution.

### **Australian Market Development of Damara Sheep**

Damara Sheep are slowly gaining recognition around the world as a fat-tailed sheep producing lean meat suitable for consumption in many developing countries overseas. Its ability to survive well under harsh conditions makes it very suitable for transport by sea in the live overseas trade and Australian producers are currently unable to keep up with demand. However, this dependence on overseas markets does make producers vulnerable (see Chapter 3, History of Land Use in Western Australian Rangelands and Its Influence on Current Changes). Most Australian Damara breeders are in Western Australia where the breed has developed very rapidly since its introduction (Young 2003).

The Damara sheep is quite different from the traditional Merino sheep as it is bred for meat production only. It also has an advantage as a fat-tailed sheep breed because many of the markets established overseas are in countries with similar environmental conditions where these types of animals have evolved and been consumed for many generations. The people therefore have a preference for these traditional animals. They are exported as live animals because religious culture in these countries demands the killing of live animals under specific conditions. Currently there is very limited sale to consumers on the domestic market because local people are used to the taste of European sheep meats and find the taste and cooking odours of Damara different (Ibid). However, it is being promoted locally by producer groups and some believe there is potential for expanding the consumption due to the low fat and chemical-free content of the meat. Damara lamb has been found to contain less than half the amount of total fat in equivalent cuts of conventional breeds of lamb (Sinclair 2000). Some suggest it may be a pioneer in fulfilling a growing change in world eating habits, ‘...it is the catalyst for meeting worldwide demand for leaner,

better-quality meat' (Burt, Kilminster & Young 2004; Ladyman 2002, 1). Damara skins are a lucrative by-product and are used for high-quality leather products such as gloves (Peattie & Giles 1999).

### **Future Potential**

Burt, Kilminster & Young (2003) suggest the fat-tail provides some unique opportunities for value-added sales in products such as smallgoods but the supply in Western Australia is not sufficient at present as most Damara are exported live. This would provide potential for increasing the value of Damara sheep and for increasing employment opportunities within Western Australia. But the production of exotic animals such as Damara has an overwhelming reliance on the export trade. They inform us that future potential for the domestic market as well as overseas markets with chilled or frozen Damara meat are being developed which will help spread the risks involved in the live export trade. Brennan (2004) suggests the organic market provides useful potential for Damara producers in the rangelands.

Insecurity of the live export trade and the lack of alternative markets remain significant constraints to growth of Damara production. However, the production of exotic sheep by Western countries is a recent development for world markets. As products receive greater promotion and new ways are developed for using this product there appears significant potential for expansion. A growing demand for healthy, new foods amongst affluent sectors of society may also encourage growth. Interestingly, Murphy (2003) informs us the low management requirements for Damara sheep are fostering an interest from rural females to produce these animals. This may provide a worthwhile potential for diversification. If they are able to effectively protect themselves against the wild dogs, limited Damara production may

be something that can be undertaken by female spouses to provide a profitable sideline to cattle production in the Upper Gascoyne.

**BOX 4. FERAL GOATS**

**History**

Goats were first mentioned coming to Australia aboard the ship Sirius which left South Africa in October 1787. During the 19<sup>th</sup> century they were also introduced to many islands and mainland regions by whalers, sealers and naval officers to establish emergency supplies of food. Goats continued to be brought to Australia to provide milk, meat and skin for early settlers from a number of different countries. They were among the first livestock to be introduced by European settlers in many parts of Australia. Angora and cashmere goats were imported from Asia in an attempt to start a goat fibre industry. However this collapsed in the 1920's. These domestic goats escaped or were abandoned or deliberately set free and the mix of goat types form the feral goat today. They were able to become established in the arid pastoral regions of Australia because there was plenty of food available, waterholes were established for sheep and their predators such as dingoes and wild dogs were controlled to protect the sheep (Parkes Henzell & Pickles 1996). Feral goats are now an agricultural pest and considered to be a major environmental problem by many scientists and government authorities. Of all the domestic animals introduced by Europeans that have become pests, goats have probably been the most environmentally destructive. The vastness of the area and the low value of goats to people also meant it was not worth the effort to maintain control of their population growth. By the beginning of the 20th century there was probably already quite a large population of feral goats in Australia (Parkes Henzell & Pickles 1996; Bolton 1981).

## List 6. **Breeding of Feral Goats**

### Feral Goat Breeding Under Rangeland Conditions.

The breeding advantages for Feral Goats in rangeland conditions are as follows:

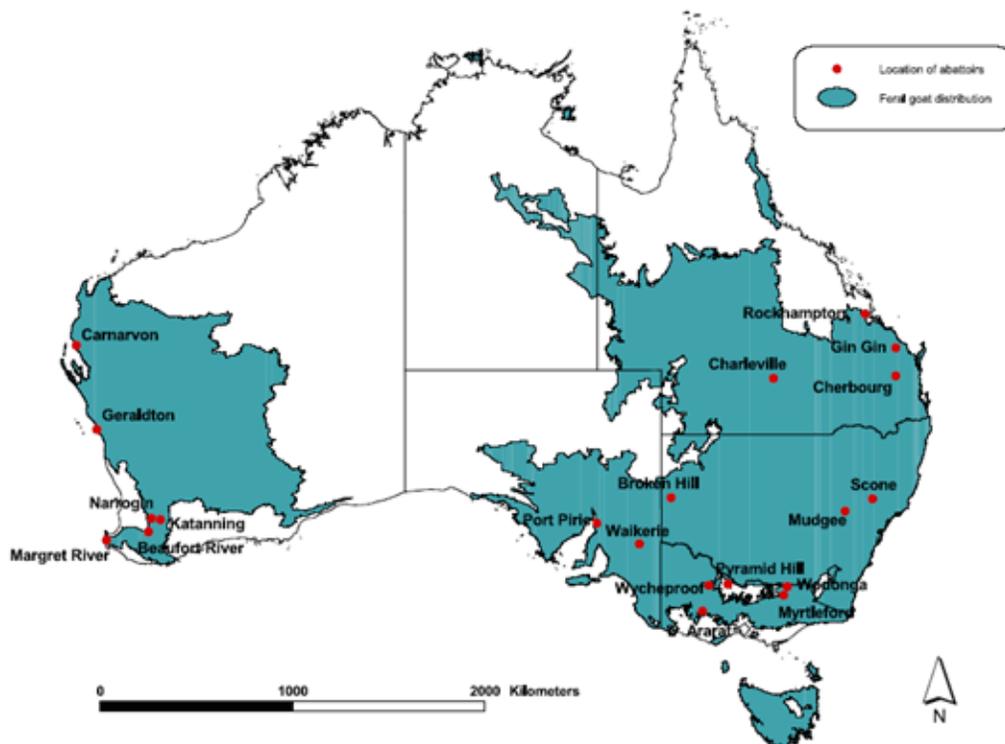
- Goats become sexually mature at an early age, have extended breeding seasons and can conceive while still lactating.
- Harvesting or culling alters the age structure of populations and harvested populations are generally biased toward a younger population with a significantly higher ratio of females than is found in unharvested populations. The higher proportion of females in many populations increases reproduction.
- Females have a short gestation period and can become pregnant in their first year. They can then become pregnant again soon after giving birth so they can therefore breed twice a year and often produce twins or triplets.
- Consequently harvested populations of feral goats can increase by over 50% per annum if harvesting stops. This provides goats with the ability to become a significant pest species.
- However, the food supply and quality generally has a profound effect on birth rates. Therefore, breeding declines as food quality deteriorates during dry seasons.
- Natural mortality of feral kids up to 6 months is thought to be high due to predation by dingoes, foxes, eagles and feral cats (Parkes, Henzell & Pickles 1996).

The inherent breeding traits of feral goats give them the capacity to reach high densities and inflict severe damage if left uncontrolled. It is difficult to accurately measure feral goat populations because almost all populations in Western Australia are regularly subject to human mustering and animal predation. Average population densities were estimated to be from 1-3 goats per square kilometre in the pastoral areas in the decade from 1982-1992 and at two goats per square kilometre they are estimated to constitute about 10% of grazing pressure (Parkes, Henzell & Pickles 1996). Despite regular control by Government agencies and mustering by

leaseholders, feral goat numbers in the rangelands of Western Australia are not declining. Populations were estimated to be around 450,000 in 1982 and rose to 755,000 in 1993 (Ibid, 13), and are estimated to remain around 700,000 today (Department of Agriculture 2003).

Map 7.

#### DISTRIBUTION OF FERAL GOATS IN AUSTRALIA



Source: Forsyth & Parkes 2005.

#### Impacts of Feral Goats on Environment

Feral goats were declared vermin in the Upper Gascoyne district in 1928 and around Mt Magnet area in 1954 (James 2000). As a result, the Government Feral Goat Eradication Program was formed by government authorities (Department of Agriculture 1997). However, the recent rise in the prices paid for feral goats and the development and use of trapyards by leaseholders has encouraged greater control of feral goat numbers and changed the focus of this program. The Agriculture

Protection Board of Western Australia now has responsibility for overseeing management of feral goats in the rangelands to ensure numbers are controlled (Agriculture Protection Board (APB) 2002). Aerial surveys undertaken by the Department of Agriculture help pastoralists manage feral goat numbers (James 2000). When asked about the impacts goats and Damara sheep have on the environment compared to sheep and cattle most leaseholders considered goats and Damara had the greatest impact. However, leaseholder opinions were generally positive for the type of animal they produced themselves and negative for other animals. Several leaseholders also suggested it was the number of animals that produced the greatest impact not the type of animal, but they believed the environmental impacts by different animals needed further research. This leaseholder had a well-constructed argument about the situation.

‘I think the only reason that argument has probably got some currency at present is because the land has been used for grazing sheep for 100 years so these species that have come under pressure are those the sheep have preferred. After 100 years of grazing goats, the species that the goats have favoured will come under the same pressure or we’ll see different species that have alleged to have been overgrazed or under threat. So it’s what animals are predominantly grazing the area that makes the difference. At the moment the Department of Agriculture says these are the species that are decreaser species. It just so happens that those species are the species that the sheep like to eat the most, so they are the species they have seen decrease where sheep have been running for a long time. If you run the same proportion of goats, they will have preferred species that they graze and after the same period of time running goats, eating the species that they prefer, I imagine we will see the same pressure placed on their preferred herbage. That’s just a fact of life’ (male 40s).

The following leaseholder had done considerable research on feral goats before changing his production system and believes that goat production is not detrimental

to the environment if it is managed correctly. He believed there is a problem in the communication of information about the management of goats and their impacts on the environment.

‘But the information on goats is pretty limited. It got to the stage where I was just about writing my own books. ...The quality of the information is very scarce. I can get on the internet now and just about anywhere in the world the information on goats is terrible, there's nothing there. I think the biggest problem is not so much the research, it's actually getting the information out. Proving that my system works, proving all the stuff the Ag Department has done, their research at Winderie (station in Upper Gascoyne) and stuff from NSW, put it all together and try and get it more out into mainstream farming, because it's just not there. Unless you go looking for it, you don't find it’ (male 40s).

Therefore information and attitudes about feral goats often appears to be contradictory and conflicting. The current shift by leaseholders into the management of feral goats is raising concern and awareness about natural resource management practices amongst leaseholders and government scientists alike (James 2000; Pringle 2002). These attitudes are based on arguments about the impacts of feral goats on the rangeland environment. The problems are described below.

1. Feral goats cause land degradation through overgrazing of annual grasses and herbs and browsing established trees and shrubs, breaking branches and preventing their regeneration. ‘Browsing by goats can kill established plants by defoliation, especially those less than about two metres tall, or by debarking their trunks’ (Parkes Henzell & Pickles 1996, 28). Defoliation limits the ability of plants to produce seeds and if the young plants are also eaten by goats, this may have a considerable effect on the distribution of native species in the area. By reducing the protective vegetative cover of the soil feral goats also contribute to the significant issue of soil

erosion. Their sharp hooves also break up the soil cover which leads to wind erosion during droughts and water erosion or slips in the steeper country during storms (Parkes Henzell & Pickles 1996; James 2000).

2. Feral goats also impact on native fauna by competing directly for food and water and indirectly because their effect on vegetation and soil reduces habitat. Parasites and diseases such as foot and mouth or bluetongue are known to be carried by feral goats and these have the potential to produce problems for domestic animals if they became established amongst feral populations (James 2000). They are very agile, non-selective grazers and will therefore damage and eat vegetation that is not accessible or palatable to other animals. They are able to eat the majority of plants in Western Australia including the prickly acacias, as well as some poisonous or bitter plants that are avoided by sheep and cattle. As a result they cause long-term damage to the perennial vegetation that other animals rely on during periods of drought and this may also encourage the proliferation of unpalatable shrubs or woody weeds (Parkes Henzell & Pickles 1996).

Leaseholders commented on the concern they had about the impacts of goats. This leaseholder reflected on the impacts consecutive years of goat grazing have had on the local environment.

‘I think goats and Damara are probably about the most destructive animals you can get. The goats destroy the bush as well; sheep can’t get up in the tree and do much damage. But seeing the country as you drive in, seeing country that has been goat country for years and years and working on those properties with big goat numbers further toward the coast, the goats have been destructive, there’s no doubt about that’ (couple 40s).

One older leaseholder also believed that increased feral goat grazing in previous years has significantly worsened the impact the current dry seasonal conditions are having on the environment.

‘This current drought has been much worse than the last big drought we had and I reckon one of the main reasons is because the goats have eaten a lot of the shrubs that hadn’t been eaten by the sheep in previous years so when the sheep ran out of grass there wasn’t enough shrubs left for them to eat because the goats had already eaten it. So the impact of this drought for the sheep has been a lot greater’ (male 60s).

3. In unmanaged feral herds the percentage of males may be larger. Young males will often separate from the main mob and their intense competitiveness results in severe localized damage to the environment, often eradicating rare vegetation that is generally ignored by other livestock. This is most evident around campsites, refuges and water points. Goats will sometimes pollute waterholes with their dung or dead bodies or reduce the water level to an extent that native animals are not able to reach it or may fall in and drown. It is also these areas where the most severe effects of goat grazing behaviour are often found (Parkes, Henzell & Pickles 1996; Pringle & Landsberg 2004).

However, Parkes, Henzell & Pickles (1996, 31) also suggest that large reductions of males in a herd through trapping or mustering effectively reduce or even eliminate this behaviour. This is what some leaseholders consider is currently happening with managed goat production and the extensive harvesting of feral goats by leaseholders. Increased prices for goats have encouraged these practices (see Chapter 6, Total Grazing Management Systems). This leaseholder explains.

‘...the feral goats can be (*a problem for land degradation*) too, but the price on their heads now and everyone chasing them, they're not going to be a

problem. I think too that the amount of great big billies that used to be in the country are not here now. They reach up and rip trees and more or less wreck the country but the small goats and the nannies they don't knock it about like the big old billies, standing up on their haunches and ripping things to bits' (male 70s).

Under the APB specifications for control of feral goats, leaseholders are also supposed to destroy any harvested goats not suitable for sale (James 2000). However leaseholders commented that sometimes these goats were set free, adding to the problem of controlling goat numbers.

The following leaseholder is currently managing feral goats and explained how he believes his change in management is reducing the impact of goats on the environment.

'If you watch wild animals in any situation, the young males go out to find their own herds and they just wait around until they can kill the boss. So if you take all the billies out, all the old animals out, there is no movement of the herd. What happens is that in a wild situation the herd moves when the billies move, when the males move. The females go with them, so if you take all the billies off and stop the movement of the billies, the nannies shouldn't go anywhere, and that's exactly what happens. ...most people consider goats, and see the goat's destruction in a totally feral state where the billies are 50 – 70% of the mob. What happens with my goats, the billies are only about 5-10% and the destruction just disappears. It's the young billies fighting each other that smashes everything down. They have their special areas but we've got to put this in perspective. People constantly say that they go on top of breakaway and hills and totally denude the area. I say 'Well yes they do. But often, off those areas they're far better than any other animal; because where they go and graze they actually eat bits of everything'. But yes, they do have some special areas of breakaways, but they're not very big areas, probably only 400 metres across or something like that. And they don't camp there at night. They tend to go to those places mostly when it gets cold and wet. In the

summer they don't care where they camp. But when it's cold and wet goats hate getting wet so they tend to find a cave and they do smash things down around there but it's a small area in comparison' (male 40's).

However, government scientists suggest these areas, along with swamps and drainage areas favoured by goats during dryer seasons, are often vital for the survival of native animals and birds (Pringle 2002).

The increased price in feral goats in recent years has added to the ambivalence of leaseholder attitudes toward feral goat management. As feral goat prices increased, attitudes that goats are destructive has had significant constraints on those who were considering changing to the management of feral goats. The management of feral goats is also having impacts on neighbouring properties in the region. The following leaseholder has property next to the above leaseholder who is now managing feral goats. He explains how this is a short-term advantage financially but a long-term disadvantage to the sustainability of his production. Like many scientists and other leaseholders, he also considers it is the number of animals grazing on vegetation that creates the problem of land degradation in these regions.

'Because our other neighbour has changed to goat production we probably sell more goats now. But it is an advantage as well as a disadvantage because it isn't doing our country any good at the same time. Sometimes this is an issue. You can clean your goats out and then you've got lots of goats back again, but we just keep selling them. So it is a bit of a financial advantage probably, but for the actual condition of your land it's a negative. So in the long-term it will be a negative, it will only be a short-term gain, long-term it's got to be a negative because we haven't got control over those animals. They just keep coming from next door. They do affect a fair bit of our land because ...we've got a lot of boundary with them so it affects a lot of the place. ...You've only got to go and have a look where goats have been. You can see where the bush has been pulled down and totally wrecked and that

can only happen for so long and then there's no more bush to pull down. I think goats can be very destructive. ..But it's the same as any animal. If you have too many animals you will damage the land, it doesn't matter whether you have goats, cattle, sheep or Damara you will damage it' (male 40s).

Interestingly leaseholders suggested the two most productive Merino wool properties in the region were located on either side of this property now managing feral goats.

However, studies conducted recently by Blood, Johnson & Scott (2002) found that grazing impacts of goats on the environment have demonstrated that the selective grazing habit of goats may allow leaseholders to carry higher numbers of goats than sheep on the land. This research was undertaken on a station that had recently changed to goat management in the region. Observations from a trial at Winderie station in the Upper Gascoyne show that although their goat grazing was generally distributed over a wider area than sheep, they tended to search for plant species they preferred. This highly selective grazing behaviour demonstrates the need for effective management and planning of fences and water locations to reduce their ability to exert preference over any one plant community.

Blood, Johnson & Scott (2002) also conclude that this research is reinforcing growing arguments that the sustainable carrying capacity for goats appears to be higher than that for sheep because they consume and metabolise a wider range of dry vegetation more efficiently than sheep. Goats also require less water than Merino sheep and are therefore able to graze over a much wider area, so the grazing pressure is reduced compared to sheep. It is therefore argued that more goats can be carried per area than sheep. However, similar trials at another station indicated 'that unmanaged goat populations have the potential to inflict unprecedented damage on rangelands during prolonged poor seasons' (Pringle 2002, 3). Therefore, some

scientists are concerned about the impact of goats during the current drought on the natural resource.

Parkes Henzell & Pickles (1996) argue that during favourable seasonal conditions when feed is abundant there is little competition between sheep and goats. However, as feral goats have the ability to survive longer than sheep when dry seasonal conditions occur, they provide serious competition for sheep during periods when food and water are scarce. They also continue to degrade the vegetation throughout periods of drought well after sheep have been removed or died. This attribute is obviously a financial benefit to leaseholders in the short-term, but the increasing numbers of feral and managed goats in the area may have long-term impacts on the natural resource they are dependent on.

Parkes Henzell & Pickles (1996) also suggest that because goat populations have in the past been relatively low compared to other large herbivores, the share of land degradation by feral goats has been less than other large herbivores. They inform us that feral goats were introduced to the area later than sheep and this factor combined with the spasmodic control by government and leaseholders, has limited their capacity to reach higher densities and cause more damage. They also point out that because of their low numbers and the fact that their impacts are confounded with other rangeland herbivores, the overall impact of feral goats to perennial shrubs is unclear and they therefore need to be managed as part of the overall impact of herbivores on the region.

### **Social and Economic Costs and Benefits of Feral Goats**

According to Parkes Henzell & Pickles (1996) feral goat competition with sheep for vegetation during dry periods has been found to create a significant net cost to production for leaseholders. Those leaseholders who have not controlled goat

populations on their property may have to sell extra sheep at very low prices or destroy them because the increased goat numbers have consumed the vegetation that would have supported them. These sheep will need to be replaced at a much higher cost when favourable conditions return. As rangeland vegetation becomes more degraded the potential for competition increases thereby reducing the potential profit for sheep and cattle producers. They suggest that feral goats also damage fences, which increases maintenance costs for producers. Costs are also associated with the threat of exotic disease and expenditure incurred by Government Agency control programs. They also note these estimates of costs do not take into account the ecological costs such as biodiversity loss, soil erosion or degradation of native vegetation. Therefore the overall costs of feral goats to leaseholders are not revealed.

Many leaseholders commented they have managed to survive the recent dry seasonal conditions financially, by trapping and selling feral goats on their property. Leaseholders have been trapping feral goats in both regions for around 50 years but the recent increase in prices has encouraged them to use this as a means of supplementing their income. This income has become very important because it has provided partial, and in some cases the sole source of income for many leaseholders during the recent dry seasons. Infrastructure to improve the quality and sale of feral goats is also an important component of efficient market management. A station in Mt Magnet has recently been developed to hold and on-sell the incoming feral goats from local leaseholders. This helps to improve the quality of the goats sold by feed-lotting them and the regularity of their supply. This leaseholder explains the advantages for him.

‘The holding station at Melangata is a big benefit to the whole district to be able to get rid of goats. You don’t have to hold your animals for so long, you

don't have to wait, even if you're transporting them yourself you don't have to load them and take them all the way to Geraldton or Perth, you just shoot over and you're there within an hour. We can take small loads over anytime. We haven't had any knocked back in the last three years that they've been there. They take them all the time. You can go over and bring a cheque home, that's a big benefit to the whole district. You don't have the big freight costs and it's more money in your pocket and the animals don't suffer because they're only on the truck an hour so it's really a big benefit' (male 40s).

The emergence of managed feral goats using watering points to control animals instead of fencing is raising concern and conflict amongst leaseholders and government agencies. Scientists argue that effective fencing is required for sustainable goat management and that trapyards alone will not address the problem (Pringle 2002). In 2002 the government changed the definition of goats from prohibited stock to authorised stock. This change in status means that producers need to demonstrate they have sufficient infrastructure developed on their property to enable the goats to be classified as 'managed'. They will also need to develop effective land monitoring systems to prove they are managing their stock sustainably. This can be achieved through 'effective fences or a management system based on multiple TGM yards'. They are proposing that only these producers will be able to access the lucrative live export markets. Those leaseholders wishing to harvest and sell feral goats will therefore only have access to markets via abattoirs which are subject to price constraints in the longer term (Nickels 2004, 42).

Some leaseholders argue fencing is not necessary because they believe the reduction in billy goats reduces the most destructive impacts goats have on the environment. As mentioned above, this leaseholder has changed his production system to feral goat management and is currently producing goats using a 'free range' system that

does not use fences. He explains his point of view and the financial, infrastructure and institutional factors he dealt with in his change from sheep to goat production.

‘In actual fact converting a million acres from sheep to goats is going to cost me around \$400,000. Because I have to build TGM yards. Now the GMS gave me quite a bit of that money, probably about a quarter of it, but I still have to build this road infrastructure. Now you can't build road infrastructure without machinery, so I bought the machinery, I had half of it anyway I've got a double road train and that has to go round the whole mill run and there's not many properties in Western Australia that run a road train around a mill run. I haven't got right around yet but we're not far off. The only reason this is feasible is because technically I have broken the rules, but I've written papers for the Ag Department and Pastoral Board about goats, and that is that you don't need fences. If I'd had to electrify all my fences I would never have been able to go to goats; it's impossible' (male 40s).

‘Open range’ grazing systems using TGM yards appear more cost-effective for managing animals over these extensive arid areas. However, the lack of fencing may reduce effective control of grazing animals and the ability to reduce impacts on palatable plant species. This is the same problem that has occurred with sheep grazing in the past and therefore raises questions about the ecological sustainability of this type of animal production. As discussed above, it is also increasing problems for neighbours. The growing Muslim populations of the world appear to provide a viable future for the marketing of goats. If prices remain worthwhile their harvest and production will continue to provide a useful additional income for many leaseholders in these regions and may encourage an increased move from Merino sheep to ‘managed’ goat production. However, improvements in monitoring of vegetation and control of goat numbers appear essential to prevent further long-term degradation from occurring. Some leaseholder comments suggest this is already beginning to occur.

**BOX 5. BOER GOATS**

**History**

The use of Boer sires to improve the meat quality of feral goats and enhance overseas marketing has allowed the development of the rangeland goat industry to increase security of supply and expand their markets. They have now established a viable, long-term industry for Boer goat producers in the rangelands. Farmers in South Africa developed the Boer goat in the middle of the 20<sup>th</sup> century and they were released in Australia in 1993-95. Many producers now import Boer embryos from Africa. Although there has been little research completed so far on growth rates of goats, it is generally assumed that under the same conditions, Boer-cross kids will reach their target weights in approximately half the time that feral goats take (Boer Goat Breeders Association of Australia n.d.).

There are obvious advantages in the natural attributes of Boer goats over feral goats. Their good temperament and unwillingness to ‘crowd’ each other mean they are easier to handle and suffer less damage in yards or during transportation. Consequently they have a higher rate of survival during sea voyages and when they are held in assembly yards in importing countries. This is one of the reasons they are in such high demand for live export markets (Blood, Johnson & Scott 2002). Their docile nature also means it is not necessary for fences to be any higher than those used for sheep or cattle but because they tend to go under or through a fence rather than over it, either a 5-7 wire electric fence or prefabricated netting fences are required. Fencing will contain goats more efficiently if goats are trained to stay within the fences. But the development of adequate training compounds to establish this learning process can cost a considerable amount of money. The need for drenching is reduced or even eliminated in rangeland conditions and the skin of the Boer is well adapted to deal with most insects and parasites. The low fat content and low cholesterol levels of goat meat compared to beef and lamb improves its potential for growth in health-conscious markets both in Australia and overseas (Boer Goat Breeders Association of Australia n.d.).

### **Leaseholder Boer Goat Production**

The first consignment of first cross Boer goats to be shipped from Gascoyne Junction went to Malaysia in April 1997. There are now more than 10,000 domesticated goats in the region and sales in the area were estimated to be \$566,000 in 1998/99 (Regional Development Council of Western Australia 2001). Live goats, made up mostly of male, feral and Boer goats, are transported to Broome where they are exported overseas to countries such as Indonesia and Malaysia. One leaseholder interviewed in the Upper Gascoyne and one in the Mt Magnet were producing Boer goats.

### **AUSTRALIAN AND WESTERN AUSTRALIAN GOAT MARKETS**

Australia produces over 50% of world goat meat exports and is currently the world's largest exporter of goat meat and live goats with the majority of meat originating from captured feral goats (Boer Goat Breeders Association of Australia n.d.). A growing demand and high prices currently being paid by overseas buyers is encouraging goat production in Australia. Goats are being exported to an increasing number of countries overseas including Egypt, Taiwan, Malaysia, Korea, Singapore, United States and Canada. Many of these countries are increasingly requesting only Boer Goats and production levels in Australia are not sufficiently established to be able to supply these markets. These orders are currently being filled with feral goat supplies which have significantly increased the overall numbers of feral goats being sold (Carpenter 2002). Exports have been steadily increasing over the past few years in Western Australia as prices increase and in 2001/02 Western Australia exported more goats than any other Australian State.

Table 8. Western Australian Goats Processed and Exported; 1999-2002.

<b>WA Goats Processed at Abattoirs and Prices Received by Pastoralists</b>			
	<b>1999/00</b>	<b>2000/01</b>	<b>2001/02</b>
Number of rangeland goats processed	210,181	173,906	286,743
Average Prices (per head)	\$21.42	\$27.07	\$30.25
<b>WA Goat Meat Exports</b>			
	<b>1999/00</b>	<b>2000/01</b>	<b>2001/02</b>
Goat meat exports from WA (tonnes)	3155	3640	4617
Value (\$ million)	\$9.26m	\$10.68m	\$14.38m

Source: Johnson 2002.

One of the reasons for Western Australia's record volume of export sales since 2000 has been the resumption of livestock exports to Saudi Arabia for Haj religious festivals.

Table 9. Western Australian Live Goat Exports; 1999-2002.

<b>WA Live Goat Exports</b>			
	<b>1999/00</b>	<b>2000/01</b>	<b>2001/02</b>
Live goat exports from WA (No.)	31,772	57,365	63,690
Value (\$ million)	\$1.57m	\$2.84m	\$3.21m

Source: Johnson 2002.

The higher prices paid for Boer goats as well as the increasing demand for 'managed' goats are likely to encourage increased production in the future (Johnson 2002).

Many developing countries have an historic association with goats and goat meat and there is a growing interest from these countries in importing goat meat. Unfortunately these markets are based on the erratic supply and low quality of feral goats from the semi-arid and arid rangelands. This has hampered the development of a viable, sustainable goat meat industry. During winter months where rains produce water on the ground, there is no longer any necessity for feral goats to use artificial water, making them more difficult to muster and contain. Therefore orders for goat

meat often exceed the capacity to supply. This leaseholder explains what he considers may assist the problem of surety of supply of feral goats.

‘Goat is the most eaten meat in the world and all the main people you talk to say it’s supply not demand. But I’m also aware of market forces and people will pay the absolute minimum in order to purchase the product and we still see it now that when it’s good trapping weather and everyone’s getting goats the price suddenly drops to \$18-20 and the cut-off point becomes 16-18 kilos liveweight. So to that extent it’s something that needs to be done on a macro scale rather than micro to make it work. As suppliers we would need purchasers of our goats with the ability to hold them for lengths of time. We would need forward marketing contracts so that you could actually have a guaranteed income. However when you’re at the mercy of the markets and have the inability to supply at times other than those when you can trap, ...this makes it quite difficult’ (male 40s).

The recent development of stations such as Melangata, mentioned above, which holds and on-sells feral goats, has helped this situation. However, the current market also relies heavily on one major market, Taiwan, importing whole carcasses. This creates risks by relying exclusively on one market. It also raises the issue of selling a product in wholesale form thereby reducing the ability to value-add. The Australian goat industry is therefore currently selling goat meat as a commodity resulting in high volumes sold at a reduced value (Johnson 2002). Some leaseholders in the goat industry also believe that exporters have too much control over prices and conditions in the marketplace resulting in increasing tension between producers and exporters.

‘In the goat market there is huge skullduggery, when you look into it, it is not very nice, the way they conduct themselves; control. But you can’t get these people moving. The abattoirs, the buyers and exporters, it is not nice, there is too much control in the fact that they get total control and they just keep it at that level, it is hard to break through, you can’t. The system is not fair, it is controlled with them getting in a group and they are not going to let the

producer break through. They are not giving the producers enough of a share of the income' (female 60s).

Increased globalization and free trade agreements tend to exacerbate this problem and as Australia attempts to comply with the forthcoming trade deal with America, many primary producers in Australia may be faced with this growing problem. There are subsequently a number of producers in these regions in favour of developing local producer-owned marketing co-operatives to carry out their own exporting initiative (see Chapter 8, Marketing and Resource Management Strategies).

Current overseas demands for goat meat are therefore encouraging increasing production in these regions. The natural ability of feral goats to survive and produce in the difficult conditions of the rangelands gives them an important potential for improving the income of leaseholders in these regions. However, it is this very ability to survive during difficult seasons that makes this animal a potential threat to the sustainability of the natural resource in the region. While the focus of leaseholders remains on increasing production and maximizing economic gains, these new types of animal harvest/production are highly likely to play a dominant role in future arguments surrounding both the economic and environmental sustainability of grazing systems in these rangelands.

### **Summary**

Leaseholders in these two regions have responded to pressures in recent years by changing the type of animal they produce and improving their infrastructure and management. Differences in environmental conditions and perceptions of risk have resulted in a variety of changes. In the Upper Gascoyne, changing market demands, increased live export trade and the growing problem with wild dogs have resulted in changes to *Bos indicus* cattle, major infrastructure changes and many station

amalgamations. However, some suggest these changes, combined with the low, erratic rainfall in this region, may create even greater risks for future production viability and the ecosystem.

The reasons most leaseholders remain in wool production are due to social factors and unsuitable environmental conditions for cattle. Many leaseholders believed the future of wool production in the rangelands was limited. Those remaining are hoping the reduction in producers may improve their viability in the future. Increasing market demand, easier management and the physiological advantages for Damara sheep and feral goats will encourage greater production of these animals in the future. Unless technology improves, this will increase contamination problems for wool producers, creating greater social conflict in the region. It also creates potential for greater impacts on the natural environment. There is an urgent need for more research into this issue and greater enforcement of sustainable management practices.

## **CHAPTER 8**

### **OPTIONS FOR FURTHER DIVERSIFICATION AND SUSTAINABLE LAND USE.**

Leaseholders face few options and many limitations in diversifying their income base to try and cope with their changing circumstances. Some leaseholders are undertaking market and environmental management strategies to align their production systems more with changing market demands or attempting to develop niche markets for their product. This chapter investigates opportunities and challenges to diversification, strategies for diversification, and leaseholder attitudes toward their effectiveness.

### **LEASEHOLDER ATTITUDES TOWARD DIVERSIFICATION POTENTIALS.**

The main purpose of the pastoral lease is grazing, and the necessity to change lease conditions to allow alternative land uses creates key barriers for change. The Productivity Commission (2002) report found that the major impediments to non-pastoral land use are the low or variable profitability of many pastoral leases and the limited potential for diversification to supplement pastoral income. Permits are required for diversification into non-pastoral activities to ensure leaseholders comply with local planning and land clearance legislation. Where native title is applicable, non-pastoral land uses also need to comply with the *Native Title Act 1993*. To assist with development of new enterprises, other factors such as land tenure arrangements, access to suitable markets, flexible financing and skills, services and information and the availability of appropriate infrastructure also need to be addressed.

Diversification is often essential to leaseholders for economic viability. In his 1996 paper on page 16, Holmes discussed the different levels of regional potential for Australian rangelands stating that the Gascoyne-Murchison region has 'only modest

pastoral potential but lacks any clear alternative resource-use orientation'. When asked about diversification many leaseholders in the Upper Gascoyne and Mt Magnet commented that the major problem for them is the limited options available to diversify their income. Overall those under 50 years were relatively more positive about their options than those over 50 years. Some considered distance and transportation limited diversification opportunities. This leaseholder in Mt Magnet explains the many alternative options for income he attempted when the price of wool dropped and the limited options he believes are now available to leaseholders in these regions. His comments demonstrate the difficulties some leaseholders face in trying to produce an income in these regions. This leaseholder is now living and working in Perth with his school-aged family because of this difficult financial situation.

'The options that are available are very limited. I considered that everyone can't go into tourism. (station name) next door tried to make some money out of tourism with a limited success; it's as much a hobby income as a genuine income. (Other stations) had them and the reality is that the thinner you slice the pie the less there is for everybody. If I was to say 'Come on let's make money out of tourism', I'd buy a motel. I've been involved in the tourism industry ...and we didn't want to deal with tourists. The infrastructure didn't suit cattle. We did get a few cattle but that was basically so we could eat a bit of beef instead of eating mutton all the time and using the available ground water, which we have got good volumes of there, and a very big dam, there was no crop that I could find that had proven to be commercially viable... When it first happened we did just actually keep our heads above water. We got a professional kangaroo license so we could shoot kangaroos; we were growing a huge vegetable garden and selling vegetables in town. I was shearing and we did everything we could to make a dollar. Other than that the ability to diversify was really zero. No-one has suggested anything to me yet that could be a better option than running sheep. You've also got to bear

in mind that from that point in time until recently, even goats were worth \$5-7 a head. So goats as a diversification option would have been unrealistic. So there was really nothing else to diversify into' (male 40s).

Diversification into other options were thought to be limited by almost all leaseholders either because of environmental conditions, distance from markets, lack of infrastructure, regulations or lack of time and motivation. Tourism was the main option but was considered by leaseholders to be only a small sideline and not viable as the principal income. However, around 24% of leaseholders have developed forms of tourism ranging from shearers quarters or homestead stays to organized educational groups that used Aboriginal people who imparted their knowledge to visitors. One leaseholder is in the process of establishing horticulture crops to assist him to buy a herd and intends to produce crops for feedlot in the near future. Lack of suitable water sources and low returns for the work involved discourage other pastoralists from undertaking this type of diversification. It was also suggested the type of vegetables that could be grown is limited because of the difficulties of transport to market. They also believed it was currently cheaper to buy fodder than to grow your own so they felt it was not worth doing.

The lack of available water was quoted by several leaseholders as a major barrier to diversification. One leaseholder who had water available in the river system on his property commented he was investigating opportunities for use. Leaseholders who had taken over the lease very recently generally appeared more positive and their experience and skills sometimes allowed them to gain employment outside the industry, so they were not solely dependent financially on the income from their station. These factors also influenced their attitude toward production, protection and consumption values and they appeared more open to adopting alternative ways of producing income than many long-term leaseholders.

One young couple had their pilot's license and had started an aerial mustering business. The female leaseholder explains what is involved and how the dry seasonal conditions affect this type of enterprise.

'We started the aerial mustering about 7 years ago. We employ 2 pilots to do the aerial mustering for us. In the beginning (K) would go away for 2-4 weeks on end for aerial mustering and built up a lot of clientele and when the work became too much for him we decided to employ a pilot. (K) does local stuff when he can just fly over for the morning, fly round and get their goats or sheep or whatever, but he very rarely goes away these days, we employ pilots to do that. So the initial set up, the training of the pilot takes a while, I do the books which is maybe an hour a week. It's not a lot because we only have 1 or 2 planes operating and they'll go on a job for maybe 3-4 weeks so I only have to do an invoice up every now and then. When the pilots aren't flying they're living here, so I have to feed them so it's a bit extra cooking. It's intended to be a full-time job for the pilots but this year it's been dreadful because of the drought. Last year we had 2 ½ pilots on and we could have had more. The year before that was the same' (female 30s).

However, a number of leaseholders commented that the cost of aerial mustering was too high and the move to more extensive use of trapyards is reducing the potential for this enterprise. Several female leaseholders were attempting to find alternative methods of income generation. One female had developed a worthwhile reputation with homestead stays. She also combined this with the organisation of music festivals which attracted urban visitors to the area. Another relatively new, female leaseholder was developing cut flower production and was the only person interviewed attempting this. Her training as a school teacher may also influence her interest in learning about plant species. One of the main problems she encounters is the transport of flowers. Because of the distance to markets, flowers require good quality packaging and fast transportation and this is sometimes a problem in these

regions. She also mentioned that saline water may become a problem for her in the future as a station next door has similar problems with their fruit trees. She explains how she intends to sell native flowers and some of the difficulties and advantages involved.

‘I’d like to develop several species that are growing here. I am working on germinating cut flowers from the region, from the station, to market. We’ve got the solar power and we’ve got loads of water available and we’ve got transport. So we will probably be providing the seeds or stock or whatever so that they can start rehabilitating their mines perhaps. But the cut flower industry, I know like all production you’re on the end of the line and that’s pretty scary. And also any developments in the things that you discover you’ve got to do yourself. You can’t get boffins to help you with research or labour. You’re on your own. ...I do think we need to try new stuff; we could have a small intensive little plot. I don’t even intend clearing the trees; just grow things in amongst the trees. ...Because I go out and look for cut flowers and flowers that you can grow I have learnt about these plants. I spend a lot of time out in the bush and you get very observant’ (female 50s).

This type of enterprise shows potential for incorporating a native resource into the market economy. However it will also require substantially more time, effort and expense to develop a reasonable income. Another female leaseholder worked in textiles, creating, dying and crimping them and was attempting to develop workshops for people to learn about this on their station. Other paid work included assisting other stations during mustering. One woman had developed an ‘Outback Helpers Scheme’ that found assistance for leaseholders on a volunteer basis. This was currently unpaid work but had potential for income in the future.

Many of these enterprises require a lot of time, money and energy to develop into a viable business, factors that are generally in short supply in these regions. The distance from large centres also makes them more difficult to establish and maintain.

Unless they were developed on a large scale these enterprises appear to have limited potential and only provide a supplement to the main income from animal grazing.

## **MARKETING AND RESOURCE MANAGEMENT STRATEGIES**

### **ENVIRONMENTAL MANAGEMENT AND QUALITY ASSURANCE SYSTEMS**

Markets today include growing numbers of people around the world who are seeking agricultural commodities that are produced ethically, using methods that do not harm the environment. This is creating a demand for internationally recognized environmental management systems that safeguard produce and improve the sustainability of agricultural production (Taylor 2002). The rangelands, with their native pastures and animals virtually free of herbicides, pesticides and fertilizers, are ideally positioned to take advantage of these markets.

An Environmental Management Systems (EMS) linked to the Ecosystem Management Understanding (EMU) framework (see Chapter 9, Gascoyne Murchison Strategy) has been established as part of the Gascoyne Murchison Strategy. This system provides an important tool for leaseholders to improve their environmental performance and provide accountability for their sustainable management practices. It is also being used as part of a quality assurance program to enable pastoralists to market their produce as 'clean and green' (Burke 2005; Pringle *et al* 2003). The Department of Agriculture and food Western Australia is currently running the F1000 CM quality assurance system which certifies compliance with food safety and quality standards. Leaseholders undertaking this program have also added an environmental component to the system making it SQF 1000. By adopting management procedures specified in the code, producers are also able to develop environmental management systems that ensure eco-accreditation which allows them

to access higher value markets (Taylor 2002). These systems have a threefold benefit:

- assisting leaseholders to improve the efficiency of their management to realise better prices for produce,
- providing recognition by leaseholders for management of areas of special biodiversity value,
- setting an environmental standard for other leaseholders that may improve natural resource management in the region (Pringle *et al* 2003).

Two leaseholders in the Upper Gascoyne and Mt Magnet were involved in the SQF1000 program; one producing Boer goats and the other producing Merino sheep. This leaseholder explains some of the difficulties she had to overcome in adapting to the standards required.

‘I did the SQF1000. It was very hard for me to do this because there was no information on what you could use for goats, there was no certified medicines or dips and it was all a first and it was very difficult, but we did get through it, it was very hard. Cattle and sheep have a lot of certified chemicals where nothing was certified for goats, and because it was just getting off the ground, no manufacturer would do it because of the costs, liabilities etc. We experimented with different things, and I got in touch with people in Africa and found out what they were using and then it was accepted over here. There is still quite a bit you can’t use because it’s not accepted through the safe quality assurance. So it was quite a big program’ (female 60s).

The accreditation programs developed by these leaseholders demonstrate the costs, innovation, enthusiasm and work required by those who wish to comply with these changing market demands. Other leaseholders mentioned the possibility of undertaking this in the future but wanted to wait and see what the advantages were before attempting it themselves. Interestingly, the instigators for both stations undertaking these programs were mature-aged females. The potential for growth in

demand for assurance of safety in meat products appears substantial as countries are increasingly exposed to threats of disease. One leaseholder commented that accreditation for sustainable land use may provide a useful tool for accountability in the future. It will be interesting to see future leaseholder developments in this area.

#### DEVELOPMENT OF PRODUCER ALLIANCE GROUPS

A major concern expressed by rangeland wool producers is the structuring of the market resulting in unequal pricing systems for different types of wool (see Digman & Major 2000). Many wool producers in the Mt Magnet region were also not satisfied with the wool price structuring. Some leaseholders felt the price they were receiving did not equate with their perception of the quality of the wool they produced. They believed the low use of chemicals and the lack of fertilizer use resulted in a unique wool produced in these regions that should be marketed as high quality wool in the 'clean green' market sector. As a result these pastoralists formed a producer alliance group to develop new marketing strategies for Rangelands wool. This group, The Rangeland Fibre and Produce Group received funding and assistance from the Gascoyne Murchison Strategy that enabled them to identify markets for their wool produce. One leaseholder suggested that an additional incentive for the establishment of this group was to try and find ways to cope with the introduction of Damara Sheep in their region.

The growth of goat production has led to the formation of another producer alliance group, the Rangeland Meat Co-operative to support the emergent goat meat industry. This group was established in the Gascoyne/Murchison region of Western Australia in 1999 and is based in Carnarvon. The group consists of 17 pastoral stations who have formed a local co-operative with the aim of improving prices for their meat products (Jung 2002). Leaseholders were asked about their attitudes toward the

establishment and involvement in these groups and their replies revealed a varied mix. Although most leaseholders agreed with the idea of specialized marketing groups they all suggested there were problems with supply. Leaseholders believed the groups did not work for reasons such as:

- there was not enough support and commitment from local leaseholders,
- there were not enough people in the local area to be effective in influencing prices or providing supplies,
- the inability to ensure regular supplies because of climate conditions,
- or the group was centred in the nearest town and this reduced accessibility.

One goat producer in the Upper Gascoyne belonged to the Rangeland Meat Co-operative and considered it was a good idea but required improved infrastructure and facilities to be effective. Another leaseholder suggested the independent nature of leaseholders made it difficult for them to work together, which resulted in the group being ineffective.

‘We've gone down this track a little bit and I can't see it working because everyone has their own ideas. Everyone has got different opinions, everyone uses different stock firms, people don't want to change, and you get some people try and take over the whole system’ (male 40s).

A number of leaseholders also commented that niche marketing of meat has potential as people are concerned about what they eat, but were sceptical about the potential for wool as they considered people were not overly concerned about the material they wore. Therefore these types of producer groups currently appear to be having little impact on production in these regions.

There was, however, considerable support for the ability of these groups to support producers by providing a forum to learn from each other and improve their production systems. It also enhanced the social interaction of the community with

several leaseholders in both regions commenting on the social value of these type of groups. Leaseholders in the Mt Magnet region considered the Rangeland Fibre and Produce Group had provided opportunities for social interaction and networking. They also thought it was a useful tool to access and develop government agency projects or for commercial organizations to present educational courses or workshops to pastoralists as a group, which would not be feasible on an individual scale. Positive attitudes toward the group and the social and educational benefits had encouraged 8 out of the 12 pastoralists interviewed in the Mt Magnet region to continue participating. So although the group was not seen to be successful at increasing incomes through niche marketing, it was considered a successful tool for learning from each other, delivering educational services and enhancing social interaction within the community.

The group was also used to provide a platform for wool producers to air their views and try to find methods of dealing with the problems they were facing with the introduction of Damara Sheep in the area. The formation of any group providing a platform for communication is therefore an important tool for leaseholders and this appeared to be an important role for this group. As times improve, the need for these types of groups changes and they often dissolve through lack of direction and purpose. Much of the success, or otherwise, of producer support groups does not seem to arise from the lack of support or awareness of producers but more from the small number of producers involved in the industry and in their ability to market the product effectively. The real advantage of these groups, however, appears to be the arena they provide for social interaction, open discussion and learning for the community.

## **Summary**

Overall, leaseholder comments suggest there are limited options for diversifying their income base to cope with the changing circumstances. Women are developing a variety of income production systems based on their skills and experience. But these have limited potential and only provide a supplement to the main income from animal grazing. The environment and remoteness, combined with a lack of experience and skills tends to reduce the options available and make it very difficult to develop alternative viable enterprises. Opportunities for improving market positions for rangeland produce in the 'clean green' market have encouraged many leaseholders to take part in marketing strategies. These producer alliance groups appear to have had very limited success. However, they have provided a useful tool for improving the social fabric of the community.

The previous three chapters reflect the varied and complex issues faced by leaseholders while attempting to maintain their position as pastoralists and graziers and develop more sustainable land use practices in these regions. Global markets, government policy and environmental impacts have forced many leaseholders to undertake major changes in recent years. The introduction of different animal breeds and the management of feral goats appear to provide significant potential for increased income in the short-term. However, these animals also appear to present major barriers to sustainable land use. Changes in management practices such as the construction and use of trapyards and monitoring systems such as WARMS, as well as the use of agistment practices by most leaseholders, provide important potential for improvements in stock handling, feral animal control, financial income and environmental awareness and sustainable land use. However the potential for these changes to improve land management appear limited by:

- the lack of fencing to land type required as part of the total management system for effective resource management,
- the impact of large kangaroo populations not included in carrying capacities,
- and leaseholder attitudes toward biodiversity and production.

The lack of effective outcomes from leaseholder attempts to improve their marketing position suggests the small number of producers involved also limits their ability to improve this situation. Leaseholders are also finding it much more difficult to sustain a viable community and this is placing growing pressure on the social sustainability of these traditional rangeland communities.

## **CHAPTER 9**

### **GOVERNMENT STRATEGIES FOR SUSTAINABILITY**

This chapter discusses recent moves to improve land use practices and resolve conflicts around multiple use of rangelands using participative processes. It reveals leaseholder perceptions of power in community participation. It also describes the emergence of noteworthy participative processes facilitating important changes in sustainable land use practices and multiple use of the land in the two study regions. Leaseholder perceptions toward these strategies and the impacts they have had on their lives are revealed.

### **EMERGENCE OF COLLABORATIVE PROCESSES**

In the past, the strategic focus of rangeland development was based on supporting the pastoral industry. Pastoralists were generally seen as having all the management skills required to manage the land conservatively and develop their stock management for long-term productivity and enterprise prosperity. Top-down government policies and natural science aided objectives for resource management (Burnside & Boladeras 2002). The established relations of power between pastoralists, government and the wider community greatly influenced these assumptions and processes. Today there is a shift towards a more integrated, participatory approach where the influences of human interaction with their environment are becoming increasingly significant, especially in the sustainable development discourse.

A recent study by Kelly (2002) discussed how the relations of power are perceived by Australian leaseholders within these community participation processes. She found that leaseholders want greater power and influence over government decision-

making processes. However, the study also revealed that individual relationships were important to leaseholders and they chose to participate in community processes to ensure their interests were protected. Kelly suggests their perceptions emphasised fluctuating levels of power within projects which fitted with Flyvbjerg's (2001) conception of power. These perceptions are based on Foucault's perspective where all individuals are vehicles of power. This situation is beneficial for participants because it emphasises the dynamic and contextual nature of power (see Chapter 3, *The Influence of Power and Traditional Value Systems on the Development of Pastoralism and Grazing in Australia*). Johnson & Walker (2000) point out the result of this change has been to emphasise the importance of governments, industry and community groups working together. This has recently been occurring in the Gascoyne-Murchison region where Commonwealth and State governments have implemented the Gascoyne Murchison Strategy and The Gascoyne Muster.

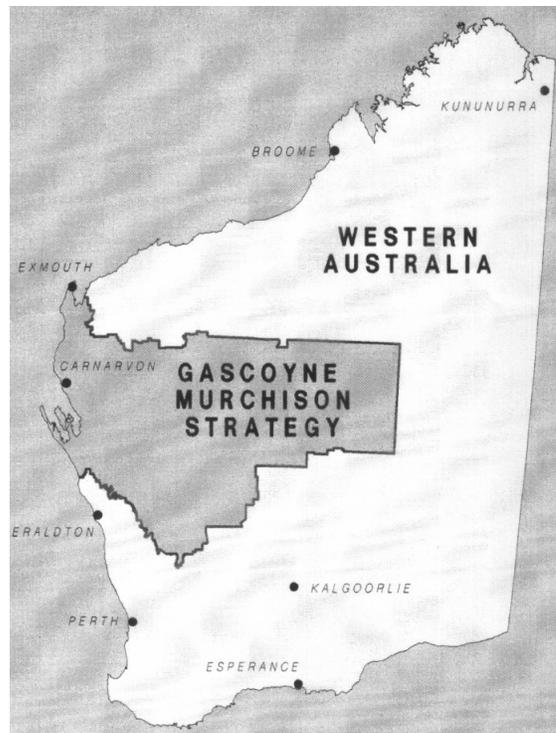
The Gascoyne-Murchison Strategy, mentioned previously in this thesis, was developed to address the declining commodity prices and productivity of the landscape and to protect the high biodiversity level across the Murchison and Gascoyne regions. Integrated within the Gascoyne-Murchison Strategy have been two important processes designed to improve sustainable land use, conserve the biodiversity, and resolve the conflict around multiple use of these rangeland regions. The EMU process is a voluntary process to improve understanding of ecological systems to change management practices. The other is a process of land acquisition to preserve land of ecological significance under a reserve system. The Gascoyne Muster was a facilitative process designed to improve multiple land use, which involved participation of all rangeland stakeholders.

## GASCOYNE-MURCHISON STRATEGY

The Gascoyne-Murchison Strategy was a participative process designed to provide funding and services to improve land use practices and conserve biodiversity. The area covered by the Strategy encompasses around 34 million hectares and contains around 250 pastoral leases. Map 8 shows the boundaries for this regional Strategy.

Map 8.

### MAP OF GASCOYNE MURCHISON STRATEGY BOUNDARIES



Source: Pringle *et al* 2003

The Western Australian Government launched the Gascoyne-Murchison Rangeland Strategy in 1998 as one of twelve national strategies of the 1995 Commonwealth Government's Rural Partnership Program. The Strategy was supported by funding from the National Heritage Trust. Integrated programs addressing a wide range of rural issues have been implemented under this Strategy. As at September 2002,

\$14,456,253 had gone into regional funding with \$1,596,800 going into the Upper Gascoyne region and \$964,892 going into the Mt Magnet region (Lewis 2002a).

**List 7. Programs Developed Within the Gascoyne-Murchison Strategy.**

**Gascoyne-Murchison Strategy Programs.**

- Industry grants and resource information for the development of business and industry initiatives: These are provided to businesses with appropriate business plans and have included diversification of pastoral leases into exotic sheep and goats, ecotourism and aquaculture.
- Research to develop technology that improves industry and enhances sustainable production: This includes the construction of Total Grazing Management (TGM) yards, fencing and Climate Forecasting to improve seasonal forecasts.
- Support for regional development groups and associations to develop and market produce such as the Rangeland Fibre and Produce Association and the WA Rangeland Meat Cooperative.
- Conservation monitoring and sustainable land use: This includes the capping of free-flowing artesian bores to retain groundwater and the development of water points through bores or pipelines. Windmill construction and restoration was also included.
- Brokering of voluntary lease adjustments to enable restructuring of pastoral enterprises across the region.
- Regional Environmental Management Program (REMP): This includes the acquisition of land for conservation reserves and environmental protection under CALM's Conservation Reserve System, the management of land based on the Ecosystem Management Understanding (EMU) process and the development of accreditation systems based on ecological sustainability (Lewis 2002b).

A two year program entitled Rural Equities, providing benchmarking and financial advice to over 55 pastoralists, was also an added benefit to the Strategy (Lewis

2004). Many leaseholders have also accessed programs such as Grazing for Profit and Best Practice funded by other organisations and found them useful for the financial and production aspects of their enterprise.

The Gascoyne-Murchison Strategy was originally established for three years and the positive outcomes achieved by the Strategy encouraged the Federal Minister to extend the program until 2004 (Laurence 2000, 1). Grants to assist business development were a significant portion of the funding and were matched by pastoralists' contributions. Most grant money (47%) has been invested in fencing of highly degraded areas, for cattle production and for the construction of Total Grazing Management yards (see Chapter 6, Total Management Grazing Systems). The Strategy has had a huge impact on the industry in recent years. The final evaluation of the Gascoyne-Murchison Strategy found that 70% of leaseholders in the region had been involved at some stage (URS Australia PTY Ltd (URS) 2004). It has enabled leaseholders to change the type of animal they produce as well as improving their infrastructure, making it easier to manage their animals. This has provided considerable potential for improvement in both animal and land management practices. These changes have had important benefits for the social, economic and environmental sustainability of the region.

However, the positive outcomes remain heavily reliant on good rainfall. The years between 1995-2000 were some of the best rainfall years experienced in the region and, combined with the GMS funding, provided opportunities for major changes to occur in these regions. But poor seasonal conditions since then have resulted in little pasture growth and have limited the rate of change in the regions (Pastoral Lands Board & DPI 2003). Fifteen of 25 leaseholders in the Upper Gascoyne and Mt Magnet study had accessed the GMS funding. Overall, the attitude of leaseholders

toward the Strategy was positive and a number of them commented on the significant benefits to their production systems they had achieved as a result of access to the funding. These comments are typical of many made by leaseholders.

‘We got an awful lot of help through the GMS to build the TGM yards. We built 50 last year. We've got 20 windmills and each one has its own drafting setup and they're big yards. It has made a big difference. They're the best thing that's ever happened' (couple 50s).

‘We accessed GMS funding to build trapyards, and have them on all our watering points, and find this a lot easier way to muster animals. We've got good fencing now with electric fences through the GMS.. We were able to access the GMS money to do the fencing to help us change to goats as well' (male 40s).

While a big percentage of leaseholders were able to access and benefit from the use of the funding other leaseholders did not apply or receive funds. Some missed out because they had bought their lease after funding applications closed. Others decided not to apply for funding for a variety of personal reasons. The comment on page 272 by an older, longer-term leaseholder reflected an attitude of mistrust that seemed to have evolved as a result of past experiences in dealing with government agencies. This issue was also explored in the survey of rangeland stakeholder groups involved in land management programs in Australia by Kelly (2002). This survey found lack of trust in government was a major problem with leaseholders in south-western Queensland. Their comments emphasised how relations of power and poor communication in past government processes created mistrust and suspicion of government. She suggested that to overcome this mistrust, government officials need to be more transparent and honest during participation processes and be willing to share power more equally with participants. Interestingly, she also found that ‘Western Australian pastoralists were more positive about government staff, even

though they tended to have far less interaction with them, and fewer opportunities for interaction' (Kelly 2001, 2).

The Centre for International Economics (1997) study also found that the isolation and experience of leaseholders often makes them see government agencies and bureaucrats as opposed to their interests. This leaseholder's comment from the Upper Gascoyne Mt Magnet study clearly revealed a similar mistrust of government as well as the level of financial risk he was prepared to deal with.

'But I didn't apply. I thought that governments know enough about what I'm doing now I didn't want them to know any more. I thought 'Well you can access some finance, but then I thought that in this point in time with seasonal conditions as they are and a whole host of economic things, am I actually going to have enough resources of my own to actually finish this?' I think a lot of funds that people got from GMS have fallen in a hole because individuals didn't have enough of their own resources to actually complete things. I thought about that and thought that I can survive without doing it and with the present seasonal conditions and financial conditions. I certainly don't want to put myself under any more stress than I'm already under to go and do something else that I don't really have to do for the time being. So that was the biggest reason that I didn't bother apply for GMS funds.' (male 60s).

However, most leaseholders considered that overall, this was a very worthwhile process for the pastoral industry and appeared pleased to be able to participate in the various strategies offered. Nevertheless, when asked whether there needs to be more assistance with government funding, leaseholders had very mixed reactions. Some believed there should be more funding while others believed pastoral enterprises need to be financially viable and not rely on government support. Some leaseholders revealed a cynicism toward government motives for providing the funding. They believed that government agencies would also benefit from providing GMS funding

to pastoralists for infrastructure, as it would assist agencies by reducing their expenses and responsibilities for the control of feral goats. They legally remain a pest and regulations require their destruction. However, leaseholders now have a worthwhile financial incentive to control their numbers. Some leaseholders believe funding allocated to feral species control would be used more efficiently if it was reallocated to increasing trapyards.

‘...That’s why I said we could do with another GMS to set up more trapyards. It’s a cheap way for them to get rid of them (feral goats). They could spend the money there. The money they are spending on trying to get rid of them now is a joke’ (males 70 & 40s).

The Gascoyne-Murchison Strategy has addressed many specific needs in the region. The URS Australia Pty Ltd (URS) (2004, iv) report also found that ‘New activities prompted by the GMS have improved people’s perceptions of viability...’ However, while the Strategy assisted many leaseholders to diversify their income, it also maintained traditional government strategies based on structural reform of pastoral enterprises and the continual dominance of the pastoral and grazing industries in these regions. The effect of this is to reduce the incentive or opportunity to change the dominant value system and develop alternative methods for multiple use of rangeland resources.

The URS report also suggests there is a declining need for pastoral support and emerging priorities for facilitating multiple use of rangelands. Those involved in the development and delivery of the Strategy consider it has reached its limit to proceed further in any meaningful way. They believe there is now a need for the development of national frameworks to better deliver regional development in rural areas (Laurence 2000). A Strategy has therefore been developed that adopts a more holistic approach. The Gascoyne-Murchison Natural Resource Management Plan

(2005) attempts to develop strategies with greater connectivity between the land, water and ocean environments. This approach also aims to better ascertain the multiple stakeholder values for these regions and develop better partnerships between stakeholders, industry and the government (Rangeland NRM Co-Ordinating Group 2005).

#### THE EMU PROCESS

Another government-led participative process that appears to be having some success today is the Ecosystem Management Understanding (EMU). This process was established as part of the Regional Environmental Management Program (REMP) programme included in the Gascoyne Murchison Strategy (see above). The process is encouraging leaseholders to improve the awareness and understanding of ecological systems on their land and incorporate this knowledge into station management. It refocuses attention on the importance of developing management strategies that incorporate conservation into production practices. The major benefit of the process is that leaseholders are encouraged to see resource degradation as diffuse holistic concepts rather than just in production terms that relate to specific problems. The Rangelands Natural Resource Management Co-ordinating Group (2005) report points out that improvement in surface water drainage regimes is a major challenge to sustainable land use. They suggest there is a need to further improve leaseholder understanding and encourage them to manage critical control points to slow rainfall runoff and increase water infiltration rates. This has been the central focus of the EMU process. Four pivotal factors are important features contributing to the success of this new process compared to traditional methods of communicating science.

List 8. **Four Factors Determining Success of EMU.**

1. *The voluntary nature of the process:*

All participants must volunteer to take part in the process.

2. *The use of local knowledge:*

The process is based on the use of local knowledge and ecologists work with individual leaseholders to increase their understanding and encourage them to undertake improvements in sustainable land use.

3. *The participatory nature of the process:*

The process involves participative processes that are based on equal partnerships between leaseholders and ecologists (Pringle *et al* 2003)

4. *The scales of the process:*

The process addresses sustainable land use on a local as well as regional scale.

The process was initially based on the work of two landscape ecologists, Ken Tinley and Hugh Pringle, who established dialogue with leaseholders. Using leaseholder knowledge and understanding of the land, they used their own expertise to assist leaseholders to assess how their ecosystems are constructed and how they function. The use of clear overlays on station maps showed land systems and their various ecological and production values. This helped leaseholders to identify important ecological features and establish key priorities for management that were more socially, economically and ecologically sustainable. The process also provided a baseline to monitor future changes in the land, particularly after major occurrences such as floods or dry seasons. It encouraged leaseholders to record permanent records of their knowledge of the land in a format that was easily reviewed and updated. This provided a useful tool for ongoing monitoring and ecologically

sustainable management of the station and was an important historical record of the land (Pringle *et al* 2003).

An important issue highlighted by the success of this process is the level of contribution by the EMU team to the success of the process. Their enthusiasm, good listening and communication skills and openness to others' ideas were significant factors in the high level of support for the process. Traditionally government agencies have generally measured competency of their staff by their level of technical expertise. As Kelly (2002, 155) suggests, 'Performance criteria need to be changed to reflect the skills required for participation if this role is to be improved'. The success of the EMU process demonstrates this need for change.

A number of leaseholders discussed the advantages of undertaking this process. Their comments emphasised the importance of participatory processes as well as understanding the willingness and ability of leaseholders to undertake change. Their comments also confirmed the success of this process in changing management practices. This leaseholder had learnt about the need to fence to land type (see Chapter 6, Changes in Land and Animal Management). She explained how they were currently planning to change their management practices to reduce the grazing pressure on certain areas of their land system.

'So we have gone through our land system with Ken Tinley. We have a map to work with and we have identified how we would re-fence the property, so rather than re-fencing the old sections we will start to look at re-fencing according to land type. The idea of that is that you then move your sheep according to the season, knowing where the plants are in their growth at certain times of the season, so you are getting the best advantage from the country' (female 40s).

However many leaseholders now use watering points instead to manage stock movement on their property. Some leaseholders believe monitoring systems, emphasised in the EMU process, are essential practices for accountability of improvements in sustainable land use.

‘This marking system that the EMU process is introducing is vital. Every leaseholder should have a monitoring system so he can quite categorically say, “Look, this country is improving under my management’. And unless he can prove it, then he should have his lease looked at’ (couple 50s).

Others considered EMU was a useful tool for passing on information from one generation to the next.

‘I think one of the things I've noticed having my son home is that it's nice to have all this information in here (in husband's head) out on paper and (K's) not the best of communicators. He knows in his own mind and will see things but he forgets that my son has got to see these things. The EMU process was good because it got all that information down. My son said he didn't realize that that's how (K) saw the implications of what is happening. We found the EMU process a good way to pass on knowledge. I think the EMU process is one of the best things that could happen to this pastoral area’ (female 50s).

The process has also provided authority for new leaseholders to change from a focus on production to one that promotes protection values, and therefore it is an important tool for change. This type of process would also assist people wanting a ‘bush lifestyle’ as discussed in Chapter 5, Leaseholder Cultural Issues and Perceptions That Influence Change.

An evaluation of the EMU process was completed in 2002 by Fiona Shallcross. The report found the overall response to the process was positive and almost all leaseholders appeared to have a good understanding of the benefits of the process and what it was trying to achieve. However the report did have a number of

suggestions for improvement. One respondent suggested the EMU process could become part of an accreditation to enhance the marketing of rangeland products (Shallcross 2002). Assistance with establishing the Rangeland Fibre and Produce Group in Mt Magnet and the development and implementation of an effective accreditation system, the SQF 1000, have been undertaken to fill this role. (see Chapter 8, Development of Producer Alliance Groups).

The report also recommended that the process include an economic aspect by providing leaseholders with methods of improving grazing production. However, the degree to which these two ideologies are realistically compatible is questionable and it may be that some are asking too much of the EMU process. Financial benchmarking and assistance was instead provided under the Rural Equities project (see GMS above). Other processes introduced, such as Grazing for Profit and Best Practice, do assist land managers to improve their economic situation and it does appear that the final decision about the balance between these two is the responsibility of the individual land manager.

A more comprehensive follow-up survey and report undertaken by Braddick (2005) included both EMU participants and government agency and industry representatives. This survey also found a high level of support for the EMU process. It found that 90% of EMU participants believed their overall understanding and awareness of the natural systems on their land had improved. It concluded that the overall changes that had occurred appeared to be the result of important attitudinal and on-ground changes, which leads us to question why this type of education process was not undertaken many years ago.

There was also an apparent increase in grazing management changes and the installation of new monitoring sites, since the Shallcross report in 2002. However,

the reports were very different so only a generalised comparison of results was possible. Also, many of the changes in management and on-ground work measured in the surveys were subjective answers. They were leaseholders' estimates of the influence of their involvement in the EMU process on their change in behaviour, making it difficult to accurately measure changes that have occurred as a result of involvement in the EMU process.

The results of the Braddick (2005) survey indicated that most leaseholders have undertaken changes in grazing management and on-ground work. They also showed that around 40% of respondents have been influenced in their decision to undertake changes in all four major factors, grazing management, biodiversity conservation, restoration work and infrastructure change, measured in the survey. Nevertheless there were a significant number of land managers (around 90%) planning to make changes to their grazing management and undertake on-ground work. Many of these changes have been constrained by the dry seasonal conditions and financial circumstances to date.

A high percentage of respondents commented that future involvement with the EMU process would assist them to put these plans into action, suggesting that this type of project may have an important influence on future changes in the region. However, agency and industry representatives commented that difficulties with the effective management of the EMU process had arisen because it was set up purely as a pilot process and failed to put procedures in place to provide institutional backing. Without being part of a budgeted agency program, the process continually had to generate out-sourced funding and this resulted in work overload for the team members and reduced their capacity to fulfil their role effectively. As a result the EMU process may be re-organised and implemented under another name.

An Environmental Management Systems (EMS) linked to the EMU process has been established as part of the Regional Environmental Management Program (REMP). This EMS process will provide an important tool for sustainable land use (Burke 2005) (see Chapter 8, Environmental and Quality Assurance Systems). The EMU process was undertaken by seven leaseholders in the Mt Magnet region and only two in the Upper Gascoyne and there are probably a number of reasons for this. These include accessibility through the Rangeland Fibre and Produce Group, the smaller distances to travel in Mt Magnet and the potential difference in the viability of production systems in the two regions. The difference in the type of leaseholder in the two regions may also influence participation in this type of process.

As pressures from the wider community for effective sustainable land use increase in the future, leaseholders were able to see the benefits of undertaking processes such as EMU. These included advantages for improving the viability and sustainability of their production system as well as the potential for accountability of their sustainable land use practices using recognised accreditation processes. The Gascoyne Muster, Sustainability of the Pastoral Rangelands working group recommended that EMU be expanded to enable leaseholders to meet their lease requirements and that leaseholders be encouraged to integrate this in their management system (Pastoral Lands Board & DPI 2003). However, the increasing age and the decreasing population of these two pastoral and grazing communities will continue to limit the overall potential for sustainable land use in these regions.

#### THE GASCOYNE MUSTER

The most recent government participative process designed to improve multiple land use was initiated in 2002-2003 by the Pastoral Lands Board and the Department for Planning and Infrastructure, Western Australia. The Gascoyne Muster has been a

useful pilot project for the reconstruction of the rangelands as a whole (Pastoral Lands Board & DPI 2003). This process held at Carnarvon, was organized to develop policy for key issues confronting Western Australia's pastoral industry. The initial forum in May 2002 invited all rangeland stakeholders to participate in a process to determine all issues facing stakeholders. These included Aboriginal, conservation, mining, recreational and pastoral and grazing stakeholders. The Minister for Planning and Infrastructure then established five working groups to report on and recommend workable solutions to these issues. These working groups brought together all rangeland stakeholders including pastoralists and graziers, indigenous communities, recreational and tourism interests, conservationists and local and State government. The results from these working groups were presented and discussed at a second Gascoyne Muster held in October 2003. Whether or not this is considered to be successful may depend on whether it is the outcome or the process that defines the success.

Comments made during the proceedings suggest the process was confrontational to some leaseholders. However, leaseholder comments in regard to the process were mixed with some believing they were not fairly represented, while others suggested the process was worthwhile for them and other leaseholders. This leaseholder was involved in one of the working groups and considered it was a relatively fair and worthwhile process that allowed negotiation between rangeland stakeholders to begin.

'I feel confident given the other working groups were probably established in a similar way, that it was a very good way to get a lot of information from aspects into one place and make decisions and recommendations from that. Whether they go anywhere is another question, but as an activity I feel that it's been valuable for pastoralism. I think for too long things have been

swirling around and changes are happening and no-one has really dealt with it. ...To bring those people together in a consultative process and put that information together; even if it doesn't go anywhere or even if from further submissions some of that is changed, it at least gave something to work with. Until then everyone was just muttering around in their back rooms. It was really important and I appreciate that. And I appreciate that there was a follow up and some people say there needs to be another one but I don't know whether we can all go to another one. I feel that it was a very constructive move. I know a lot of pastoralists were quite frightened of it and I think they felt they were concerned from a political aspect ...but I believe that what was done, whilst you can get into criticizing how the people were chosen, when you looked at it, it was a pretty good cross section. People were as good as you'd get to give a reasonable account of what was going on and I appreciate being one of those people on board' (female 40s).

There were also others who reflected their traditional distrust of government and disagreed with how the process was undertaken. They believed they were not adequately represented as a group and so their interests were not fully accounted for.

'The governments have been very clever in dividing the defence of people on the land, doesn't matter where you are. Because we're so divided, there is no united front to come forward and fight Alannah. We had all these working groups where we had representation on, but they were stacked in some cases, against us. When you stop and think about it, it was our future. When you look at the amount of representation that was on those groups who were pastoralists, you would be thoroughly shocked' (male 50's).

The Gascoyne Muster was an important attempt by government to change the established relations of power between pastoralists, government and the wider community and develop strategies and policies for future multiple use of rangelands. The process was based on a larger forum held previously by the same Government Department to determine urban attitudes toward future growth in Perth. The process appears to provide greater public participation in policy making however the Perth

forum appeared to attract more people who were aware and concerned about sustainable growth than those uninformed and unconcerned. This may have biased the results. As I did not attend the first Gascoyne Muster, I am not sure of the biases in this process. My observations of Gascoyne Muster II suggest to me the process provided a worthwhile platform to begin airing different stakeholder views and values and the relative representation of stakeholders and their contribution to recommendations in the working groups appeared to provide a fair and useful outcome for future policy.

#### **GOVERNMENT LAND ACQUISITIONS FOR THE NATIONAL RESERVE SYSTEM**

Another process integrated within the Gascoyne Murchison Strategy was the acquisition of pastoral land by CALM for National Reserves. This involved the voluntary sale of leases by pastoralists who wished to sell their land to the government. Before the commencement of the Strategy the biodiversity areas under protection in the Gascoyne-Murchison area were amongst the least represented within Australia. The reserve acquisition scheme has resulted in the purchase of 13 pastoral leases and parts of 10 other leases. The acquisitions are part of the national Comprehensive Adequate and Representative (CAR) reserve system and the process has been undertaken by the State to establish this conservation reserve system in Western Australia. This brings the total area of land managed for the conservation of biodiversity within the region up to around 4.3 million hectares or 7.3% (Pringle *et al* 2003). A significant area of land has therefore been placed in reserve; however, at a regional level there remain many ecosystems under represented or not represented at all. Further support from the industry and government is still required to include these areas in the CAR reserve (URS Australia PTY Ltd (URS) 2004).

The Gascoyne today remains a region of high biodiversity. The area has many different invertebrates, and a particularly wide range of reptiles and bird species, some of which are endemic to the area.

**BOX 6. BIODIVERSITY IN THE CARNARVON BASIN**

A study completed in the Carnarvon Basin in 1994 and 1995 by the Department of Conservation and Land Management (CALM) found a decline in numbers of native mammals in the area and an increase in pest species. Goats, wild dogs, cats and foxes are the main pest species in the Gascoyne. Nearly half the ground-dwelling native mammal species in the Carnarvon Basin (22 out of 48 original inhabitants) were found to be extinct due to habitat loss and the introduction of predators. The study also found that no bird species had become extinct within the last century but about 13% have increased in abundance and 10-15% have decreased. The increase in waterholes provided by pastoralism is suggested as the reason for the increases in population. This study led to the purchase of 470,000ha of pastoral leases which were instigated as part of the GMS (Burbridge 2002).

A process of voluntary pastoral lease acquisition was initiated through the Strategy. This process was implemented to assist pastoralists with financially unviable leases to exit from the industry and provide opportunity for this land to be integrated in neighbouring leases. The size of the lease and condition of the land are often the cause of unviability of leases. However the response to this was very low for a myriad of complex social and cultural reasons (see Chapter 5, Lease Tenure as a Driver of Change). The reluctance of authorities to assist the sale of land for pastoralism if the potential for increased production was not there, also affected change. Strategy arrangements were therefore changed, allowing leases to be purchased through GMS for reserve acquisition. Areas of the lease that were not important for reservation could then be sold to neighbours at market rates. However, the administration process is complex and lengthy and leaseholders generally prefer

more straightforward open market processes, so the outcome of this has also been limited (Gascoyne Murchison Strategy Board 2004).

The Department of Conservation and Land Management (CALM) now has responsibility for management of these reserve areas. Feral goats and native kangaroos are abundant in large numbers and have become a major problem for sustainable land use in these rangeland regions. Artificial watering points have therefore been progressively closed and feral animals removed as part of conservation measures. Roads have been upgraded to improve access and firebreaks have been improved to assist fire management procedures. Boundary fences are also being established with the assistance of neighbouring leaseholders.

The majority of the region remains under pastoral leasehold and there continue to be large areas, such as river systems, with high pastoral productivity that will be difficult to acquire. There are also many areas of high biodiversity value that are small and scattered across the pastoral landscape. It is therefore difficult to provide effective management of these areas and their future conservation will rely on stewardship arrangements with pastoralists and graziers (Pringle *et al* 2003). The closure of watering points on CALM land is also proving detrimental to the natural resource management of neighbouring pastoral and grazing properties because of the increase in feral animals moving to these areas. (see leaseholder comments on pages 288-290).

These changes were a major issue of concern for some leaseholders and their comments revealed a wide range of differing views. Their attitudes reflected the large variance in leaseholder identities that make up these two rangeland regions. Some considered the Strategy was worthwhile for conservation and highly beneficial to those leaseholders who were able to take advantage and profit from the situation.

Others thought it was a waste of good productive land and the potential for lease amalgamation was not fully realised. Some think that it is OK for CALM to take over leases but consider they have to manage them much more closely, and cannot adopt a position of benign neglect. They considered that more needed to be done to assist leaseholders to amalgamate or leave the industry. Many were more concerned about the ongoing management of the Strategy and how this would affect them in the future while others were more pragmatic about the situation and were prepared to wait and see what happened. Their comments reflected the complex nature of leaseholder views with dominant production values combined with a high mix of protection and consumption values as well (see Chapter 5, Changing Value Systems and the Difficulties for Leaseholders).

However, the purchases have injected cash into the Upper Gascoyne area and resulted in economic benefits to some leaseholders who sold part of their land. They used money from the sale of specific areas of their leasehold land that were marginal for grazing to change from unviable sheep production to cattle production. They achieved this by purchasing more land and amalgamating stations for cattle production and/or by purchasing cattle and paying for new infrastructure to manage them. They commented that some leaseholders in other regions remained on as manager of the CALM conservation reserve. But land acquisitions for conservation have only occurred in the Upper Gascoyne Shire to date with the major land purchases in the Mt Magnet Shire being made by the ILC (see Maps 3 & 5). The voluntary nature of these acquisitions allows Government departments and leaseholders to retain satisfactory relations, which may not be possible if the acquisitions were compulsory.

Management of these areas is controversial and many leaseholders were concerned about current and future issues concerning management of CALM land. These include access to CALM land by the general public, management of fire regimes, fencing issues, policy on closure of watering points and the impact on native wildlife and continued funding to maintain the reserves. Their comments also demonstrated the different attitudes of leaseholders toward government policy and management of reserves with some leaseholders believing the problem lies with funding while others believe the management strategies need to be improved. Many leaseholders were very concerned about the policy of CALM to close down watering points and the effect it was having on the wildlife. It is interesting to note that even though pastoralists are significantly affected by kangaroos competing for feed with livestock, many also appear to have a fondness for them and a strong concern for their survival.

‘They’ve closed all the waters down on the properties so all the wild life whether introduced or native either died or moved on to the neighbouring property. Lots of birds and wildlife died because water that had been there for the last 100 years, they just pulled it out, shut them down. They didn’t think much about the environmental effects of that’ (couple 40s).

Many leaseholders appear to have a strong concern for the welfare of animals and watching the animals suffer probably increases this concern. One leaseholder had a more pragmatic outlook and recognised the complexities and difficulties of CALM’s decision to close down watering points on reserve land to create a more balanced environment. He discussed the conundrum of closing waters and the deaths of native animals as a result, versus keeping the water points open and creating overpopulation, resulting in degradation of the land. So the long term results on the

animals are the same, and land that is placed in reserve for protection is not being fully protected.

Leaseholder comments about the CALM land acquisitions demonstrated the practical difficulties faced by stakeholders as they attempt to deal with the impacts of the changing value systems being imposed on them. These types of practical problems and ideological conundrums are rarely recognised or acknowledged by those in urban regions driving changes in resource use, yet they present significant problems for those directly involved. This leaseholder made an interesting comment revealing why he had a different attitude toward goat and kangaroo grazing pressure.

‘...I think in the long-term there is concern about CALM buying all this country up and vermin breeding up on it. They pull all the waters up and the goats and roos will be on their place in the winter but in the summer time as soon as they need water they’ve got to go next door. I don’t mind that with goats, but I don’t want to be watering their roos all summer’ (male 50s).

The following leaseholder was concerned about the extra work involved in erecting and maintaining fencing if he was required to have boundary fences with CALM property to control his roaming livestock. This could be a substantial problem for both CALM and leaseholders in the future.

‘We’ve got 150 kilometres with CALM and that hasn’t been a problem yet although when the time comes that they grizzle about the cattle straying onto their land, that could be a problem then because there’d be a lot of fencing needed. That’s a huge cost and huge maintenance factor to bring into it then, which I know who will be the silly guy who’s doing it. Definitely something to worry about round the corner that’s for sure. It hasn’t happened already because there’s no man-made waters on their land anymore unless it rains, but when there’s a few surface puddles around, the cattle do wander onto their side then, but they don’t stay there once the puddles dry up. ...But boundary fencing and maintenance, which is a bigger factor than just putting up the

fence, maintenance is a big thing in this country due to the terrain and the creeks and rivers. I don't know who's going to maintain all this fencing when and if it ever gets put up. I know I'm not going to. I'll do half but I'm not doing the whole lot. They've actually had a look a few times and seen them (cattle) on their side when the water is there and they ring you and grizzle about it. In my opinion a little bit of tolerance would be a better option than putting up and maintaining a huge distance of fence. ..if we're forced to fence and maintain our boundary with them, without any help from them. I think that's going to put a fair bit of pressure on us.' (male 40s).

Other leaseholders did not consider there were problems with the management of reserved land adjacent to their property at present. Because these were relatively recent purchases of CALM properties and impacts occur in these regions over large temporal and spatial scales some leaseholders considered it was too early to comment on the management of these reserves.

However, the resounding message through many of the comments was the feeling of insecurity and frustration many leaseholders seem to be experiencing with these changes. Therefore, the essential problem of government policy, such as land acquisitions and lease excisions (see Chapter 5, Changing Value Systems and the Difficulties for Leaseholders), seemed to be the uncertainty it created for the future situation of leaseholders. Several leaseholders were really concerned about the possibility of loss of their land at some time in the future, while others believed it was unlikely to affect them and was only likely to affect coastal property. Many leaseholder comments also suggest a general misunderstanding and fear about the attitude of the wider community toward placing pressure on government to reduce the land available for them and their industry. There is therefore a need for them to differentiate between the wider community pressures for responsible stewardship versus being pushed off the land altogether.

## **LAND MANAGEMENT AND CONSERVATION ISSUES**

There are many areas of high biodiversity value that are small and scattered across the landscape. Although it is essential to reserve land in conservation areas to maintain biodiversity, it is not possible to manage these dispersed areas of biodiversity in reserves. It is therefore important that conservation for biodiversity is practiced on privately managed land. Pringle *et al* (2003) suggest this is best achieved through stewardship arrangements with pastoralists. However, the widespread adoption of these practices is a difficult challenge for two reasons. First, legislation currently does not allow pastoralists to completely destock to manage discrete areas of a lease exclusively for conservation purposes without a special permit (see Land Administration Act 1997 s106). Second, attitudes toward 'private benefit versus public good' present significant barriers to adoption. McLeod & McIvor (2002, 137) argue that the boundaries between 'duty of care' and making a private sacrifice are ill-defined. They state that 'Many pastoralists consider it inequitable to have to provide non-compensated public benefits' and suggest the issue needs urgent resolution so effective policy can be developed for sustainable land use.

Many leaseholders in the Upper Gascoyne and Mt Magnet commented on their role overall as caretakers of the rangelands. However, they generally appeared to have high expectations of financial compensation by the wider community for conservation on their land. Some have recently accessed money provided by the Natural Heritage Trust (NHT) for fencing of small areas of land for conservation purposes. One leaseholder interviewed mentioned he had received funding for fencing from the NHT. Another leaseholder received money to protect an important plant species found on their property. Under the old Land Act 1933 (reprinted in

1985), leaseholders were expected to ‘manage and work the land... in a proper and husbandlike manner and according to the ...management, conservation and regeneration of pasture for pastoral purposes...’ (s103). Yet, under the current Land Administration Act 1997, one of the functions of the Pastoral Board is ‘to ensure that pastoral leases are managed on an ecologically sustainable basis’ (s95). This requires a very different outcome for land management. Leaseholders are therefore now required to sustainably manage their properties to maintain the ecological integrity of their land. Therefore conserving areas of high biodiversity is an important part of this requirement.

The recent availability of government funds for local conservation suggests that the wider community and government are prepared to support this practice in certain circumstances. However, the contentious nature of the issue reduces the potential for greater adoption of practices to conserve natural resources on privately managed land. Fessey, Green & Kneipp (2004) described a recently developed cost-sharing method in NSW that protects native vegetation on privately managed land. However, leaseholders’ strong production values and their need for income may limit their ability and willingness to manage large areas of land for conservation.

Interestingly, while government agencies have concerns about the sustainable practices of leaseholders there are also a number of leaseholders concerned about the sustainability of current government practices in harvesting of Sandalwood on their leasehold properties. Comments made by leaseholders during the interview process tend to suggest that many are strongly opposed to this practice and appeared to have a number of concerns. These included concern about the damage that is done to the area by the machinery used to harvest the trees and the difficulty for regeneration of the trees in these regions because of grazing animals and the lack of adequate

fencing. Leaseholder comments suggest there is a need for more research on the regeneration rates of Sandalwood in these regions. As the establishment of Sandalwood plantations increases in other areas, the government may also need to reassess the need for harvesting these trees in the rangeland regions. The Western Australian Sustainability Strategy recommended that the industry be reviewed to ensure the resource is managed sustainably (Department of Premier and Cabinet 2003).

There remains an important role for government in developing strategies and policy to improve sustainable land use and encourage multiple land use in these regions. One area requiring urgent attention is policy to encourage leaseholders to manage areas on their land for conservation of biodiversity (Pastoral Lands Board & DPI 2003). This is needed to improve the National Conservation Reserve system. The State of the Environment Report (Draft) (2006) recommends a need for increased recognition of conservation for leaseholders, along with some sort of financial or other incentive to encourage and assist more leaseholders to undertake this practice. The wide diversity and complexity of values of the different interest groups continues to make development of effective policy a difficult process. The above strategies demonstrate the wide range of assistance required to achieve this goal. Nevertheless, the relative success of these processes demonstrates that government is attempting to deal with issues affecting all stakeholders in these regions.

Leaseholder comments reveal the difficulties they are having in coming to terms with the changing value systems in the rangelands. Many seem to feel a general frustration and anger at the loss of what they consider is not only productive land, but is also land that belongs to their industry. Their attitude toward property rights deepens this dilemma. Many of the comments suggest a lack of acknowledgement

that much of the land is no longer productive enough to support viable grazing production and their ability and willingness to undertake conservation appears limited. Instead they identify CALM or the ILC as the problem. Yet one of the main factors responsible for their current situation may be the legacy of poor management in the past they are obliged to live with today.

#### LEASEHOLDER ATTITUDES TOWARD GOVERNMENT STRATEGIES FOR SUSTAINABILITY

Recent government strategies reflect the changing emphasis on protection and consumption values. Strategies such as the Gascoyne-Murchison Strategy and Gascoyne Muster demonstrate an increasing focus by governments on regulating for more sustainable land use and allocation of resources for all rangeland stakeholders. This process of change has been of particular concern to leaseholders and their comments demonstrated the wide range of attitudes amongst those interviewed. Some were disappointed that the GMS funding was used to purchase land for conservation reserves and was not used to assist pastoralists to amalgamate land and improve their viability.

‘The GMS money also went into CALM to purchase the pastoral leases, and probably some of these pastoral leases should have been amalgamated into other pastoral leases in some areas and they didn’t. The good areas could have gone into other places to make them more viable’ (couple 50s, son 20s)

Other leaseholders agreed with the concept of reserving natural areas.

‘I am one of the only pastoralists who are quite in favour of CALM buying land, because they have no inventory. With all the agriculture areas around they had no inventory of what was there in the North West. I feel they had every right to buy that’ (male 50’s).

Some were a little more pragmatic about the land acquisitions and believed that this was the choice of those leaseholders who had sold.

'Naturally I'm saddened to see so many places gone to them because it's a lack of production for the area, but that's the people's choice and hasn't directly affected me' (male 40s).

The growing percentage of leaseholders who are over 50 years of age exacerbates the situation and is a concern to those involved in the industry. While aging producers have significant consequences for the future of the industry because it influences adoption of new technologies and management practices (see Webb, Cary & Geldens 2002) it also increases the potential for land currently used for production to be 'lost' to government reserves or Aboriginals as aging pastoralists retire. One leaseholder commented:

'The big thing is that there is not many young people coming back to the stations. That will make a big difference in the future. We can see the blokes running the stations now, a lot of them are nearing retirement age and haven't got anyone to take on the station. So the station will be sold, perhaps to CALM perhaps to Aboriginal groups, in fact they're the only ones with money to buy stations or may be interested enough to buy the stations, so that's a big thing. Not many families coming through' (female, 30s).

The dominance of production values and the changing landscape create conflicting beliefs for leaseholders. Many believe the land purchased by CALM or the ILC resulted in a loss of land used for productive purposes. However, they also believe some of the land was never viable or is no longer viable for production. They also believe that government policy to protect areas of land for certain lengths of time is very useful if it then allows productive use of the land to resume at some time in the future. The protection of land by CALM is therefore aligned with their production values. However there is also recognition that protection values are driving CALM land acquisitions and future policies therefore may not allow productive uses of the land. They therefore disagree with these actions.

‘Probably some of the country they bought should never have been pastoral leases from the start’ (male 50s).

‘In some cases it's been a good thing. Some of those properties are absolutely had it. They need to be locked up for 20-30 years and hopefully one day they might go back into production but under the current rules that's not going to happen. So I find that a bad thing’ (male 40s)

Other leaseholders were concerned about how the land acquisitions were going to impact on the local community and the viability of the industry in the future.

‘Every time a property gets sold to CALM or is owned by ATSIC, they're virtually taken out of the industry, out of the local community and it weakens the industry in the local district quite a bit’ (male 40s).

This leaseholder explains how the acquisition of land results in a flow-on effect affecting both government and private services that support the industry and the community.

‘But I could see the problem right from the start when they first made it public that they were going to buy all this country, was that agencies like the Ag. Department, if there's 20 less stations in say the Meekatharra area that are viable or running as stations, it affects agencies like the Ag. Department. They've got 20 less stations they have to look after, it affects mail runs, it makes the mail run less viable and there are 20 less families that support one or two towns. I suppose the equivalent would be back in the 1980's when the Aboriginals bought all their pastoral leases in the Kimberley's and it made the cattle industry a lot less viable because when they had their cattle going through the meatworks up there, as soon as the Aboriginals bought their places they became non-productive and it made the meatworks not as viable because they didn't have the throughput that they had before because of all these places becoming virtually nature reserves. That's the same thing in the southern rangelands, all these places that have reverted to being non-productive places’ (male 50s).

Concern about the CALM acquisitions was clearly evident during the interview process and was also raised a number of times during the first Gascoyne Muster held at Carnarvon during May 2002. Issues raised by pastoralists at this forum included:

- a lack of industry consultation or explanation for the excisions; is exclusion necessarily better than competent land management?
- unused excised land is unproductive and should be returned to pastoral use;
- conservation land should be reallocated for other uses in the future;
- there needs to be a time limit placed on future CALM and Native Title acquisitions (Pastoral Lands Board & DPI 2002).

These comments demonstrate a clear focus on production values, a general frustration with current changes and little acknowledgment of the values of other stakeholders in the rangelands. One leaseholder commented during the Upper Gascoyne and Mt Magnet study that ‘This land needs to be encouraged to be used’ (male 50s). But the problem for conventional production values in rangelands is the limited success for production capabilities in these regions. Leaseholder comments did not raise this factor as an issue of concern and there were few who acknowledged that much of the land purchased by CALM and the ILC is marginal for grazing production. Their comments exposed a clear denial among some pastoralists about the inability of the land to support grazing production under current scenarios. These limitations on production are now helping to drive the emerging values and uses such as Aboriginal self-sufficiency, conservation, tourism and recreation. They are also influencing growing demands by the wider community for more sustainable land use. This is sometimes interpreted by leaseholders as a desire by government to remove them from these regions.

‘I believe the government doesn’t want us out here. I believe they think we’re wasting our time’ (male 70s).

The diverse range of values is a significant barrier for efficient and equitable allocation of resources. In the past the singular values of production presented few difficulties and pastoralism and grazing took precedence. With the changing attitudes and reduction in importance to the economy of pastoralism and grazing, the power structures that supported this resource allocation have diminished. They have been replaced by complex and varying demands from different interest groups, all seeking to capture power to influence resource use for their own agendas. As a result there is generally little interest in sharing resources with those groups who have different values from their own.

The wide difference and complexity of these value systems generally make it difficult for these interest groups to agree on strategies that will achieve multiple-use goals for the rangelands. There is also a lack of appropriate government and social institutions to support the varied interest groups. The three major groups, pastoralists and graziers, conservationists and Aboriginals have vastly different value systems and will sometimes align themselves with one group or the other in order to gain advantage in their competition for resources (Holmes 1994a, 1996, 2004b). This comment by an Aboriginal leaseholder reflects this situation.

‘I think the number one thing that really concerns me is the takeover by CALM of a lot of places. That’s a big concern. Once it's taken back by CALM into a reserve it's gone. No matter which way you look at it, it's gone. Also, once it leaves black fellows hands it will never get back to us again. So it's a two pronged attack for us as far as CALM is concerned. That’s why my major concern is takeover of lands because you'll never get it back no matter whether you are white or black and in the sense of the blacks situation, it's traditional land that maybe people are tied to and will never get back in that sense. When you’ve got the land in a pastoral sense you’ve got room to manoeuvre as far as land tenure for living excisions and other things is

concerned. But once it is taken over in the reserve sense, it's gone. So that's my main concern' (male 40's).

In this instance as a pastoral leaseholder he is more aligned to the production values of leaseholders than the protection values of CALM. There are therefore considerable difficulties involved in understanding the competing interests as well as creating consensus amongst the different interest groups so that policy and management strategies can be developed and implemented.

However, emerging consumption and protection values were revealed in these two rangeland regions under study. New leaseholders to the industry bring with them different attitudes and wealth gained from outside sources or they have skills and experience that enable them to finance their lifestyle from outside sources. They are therefore not locked into a production ethos. These values are driven by a desire to experience the 'bush lifestyle'. These new leaseholders may become part of a shift away from the dominant production ethos to include consumption and protection values as well; as this leaseholder explained.

'I think that because the stations around this area are reasonably small and they've got a fair amount of infrastructure on them, as in houses and sheds and shearing sheds, people who want a different lifestyle than the city, not just hobby farm-type people I'm talking about, it's people with money who want a bush lifestyle, they can buy a station for the price of an ordinary house in Perth. For \$400,000 you can buy an ordinary house in Perth, but you could buy a sheep station here and I think there's going to be a movement, because there's not ever going to be any more stations, there's a finite number of stations and I reckon they're going to be snaffled up by people who want to have a lifestyle similar to what (C) and I are trying to do. A house with a big back yard. There's a similar thing happening around Beverley, York, places like that and I see no reason why it can't happen here. You can buy a house

with all this infrastructure on it for the same price as a little box on a quarter acre in the city' (couple 50s).

The closer proximity of Mt Magnet to Perth than the Upper Gascoyne and the smaller station size is encouraging the beginning of urban lifestyle options which could have a significant impact on the way this region develops in the future. It remains to be seen whether these type of leaseholders are able, or willing, to maintain or improve the ecosystems on the property effectively when they are gaining little income from it.

### **Summary**

Because the land remains in its natural state the potential for leaseholders to have a greater appreciation of intrinsic values of the environment appears more likely than the highly altered landscape of the agricultural regions. The diversity of rangeland vegetation and the harsh landscape in which it survives often provides us with a feeling of wonder and respect, and the expansiveness of the land creates a sense of isolation making us feel more at one with the land. This emotional bond with the land increases over time and as the pastoralist and grazier have shaped the land over time, so too the land has influenced the formation of the character and culture of the pastoralist and grazier (Bryant 1992).

This appreciation of the intrinsic values of the landscape was clearly evident in leaseholder comments. Their comments show that leaseholders are not just focussed on production but are also concerned about stewardship and care for the natural assets of these regions. They demonstrate the varied mix of production, protection and consumption values that both European leaseholders and Aboriginal people have for the land in these regions. Their comments therefore challenge this trilogy of

production, protection and consumption values and point towards a more integrated stewardship-oriented framework of sustainability.

These values are also a significant part of the emerging public values which are creating dilemmas for leaseholders and policy makers alike. As Holmes (2004b) argues above, many of these values are not based on the market economy and therefore do not produce an income for the people and communities of the rangelands. A further problem is that much of the income derived from these emerging rangeland enterprises, such as ecotourism, is retained by national and international companies or urban-centred ventures with little income returned to benefit the infrastructure and people of the rangelands.

Holmes (2004a) also suggests that geographical differences in the ways the land is being occupied as well as the complexity and variability of the different modes of emerging changes are the forces moulding development. He states it is this 'multifunctionality' that is the central dynamic driving rural change. These changes can clearly be seen in the Upper Gascoyne and Mt Magnet regions as government and Aboriginal land acquisitions, station amalgamations, ecotourism and mining change the spatial occupance of the regions. The very beginning of lifestyle options emerging in Mt Magnet may also influence land use in the future.

Diversification options for leaseholders into tourism, visitor accommodation and horticulture are already beginning to change the way the land is being occupied and used and opens up further opportunities for increased multifunctional uses in the future. Changing value systems are therefore driving change and it is clear from their comments that leaseholders are struggling with many of these pressures to change. These values are slowly forcing change from a reliance on a single production value that drove a monocultural mode of occupance to a mix of contested,

multifunctional modes based on production, protection and consumption values. Holmes (2004a, 18) suggests that the 'contests, actions and power relations of interest-groups are closely aligned to the modes and trajectories of rural occupance' and that future research needs to focus on developing and understanding the different value-orientations and their influence on the perceptions, needs and expectations of these various groups.

## CONCLUSION

This thesis has revealed the changing attitudes and practices in European pastoral and grazing systems in the shires of the Upper Gascoyne and Mt Magnet in Western Australia. The historical, socio-economic and technological events, combined with the development of social values and policy explored in the thesis, exposed a broad suite of factors that shaped this development, and continue to influence pastoralism and grazing in these regions today. The thesis has also explained how the emergence of the sustainable development paradigm is raising awareness of the ways societies define the issues of development, and the influence of this paradigm on attempts to shape change for the benefit of future generations. Both the natural and social sciences have a role to improve understanding and assist with the establishment of policies and strategies that combine the diverse and complex knowledge from all sectors and levels of society and the environment. The thesis has therefore built on this process by increasing understanding of the human drivers of recent adjustment activities of pastoralists and graziers in the two regions of this study, as well as their attitudes toward their issues of concern.

The thesis investigated how relations of power had a significant influence on the evolution of the pastoral and grazing industry in Western Australia. It explained how European settlers developed the basic rural ideology of agrarianism because of their past experiences in European countries and attempted to create pastoral lifestyles in Australia. Pastoralism was encouraged to help support a growing urban population. Government policy developed as a means of control and legitimized land use, which promoted the interests of the pastoral industry. The relations of power were thereby established among government, leaseholders and the wider community. At the same time, the growth of an urbanized society restricted growth in public

awareness of environmental conservation and enlightened policy development. These factors, combined with leaseholders drive for increased income, set the stage for overgrazing and the resultant land degradation that occurred.

Improvements in science and technology, combined with global and national policy changes, have continued to drive changes in the relations of power between government and those in the pastoral and grazing industry. In recent years, shifting world markets have increased the importance of mining activity within the economy and reduced the dominance of agriculture. In conjunction with this, changing global views on the environment have created pressures by the wider community for improvement and more accountability in natural resource management of rangeland regions in Australia. Changes in wider community views on the use of rangelands are now resulting in greater demands for multi-use of these regions. These emerging community views are also shifting the relations of power and placing growing pressures on leaseholders for change.

The review of the history of pastoralism and grazing in Western Australia demonstrates how development in the two regions of study reflected these State-wide trends. Encouragement by government for settlement resulted in early development of the pastoral industry in the two regions of study. The relations of power between Europeans and Aborigines at this time were an essential advantage to this early pastoral development. The discovery of gold also enhanced pastoral settlement in the regions. However the limited understanding of land systems, combined with unrealistic expectations of the productive capabilities of the land, by both pastoralists and government agencies, resulted in severe land degradation over wide areas of rangeland. This remains a legacy land managers and other stakeholders are forced to deal with today. The introduction of award wages for Aboriginal workers and the

loss of Aboriginal labour had a big impact on the social interaction in the region, as well as station management and infrastructure development. These factors combined with:

- decreased commodity prices,
- adverse seasonal extremes,
- land degradation due to past overgrazing,
- large increases in non-domestic grazers, and
- a comparatively low level of investment in infrastructure,

have resulted in significant land management and infrastructure issues apparent in these regions today.

Economic issues have a major impact on the development of this industry. Low market values for land, combined with difficult financial and environmental conditions have resulted in limited infrastructure development in Western Australian rangeland regions in the past. This has restricted the ability of leaseholders to effectively manage the natural resources. Declining income and the difficulty of accessing finance or off-station work has had a significant bearing on the ability of some leaseholders to diversify or change in the past. In recent years, the availability of funding from the Gascoyne-Murchison Strategy has enabled most leaseholders in the Upper Gascoyne and Mt Magnet regions to make important changes to both management and production systems.

However, today the same difficult environmental conditions, combined with reduced profits and increasing land values for pastoral purposes, are resulting in many unviable enterprises and discouraging young people from entering the industry. The widening urban and rural gap and the declining contribution of the industry to the national economy are reducing public support for unviable grazing production in

marginal areas. The industry is not in net economic balance, and is therefore not sustainable. Established institutions and the desire to retain a cultural identity, currently justify government subsidies from society's point of view. However, economist's predictions for declining terms of trade in the future suggest the economic situation for many leaseholders may not improve in the short-term. Removal of public funding such as drought relief would therefore create even greater pressures on leaseholders for change.

Globalisation and government policy have also been key drivers of development, providing mixed benefits and disadvantages for sustainability. Government fiscal policy has shifted emphasis from State support to a market economy. Funding of service delivery has been reduced, producing a shift in power to centralised agency control. This has resulted in downgrading of facilities, discontent amongst declining rural populations and an increasing gap between urban and rural communications. Leaseholder opinion on these changes was very mixed with some supporting free-market ideology and less assistance from agency staff while others preferred government regulation and were concerned about the reduction in agency support.

Policies and markets developed to assist agricultural production, often result in disadvantage for rangeland producers because of the differences between agricultural and rangeland regions. Industry analysts recommend changes that better include rangeland conditions. Government agencies have provided significant assistance to leaseholders in the past. At the same time the implementation of policies generally remains poor and often not well communicated to pastoralists. Policies are also designed to promote the role of government agencies within the industry, maintaining both their role in the pastoral and grazing industry and the role of the industry itself in these regions. Reforms implemented by the Federal government

also create a need for producers to be internationally competitive without assistance from government. Australian producers are now forced to compete with overseas producers who are aided by government protection policies. This has added to the decline in incomes for many leasehold families and the increase in pressure being placed on the land. Leaseholder comments suggest there is a growing concern about current government policy on the future of their industry.

The unclear nature of pastoral lease arrangements and Native Title claims continue to create uncertainty and fear amongst many leaseholders. Their deep concern over the threat of Native Title claims arises from traditional attitudes in Western Australia over Aboriginal land rights, fuelled by extensive media campaigns in the past. However, comments by an Aboriginal leaseholder suggest there is limited traditional Aboriginal connection to these areas, making the concerns expressed by European leaseholders appear overstated. Their concerns over lease arrangements included the lack of lease security affecting: resale values, incentives for succession, and investment in infrastructure on the property.

These concerns reflect leaseholder opinions on the extent of the influence of lease arrangements. Recent government reports confirm that lease conditions do influence financial and long term planning decisions. However, the low economic viability of many production systems and the limited opportunities for income production available to leaseholders and other rangeland stakeholders will potentially have a greater influence on production than lease tenure. Although many leaseholders would like freehold title, evidence from assessments of freehold land in agricultural areas does not demonstrate that freehold leads to better land management.

Leaseholders also consider the insecurity of lease tenure reduces their ability to develop non-pastoral enterprises. However, leaseholder comments reflect other

studies suggesting the greatest impediment to diversification is their own feeling of uncertainty and insecurity of the situation. The recent push by the industry for longer leases may have worked against leaseholders as it refocused the issue of land use, raising further conflict between conservationists and industry stakeholders. The government is currently undertaking changes in policy to lease arrangements. These will need to:

- include interests of all rangeland stakeholders (although this may result in disadvantages to leaseholders),
- reduce the prescriptive government controls over pastoral leases to improve conditions for diversification,
- have greater emphasis on monitoring and evaluation of natural resources to provide greater enforcement of regulations for sustainable land use,
- determine whether lease tenure can remain a useful tool in the rangeland situation today.

Technology provides important contributions to grazing management and lifestyles in these regions and is therefore a key driver of change. Technology, combined with the economic benefits of live export has greatly enhanced animal production in Australia in recent years. It has also greatly improved the lifestyle of leaseholders living in remote conditions. However leaseholder comments agree with industry analysts suggesting adoption of technology is highly influenced by complex factors and has varying degrees of benefit for individuals and their communities. The skills and experience of leaseholders has a major influence on their adoption of technology and the remoteness creates a distinct disadvantage for much of today's technology with 'designed-in dependence'.

The introduction of younger leaseholders, experienced with computers, may create some opportunities for improvement. Nevertheless, there are many limitations to the

ability of technology to adequately assist development in these remote and variable rangeland conditions. These socio-economic, political and technological factors have had a major influence on the development of pastoralism and grazing in Western Australia and continue to drive change in the two regions of study.

From this information, we are able to respond to the first general aim of this thesis about how past events have shaped and driven the nature of pastoralism and grazing as it exists today. National and State policy, influenced by global markets and wider community attitudes, have moulded land use and the relations of power between government agencies and leaseholders. The changing economic and environmental situations have driven the type of animal now being produced, and technology has aided and influenced these developments. However, social aspects also have an important role to play in development. The underlying value systems based on production, established during the early days of settlement, continue to drive development in these regions. Yet today leaseholders are faced with emerging forces of change from the wider community. As changing community value systems reduce the traditional emphasis on production values and increase the complexity and pace of rural change, a new definition for rangelands is being demanded. Growing protection and consumption values are increasing land values and placing further pressures on grazing system viability. At the same time new income-producing activities generate income for urban residents, reducing income potential for leaseholders. The competition for suitable land, generated by these new activities, exposes an urgent need for improved regulation for resource allocation and management.

The changing value systems of the wider community about land use were an obvious concern to leaseholders in the Upper Gascoyne and Mt Magnet. Recent urban

research shows rangeland resources are valued highly by urban residents who prefer conservation and protection activities over mining and pastoralism. They also clearly revealed the growing gap between urban and rural awareness and values. These results were reflected in the main concern of leaseholders: security of their lease. The political power of large urban populations, along with future demands from the growing number of conservationists and Aboriginal populations, were seen as major threats to the future of their industry. Leaseholders mostly see themselves as *de facto* owners of the land and, overall, they were very positive when asked about their role as custodians of the rangelands. Most leaseholders considered they should be recognised for this role with some suggesting education of the public about their role and property rights should be improved. But whatever their role, the abundance of native and feral animals requires some form of active management.

On all issues, there was a wide variance in leaseholder attitudes; however, they were almost all immersed in the traditional pastoral and grazing culture. Several leaseholders had a long dynastic attachment to their property. Their comments about the historical events and infrastructure remaining on their property revealed a deep attachment and feeling of protection toward their cultural landscape. This attitude may reduce opportunities to improve public awareness. Their strong sense of place also makes it very difficult for leaseholders to leave their industry. However, the current financial conditions some leaseholders are faced with is forcing them to sell their property now that seasonal conditions have improved and is reflecting the lack of viability of some grazing enterprises in these regions. The relationship between European pastoralists and Aboriginals is also an important component of the cultural value systems driving change and a key factor in determining multiple land use in the

future. This issue needs further research to assist in the development of strategies to improve multiple land use and allocation of rangeland resources.

Profitability and productive capacity as well as the social capital of these two regions have been severely eroded in the past. The sustainable development paradigm now drives development, creating both a challenge and an opportunity for change. Environmental barriers to sustainable land use and diverse perceptions of sustainability create difficulties for developing effective policies and strategies for change. As in other reports, sustainable land use was mostly seen by leaseholders in the Upper Gascoyne and Mt Magnet regions as the sustainability of feed for livestock. The adoption of land use practices that conserve biodiversity is therefore constrained by their conception of sustainability that focuses more on production than protection values, as well as the philosophical issue of public good versus private benefit.

Technology has enabled management practices to improve considerably in recent years using infrastructure changes and adjustment practices. However, grazing production in the environmental conditions of the rangelands raises significant difficulties for sustainable land use for a number of reasons. Market systems foster short term management practices and ideals. Traditional land use practises are slow to change and investment in effective infrastructure is generally limited. The complexity and variability of the environment also limits the effectiveness of infrastructure. Land evaluation methods based on traditional carrying capacity figures appear inadequate. Recommendations to improve land valuing systems for sale of land therefore appears an important approach to sustainable land use.

The landscape complexity also constrains leaseholders' ability to detect and rectify changes in ecological systems effectively. Climate variability reduces the ability of

leaseholders to increase production to keep up with cost/price pressures. The general inaccuracy of climate forecasting produces an overall lack of trust by leaseholders toward using this information in land management. This limits the effective integration of climate information to improve sustainable land use. Further research into climate forecasting and encouragement for adoption of this technology is therefore essential, especially if temperatures increase due to climate change.

Although scientists are suggesting temperature increases will have serious implications for future rangeland production and recommend leaseholders be more proactive, few leaseholders mentioned climate change as a major concern. Greater emphasis by government agencies is needed to improve awareness and assist leaseholders to adjust to these changes. Many areas of land in these regions continue to be marginal for grazing purposes and overstocking remains a feature of management. The recent Pastoral Lands Board appointment of a Compliance Officer will assist their role of ensuring that pastoral leases are managed on an ecologically sustainable basis and, is an important component in the move to change land use practices.

The concepts of local and regional scales of sustainability are generally not well understood. Management strategies required to meet environmental and economic goals are not always feasible, and often require unrealistic personal deprivation or impossibly complex management. In many instances, the economic viability and the long-term productivity of the land for the given land use is not being maintained and necessary rehabilitation may not be occurring. Much of the problem of trading-off conservation value versus economic production remains unresolved. More holistic approaches to sustainable land use are now emphasised that include a greater

leaseholder understanding of ecosystems, improvements in business skills and development of alternative ways of producing an income.

Yet changes in land management will not be effective using altruistic approaches alone. Many scientists are now calling for improvement in policy regulations to continue the phase out of marginal areas of land use, and changes in approaches to management goals. A better definition by government of what is necessary for rangeland sustainability would help to more clearly define expectations and outcomes required for sustainable land use. Many of the issues influencing land use are social in nature and as Mackenzie (2000) points out, the challenge for the future is to reconcile the social factors with the demands that research and regulation produce. However, the cost of fuel is a significant portion of leaseholder expenses and increases in oil prices will probably become a major determinant of economic viability for grazing production in these regions in the near future.

Industry analysts and leaseholders both agree there have been important changes in land management in recent years. Most leaseholders had accessed the GMS funding and made substantial infrastructure and animal changes to their production systems. These changes will be an important benefit to both animal production and natural resource management in the region. Nevertheless the funding only allowed them to undertake a small portion of the fencing required for effective resource management. Some of the work undertaken, such as increased watering points, and de-fencing, increases land available for grazing and provides opportunity for better control over where livestock graze. Alternatively, greater areas of land are under pressure which is likely to result in the loss of palatable species and decreased biodiversity in the region. The difficult issue of managing grazing pressures on the land remains a problem for maintaining landscapes and land regeneration.

Adoption of educational process such as EMU and management practices such as rotational grazing appear to be addressing this issue somewhat. However, it is also recognised that different types of animals now being produced are placing new pressures on the land. Our understanding of the impacts of many of these changes is limited and public demands for accountability in land management practices are likely to become an even greater catalyst for change within these regions in years to come. Therefore, further research on the environmental, social and economic implications of these changes is essential to enable new and improved policies and strategies to be developed to enhance the overall management of rangeland resources.

The most effective improvement for both grazing production and natural resource management in recent decades has been the development and implementation of Total Grazing Management systems. All leaseholders, where appropriate, have implemented or improved trapyards or intended to in the near future. Both government scientists and leaseholders agree this infrastructure improves land and animal management as well as productivity. However, the use of this infrastructure still relies on fencing to land types to effectively control animals. Successful control of feral goats also relies on sustained good prices for goats. The overall effectiveness of TGM systems will therefore ultimately rely on the ability and willingness of those who are using them to implement them effectively.

Land monitoring systems such as the Western Australian Rangeland Monitoring System (WARMS) are also becoming an important tool in sustainable land use and leaseholders now recognise the role this type of work plays in providing awareness of changes in biodiversity and accountability for land management. By improving awareness of the biodiversity of land systems, it provides important potential for

balancing production and conservation goals. The development of a community-based photo monitoring process is therefore needed to better capture regional changes over time. However, the ability to use monitoring systems as a tool to manage grazing impacts is limited. Furthermore, while this type of monitoring system remains based on differing values of biodiversity, improvements in the condition of the land will remain contested.

Leaseholders' comments suggest that increasing populations of kangaroos are a major barrier to sustainable land use and the spread of Buffel grass is degrading indigenous ecosystems. High numbers of kangaroos have been a problem for regeneration of land for many decades. The fact that leaseholders do not generally include them in their assessment for carrying capacity only adds to the problem. The complex nature of the issue constrains any short-term solutions for resolving the problem. The introduction of Buffel grass has also occurred over many decades. Although scientists recognise the detrimental effects this introduced grass has on the natural environment, leaseholders consider it a valuable fodder species for animal production and a useful way of reducing the effects of erosion. These conflicting attitudes make it difficult to develop effective strategies for change. There is therefore a need for substantial research to determine areas most at risk from pest and weed species so that priorities for management strategies can be established. Leaseholders have therefore made worthy changes in management recently providing important potential to benefit themselves and the land. For a small minority of leaseholders, their land management and production skills have enabled them to maintain natural ecosystems for sustainable pastoral production. However, for the majority, there remain substantial barriers that continue to reduce the

efficiency of their efforts to develop viable production systems and sustainable land use.

The impacts of change on the social interaction and ability of the community to function effectively have been considerable. Leaseholders' comments suggest improvements in technology now encourage them to seek contacts with urban populations more, resulting in less interaction with their local community. There are many reasons why these changes have occurred. Declining incomes due to increased input and labour costs, station amalgamations, government land acquisitions and the increasing trend toward farm purchase have all combined to significantly reduce the number of leaseholders in the Upper Gascoyne region. Declining profit from wool production and changes in the type of animals being produced have increased conflict and affected the social fabric of the community in the Mt Magnet region. The recent dry seasons have exacerbated these situations. The impacts of government and industry policy have greatly reduced the population and services of the township of Mt Magnet in recent years. At the same time, the purchase of stations by Aboriginals and the growing Aboriginal populations in the Upper Gascoyne region are changing the socio-cultural balance and inter-cultural dynamics.

The size, location and environment of the two regions are also resulting in very different changes occurring within each region. These include the production of different animals, different potential for diversification, differences in accessibility and land use. These changes are producing very different outcomes for the people and their communities. As industry analysts suggest, the loss of people may be the greatest threat to these traditional rangeland communities. The social lives of both individuals and their communities have therefore been greatly affected by changing

practices and policy and will continue to be affected as global and wider community pressures increase in the future.

Leaseholders in the two regions of study have made significant changes to animal production systems in response to complex factors driving change in pastoralism and grazing in recent years. In the Upper Gascoyne, the change in animals has been to a cattle breed better suited to the environmental conditions than traditional European cattle. This change has resulted in extensive changes in infrastructure and raised new hope to leaseholders for viable production systems in the future. But, recent drought conditions and the necessity to sell off cattle early will affect incomes in the short term and the cost of replacing cattle may be too big a hurdle for some. This may result in further amalgamation or sale of stations in the region.

Amalgamation of stations and the sale of property to CALM and the ILC have been a key factor in change in this region and have assisted some leaseholders to improve their production. The growing tendency to purchase farms to complement these properties will continue to aid those who can afford to do this but will add to the social fragmentation of the region. However, the future viability of these production systems is by no means a surety. Since the interview process, at least one leaseholder in the region has sold due to the difficulties of producing viable income. Increasing wild dog populations have also driven change and require continued eradication work by government and leaseholders in this region.

In the Mt Magnet region, wool production remains dominant due to environmental conditions and the smaller size of leases in this region. Few amalgamations of stations or land acquisitions have occurred in this region and the battle for survival appears to be producing a greater attitude of pessimism and conflict than in the Upper Gascoyne. Drought conditions and declining wool prices have drastically

reduced wool production with only a small number of wool producers remaining viable. Increasingly leaseholders now produce animals for meat. Their inability to change to cattle production is encouraging them to become more innovative. Traditional attitudes toward feral goats as a pest are forcibly changing and many leaseholders are managing or were contemplating management of goats or Damara sheep. Good prices and potential for increased trade are driving a change in attitudes toward production of these animals.

Alternatively, the fear of wool contamination of neighbouring Merino sheep, along with insecure markets, remains a deterrent for change to Damara sheep for some. Others retain an absolute conviction in the tradition of wool production and appear unlikely to change in the foreseeable future. However, the many forces driving change will place increasing pressures for change on many wool producers in the future.

The characteristics and marketability of the fat-tailed Damara sheep make it an ideal animal for production in the Southern Rangelands. Their evolution in arid regions has provided them with distinct physiological benefits over those of the Merino sheep. However, these same traits create substantial risks to the environment. Their survivability potentially increases pressure on natural resources during dry periods and the limited research data available adds to the uncertainty. They have large overseas market potential, providing opportunity for worthwhile prices in the future. However, many of these markets are in politically unstable countries and rely on controversial live trade. This greatly increases the risk for those involved. The problems of wool contamination have created loss of income for wool producers and conflict within the Mt Magnet community. The wool industry's reaction has been to place responsibility on wool producers. However, more leaseholders are likely to

change in the future, placing continued pressure on wool producers and increasing conflict in the region. Improvement in technology is urgently needed to assist this problem.

Feral goats also have similar breeding and feeding advantages over Merino sheep. However, their low price and status as a pest has restricted uptake of their production in the past. Growing feral populations have greatly added to grazing pressure, increasing land degradation in the region. Leaseholders suggest this has intensified the impacts of the current dry seasonal conditions. Declining wool prices, combined with increasing goat prices and the installation of trapyards, have now encouraged leaseholders to harvest feral goats more regularly. This has had important benefits for leaseholders by providing essential income during the dry seasonal conditions. It has also benefited the environment by improving control of feral goat populations in the region and reducing grazing pressure on natural resources. These changes are also encouraging more leaseholders to change from sheep to goat production.

One leaseholder is leading the way in developing goat production relying on watering points instead of fencing to control impacts on the environment. However, this is controversial and most leaseholders and ecologists remain greatly concerned about the detrimental impacts of goats on the natural resource. Alternatively, Boer goat production within fencing systems has the advantage of better prices and greater overseas demand than feral goats, and under current understanding, appears to be sustainable. Nevertheless, it seems likely that growing market demands for goat meat will drive an increase in feral goat 'management' in the future. Further research on the impacts of both Damara sheep and feral goat management is therefore required. Improved enforcement of regulations to control detrimental social, economic and environmental impacts and greater accountability by those involved is also essential

for sustainability. Whatever occurs, feral goat production will surely continue to play a dominant role in future arguments surrounding sustainability of grazing systems in these rangelands.

The growing change in demand in overseas markets from wool to meat, based on the live export trade, has greatly influenced these changes. The primary driver of change has therefore been the pastoralist's own business decisions. However, different environmental conditions have also influenced different changes in animals between the regions. Extensive infrastructure development, much of it based on government funding, has enabled leaseholders to improve management of their animals to cope with these changing demands. These changes have greatly improved short-term income for many leaseholders; however, it has also created significant levels of risk for long-term industry growth and stability. The types of animal now being produced in these regions survive better in rangeland environments than previous breeds, but they also raise questions about the sustainability of the natural resource in these regions. The change to cattle production and the decrease in production capacity of the land have resulted in the need to increase the size of stations. The large number of station amalgamations in the Upper Gascoyne has had, and will continue to have, considerable benefits and disadvantages to the social, economic and environmental sustainability in this region. Reports suggest the Mt Magnet region will also need to restructure leases to maintain profitability in the future.

These changes will continue to create significant differences in the way these two regions develop. The variation in geomorphology, climate and vegetation, combined with the different animals being produced in the two regions will continue to affect the different erosion that occurs because of grazing animals. The different wider community pressures for land use will also create varied impacts between each

region. These chapters have explained the second general aim of the thesis to investigate what leaseholders are doing to adjust to the situation and the challenges they face in this process of change.

The focus of the lease on grazing, leaseholder values and lack of expertise create major barriers for the development of non-pastoral enterprises. Leaseholders considered low or variable profitability, environmental conditions and the remoteness from major centres were also important obstacles to diversification. Although some leaseholders have established small businesses such as tourism, that complement the main grazing income, leaseholders and industry analysts alike agree there are limited options for diversification. Combined with these difficulties leaseholders now have decreasing time, money and energy to develop a viable enterprise. Therefore, some leaseholders are now focusing on aligning their production systems more with changing market demands or attempting to develop niche markets for their product. Both these strategies appear to have involved considerable time and work with limited advantages to date. In the long term, however, these strategies may prove to be essential.

Nevertheless, the process of developing niche markets did provide some important benefits to the community. The groups developed strong community bonds and a common sense of future at a difficult period in the industry, and provided a useful arena for open discussion and learning. However, further research and policy development to assist non-pastoral activities is urgently needed for these regions. From this information we see there are significant barriers and currently limited options for diversification for leaseholders. Market and management strategies undertaken to cope with changing demands are limited and have not been effective in improving leaseholder's financial viability.

The shift to more integrated, participatory approaches to natural resource management now include strategies which structure education around the needs of the land user, aimed at empowering land users to take more responsibility themselves. These processes have changed established relations of power between pastoralists, government and the wider community making them more dynamic and contextual. The Gascoyne-Murchison Strategy provided government funding, research and advisory services that most leaseholders have taken advantage of and has been an important catalyst for change. However, it also continued the dominance of pastoral and grazing industries in these regions. This reduces the incentive or opportunity to change the dominant value system and develop alternative methods for multiple use of rangeland resources. Many of the processes introduced in this Strategy such as structural adjustment, improvements in ecosystem understanding, practices in land management, and off-reserve conservation need to be continued. The Gascoyne-Murchison Strategy had limited success with voluntary lease adjustment and industry reports suggest further reform is the principle remaining challenge. It was also apparent from leaseholder comments that further lease adjustment was necessary in the Upper Gascoyne and Mt Magnet. The more holistic approach of the Gascoyne-Murchison Natural Resource Management Plan (2005) suggests there is now a greater focus on multiple land use and the integration of all stakeholder values in the rangelands.

Two key processes linked to the Gascoyne-Murchison Strategy, the EMU process and land acquisitions for reserve conservation, have also brought about significant change. The EMU process is having considerable success in raising awareness and improving education about ecological systems, due in part to the four important factors that underpin the process. Participation by leaseholders has greatly improved

awareness of ecosystems, resulting in important management, on-ground work and monitoring changes. For a variety of reasons this process has had greater participation in Mt Magnet than the Upper Gascoyne and provides important potential for future changes in the region. The Gascoyne Muster (2002-3) was also designed to improve multiple land use. This Muster provided a worthwhile platform to begin airing different stakeholder views and appeared to present a fair and useful outcome for future policy. These strategies designed to improve sustainable land use and integrate multiple uses of the land suggest government is attempting to deal more effectively with issues affecting all stakeholders in these regions.

The change to allow leaseholders to sell part or all of their land for conservation reserves has placed some land with important areas of biodiversity under protection. However, there is a need for ongoing commitment by both leaseholders and the government to increase these important areas of conservation reserve. Leaseholders' concern about the purchase of land by CALM ranged from resentment over loss of what they considered was productive land for pastoralism and grazing, to concern about the impacts of management of CALM land. Their comments also demonstrated some of the practical difficulties faced by leaseholders, due to the change in land status, that are often not recognised by the wider community. However, the most common response to land acquisitions was their deep concern over the security of their property, confirming the difficulties leaseholders are having with the changing value systems in the rangelands.

Their attitudes toward recent CALM acquisitions expose the conflicting views that now exist about the use of land for production versus emerging views on protection and consumption. Their comments revealed a conflicting mix of production, protection and consumption values that challenges the trilogy of these values. Yet

there were few leaseholders who acknowledged that much of the land purchased for reserves was marginal for grazing. Instead they identify CALM or the ILC as the problem. These limitations on production are now helping to drive changes which are sometimes interpreted by leaseholders as a desire by government to remove them from these regions. There is therefore a need for them to differentiate between the government and wider community pressures for responsible stewardship, versus being pushed off the land altogether.

Nevertheless, CALM reserves have increased the pressures on remaining pastoral resources in the short term as well as leaseholder's workload. Current land acquisitions by CALM and the ILC have also fragmented the community and increased the social isolation for European leaseholders. The employment of pastoral lessees and Indigenous people as resident managers of conservation reserves has occurred in a few instances and opportunities to increase this practice should be investigated. However, the wide variance in values of rangeland interest groups will continue to make it difficult to work out consensus for multiple land use so that effective policy and management strategies can be developed and implemented.

It is also essential that conservation for biodiversity is encouraged on privately managed land. Leaseholders are legally required under current lease conditions to maintain these areas of land. However, perceptions about 'private benefit versus public good' limit this practice. It is a sad reflection on society as a whole that it has come to a situation where, in these regions, pockets of land need to be bought by public money and locked away to maintain biodiversity or prevent further land degradation. Further policy development is therefore needed to encourage off-reserve conservation. Sustainable land use policy needs to include better strategies for

recognising leaseholder conservation as well as incentives to assist with conservation work.

This thesis has outlined a variety of government strategies developed to facilitate change in the rangelands today and these strategies have had a mixture of beneficial and detrimental impacts on European leaseholders and the land. They have provided funding for leaseholders to change to more financially viable production systems, improved overall awareness of ecosystems and improved infrastructure and management practices, providing potential for better management of biodiversity and grazing animals. They have also begun to address the ongoing issues of structural adjustment and multiple land use. On the other hand, they have increased leaseholders' fear and concern about growing community demands for multiple rangeland use. However, most family-owned pastoral and grazing properties today have become financially unviable and a cost to society and it appears inevitable that further adjustment will occur.

The industry remains today because pastoralists and graziers are an important cultural heritage, institutional processes are established to support them and leaseholders themselves want to live and work there. Their strong appreciation of intrinsic and social values provides some compensation for their difficult economic and social position. Their declining numbers and remoteness make it difficult for leaseholders to develop complex social institutions necessary to defend their interests as a group. However, recent surveys of urban perceptions suggest most urban people like the idea of using the natural resource for production, as long as it is sustainable. Leaseholders' concerns about wider community pressures therefore show a need for the adoption of more sustainable land use practices, greater accountability of their land use and better communication between urban and rural communities.

Increasing demands from global, national and local sources will continue to impose growing pressures that threaten this unique way of life. Future increases in the price of oil and changing global climates will significantly increase these impacts on the industry. However, their strong identification as a distinct group with distinct values and needs, suggests that leaseholders are unlikely to change because other groups with different experiences and world views think they should. Their strong culture will continue to influence their vision of what they value and see as 'reality' and will continue to conflict with many other rangeland stakeholder and urban community views. As Holmes (1994a) suggests, value-based conflicts are often the most difficult to resolve and finding equitable solutions will be a significant challenge for the future. Their close identity with their strong value system enabling them to survive in the past, may be less effective in meeting pressures from the emerging values of the wider community today.

The land will remain as public land and changing public perceptions will continue to question the use of the land. Government policy and strategies will need to reflect these changing public values. Nevertheless, whatever way the land is used, barriers to sustainability exists. This thesis has discussed the many ways that traditional pastoralism and grazing affects the land and creates barriers to sustainability. Conservation reserves currently managed by CALM also have sustainability issues with feral and native animals and vegetation management. The cost to the community of managing these areas of land is also becoming difficult. The benign management of many areas of Indigenous owned land also has animal and natural resource issues and poor governance creates conflict within families and communities. The degraded condition of much of this land and infrastructure creates

major difficulties for income production. Some of these leases also support large communities and need to be dealt with differently from commercial leases.

Mining produces important wealth for the nation but has created severe local impacts across the rangeland environment. In recent decades the reduction in mining company support for local communities has resulted in devastating impacts on local communities. Increasing numbers of tourists and 4WD enthusiasts create pressures on infrastructure and local scenic environments as well as the grazing enterprises in these regions. The wealth from tourist enterprises also goes mostly to urban regions, leaving few benefits for local community improvements. The complexity and variability of the environment, political arrangements and social situation presents major barriers for effective management strategies. Greater emphasis on holistic policy designed to coordinate and integrate sustainable multiple use strategies is required. Whatever approach we take, there is an urgent need for a paradigm shift in attitudes towards land use in these regions that promotes better ways of developing sustainable land use, a greater equity in sharing resources and improvement in understanding and acceptance of the differing values of protection, consumption and production. Sustainable land use will involve the constructive integration of these values in practice, rather than their separation.

## **APPENDIX 1.**

### **Leaseholder Interview Conducted in the Upper Gascoyne and Mt Magnet Regions.**

#### **1. Affinity with Land and Way of Life**

What are the things you enjoy most about being a pastoralist/grazier?

What are the things you enjoy least about being a pastoralist/grazier?

#### **2. Changes that have Affected Leaseholders in the Past Decade**

During the last decade, what major changes have happened that have affected your lifestyle?

What has affected your ability to produce cattle/sheep/goats?

#### **3. What Changes in Production Systems have occurred in Last 5 Years and Why?**

What ideas did you think about for improving or changing your existing production system in the last 5 years?

Did this change include a change in the type of animal you produced in the last 5 years?

What were your major reasons for changing your animal production?

How have you changed your management system in the past decade?

How did you feel about the number of options available to you for diversification?

Many leaseholders have stated that the low wool and meat prices of the last decade made it more difficult financially, to make changes to their production systems? Was this true for you?

How has the condition of the land affected your decisions about production?

#### **4. Opinions about current social, economic and environmental impacts of these changes**

In what ways are the current changes in production systems that have been made making a difference to you or other leaseholders to produce and income?

How do you see these changes making a difference to the way that people in your area relate to each other, or the ability of people in your community to work together to get things done?

Do you think the changes in animal production are making any positive or negative differences to the vegetation or land problems in your area?

#### **5. Attitudes toward sustainability of their current production systems**

In what ways do you think the current changes that are happening in your area could make a difference to you in the future; in 10, 20 or 50 years?

What changes do you think might happen or might need to happen for you to remain in production?

What changes do you think might happen or might need to happen for you to remain in production?

How long do you think people in the rangelands will be able to continue to make a living from sheep/cattle/goats? 20, 50 years or is there no limit?

Some people say that goats and Damara are not as destructive to the vegetation and land as sheep and cattle. Do you agree with this?

## **6. Aboriginal Issues**

How do you feel about the rights of Aboriginals who have a traditional and/or historical association with certain areas of land on pastoral leases to have access to that land?

Do you foresee any problems with Aboriginal access and your ability to run an effective and profitable pastoral enterprise?

How do you see the role of indigenous people in station management in the rangelands?

How do you see the role of indigenous people in natural resource management in the rangelands?

## **7. Attitudes Toward Role and Responsibility of Sectors of Society in Rangelands**

What role do you think leaseholders should play in the rangelands?

What role do you think staff in government agencies should play in the rangelands?

What role do you think private companies should play in the rangelands?

What role do you think your local community group, i.e. PGA, LCDC, should play in the rangelands?

What role do you think the general public of Western Australia should play in the rangelands?

## **8. Benefits and disadvantages of live animal trade?**

Do you sell some of your animals as live exports?

What changes have you made to your production system in the last 5-10 years because of the live animal trade?

What do you see are the advantages and disadvantages of live trade for you?

If prices of live animals dropped significantly like wool prices did in the 1990's, or if we continue to have problems with markets because of diseases and animal welfare issues, in what ways do you think this will affect you?

### **9. Attitudes Toward Availability and Quality of Information and Assistance**

Where do you get most of your information from about your animal production?

Where do you get most of your information about managing your land?

What is your opinion about the quality and availability of this information?

What is your opinion about the assistance and availability of Government Agency staff?

What is your opinion about the assistance and availability of Fielddays or workshops?

What government projects or schemes have you heard of that are currently available to help leaseholders with their land management and production systems?

What involvement or assistance have you had with any of these and in what ways was it helpful?

What is your opinion about the suitability and availability of Government incentive schemes to help pastoralists and graziers to diversify?

What is your attitude about the need for improvements in seasonal climate forecasting to assist producers?

**10. Attitudes Toward Marketing Issues.**

What is your opinion about joining or being part of a local marketing group or organization, eg; the Fibre and Produce Group or the Rangeland Meat Co-operative?

**11. Attitude Toward New Technology**

Since you have been in pastoralism, what new technology has had the biggest impact on the operation of your grazing system?

In what ways has the use of trapyards been of benefit to you?

**12. Issues of Greatest Concern to Leaseholders.**

What are the 3 major things that concern you most as a leaseholder and why?

**13. Perceptions of Isolation and Remoteness**

In what ways do you believe your isolation and remoteness is an advantage or disadvantage to you and your animal production?

How do you feel about your ability to supply and access products and services by road, telephone and internet, to or from other areas?

How does your use of the internet affect the way you produce animals and your lifestyle?

**14. Impacts of changes in land tenures.**

In what ways do you believe the security of your lease tenure affects the way you are able to use your land to produce animals or your future plans for yourself and your family?

How do you feel about the Government land acquisitions for conservation purposes in your area and how they are being managed?

### **15. Public Access Issues**

In what ways does public access of tourists affect you?

### **16. Attitude Toward Urban Attitudes About Rangelands.**

What do you see as two of the main reasons we need pastoralists and graziers in the rangelands?

I see one of the issues raised by some pastoralists is that they would like the public to recognize the value of the contribution of pastoralists and graziers as caretakers of the inland areas. Do you agree with this?

How do you think the public should be made more aware of this?

### **17. Family involvement in land management**

Who makes the decisions about land management on your lease?

Do you feel there is enough incentive for your children to take over your lease?

### **18. Contentment with way of life**

If you had no financial or family restrictions on where you lived and what you did for a living, what would your ultimate wish be?

#### *Demographics*

- Type of Animal they produce
- Age - Male / Female
- Married/Single
- Education Level of Leaseholder and Spouse
- Dependent children
- Number of people that lease supports

- Family support on land
- Employment of Non Family Labour (>20hrs permanent/casual labour yr)
- Involved in Outside Employment
- Changes in People Living on Station in last 5 years
- Length of time leased this station
- Length of time leased previous station(s)
- Are you involved with any local Landcare or natural resource management group or a local group that promotes your product
- How many field Days have you attended in the last 2 years
- Are you involved in local community groups or organization? – (Sports, crafts, council)

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