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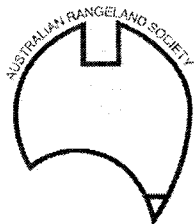
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PASTORALISM IN TROPICAL RANGELANDS: SEIZING THE OPPORTUNITY TO CHANGE

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HISTORICAL CONTEXT

The pastoral industry in northern Australia has historically been characterised by low input, low output enterprises subject to a harsh and variable climate, uncertain markets and variable prices. Because it has been a relatively low cost industry that has been able to ride out the bad times, pastoralism has been able to persist and as such has brought stability in land use and management to northern Australia. In a paper which is highlighting change as a means to a sustainable future for the pastoral industry in northern Australia it is ironic that it is stability rather than change that has ensured its survival until present.

Early in its development the pastoral industry was not in a position to improve productivity and the most noticeable changes that were being driven were in landscape condition;

“The report of the Pastoral Leases Committee referred to the Kimberley stations [owned by Vestey’s Ltd] as being as bare as bitumen. That is a positive fact because when one lands at the airstrip at Turner River station the land is absolutely bare as far as the eye can see. The Government has spent [£250,000] on rebuilding the land and planting buffel grass on hundreds of thousands of acres which have been despoiled by those lessees. They have been given the use of the land with the permission of the Department of Agriculture, and this Bill proposes to extend their tenure over the land without the need for them to spend one penny on improvements.”

The Hon. H.C. Strickland, W.A. Parliament, Western Australian Hansard, 29 October 1963.

This situation continued from the time of first settlement until the middle of last century. By then the potential to significantly develop the industry and bring about economic change at regional scales was being envisaged. Many large corporations and pastoral companies tried large-scale infrastructure and pasture developments in the north but many of these development attempts failed. In hindsight, these well-intentioned efforts at revolutionising the northern pastoral industry had little chance of success because the production technologies, the management skills and a good understanding of natural resource management were all lacking.

Ironically, much of the positive change within the northern pastoral industry that did eventuate was brought about by external forces rather than being internally driven. For example, the government decision to eradicate brucellosis and tuberculosis required much better handling and control of livestock which required significant infrastructure development in the form of fences and water points. These infrastructure developments led to much better herd management and the significant number of slaughterings associated with the BTEC campaign allowed a more rapid transition to better adapted and more productive *Bos indicus* cattle breeds. Another significant development was improved road infrastructure across the north which greatly improved access to markets. Today’s new revolution is in communications (see below).

Through the 1970s, 1980s and 1990s there was a rapid increase in herd management technologies such as early weaning, supplementation, improved genetics and controlled mating. Principles for better managing and sustaining the resource base were also evolving. So why hasn’t the pastoral industry been able to capture the full potential of these developments in production and grazing management to drive significant change? Part of the reason is that changes like improved pastures involve significant capital outlay and

risk of failure which, in a variable climate, have often combined to make such developments unattractive to smaller operators (Foran et al. 1990). Some of this risk will never go away, but we suggest that there were three other key factors that explained the modest rate of change until the mid-1990s:

1. Limited management skills, capacity and vision to bring about change – the region has been disadvantaged in education opportunities because of its relative isolation from the rest of the country.
2. Many of the new technologies and management guidelines have not been put forward in a whole of enterprise context that integrates economic, ecological and social factors e.g. technologies to improve productivity can lead to resource degradation if not put in a sustainable grazing management context.
3. From the early 1970s through to the late 1990s there has not been a sustained period when cattle prices have been high, seasons have been favourable and efficiency of production has been high. This is illustrated in Figure 1, which shows these three variables together. Good seasons in the mid-1970s were accompanied by poor prices and for much of the 1980s and the first half of the 1990s, seasons were relatively poor, particularly in northern Queensland.

The time is right for a change! Since the mid-1990s the seasons have generally been very good, prices have increased to reasonable levels and efficiency of production is at an all time high. These three factors combined have provided a period (Figure 2) of good cash flows. This, together with a more holistic approach to management now pervading the industry, improvements in management capacity and skills, and better communications, has provided a window of opportunity for the industry to bring about significant change and drive its destiny to a greater extent.

OPPORTUNITIES TO DRIVE CHANGE

1. Precision pastoralism – a systems approach to improving productivity, profitability and natural resource management

In response to improving productivity and efficiency, helped by the recent good seasonal and market conditions outlined above, the pastoral industry is undergoing a quiet revolution of intensification (more targeted grazing systems, infrastructure development, improved weed management, better supplementation strategies, improved market opportunities etc). This intensification has the potential to improve long-term viability of beef enterprises but it also needs to be balanced with natural resource management so that ecological sustainability is achieved. To reach this balance the industry is seeking to be more sophisticated and precise in its management. This will require a more integrated systems approach to production and resource management than currently exists so that beef enterprises:

- (i) can better examine the trade-offs between intensification, productivity increases, farm economics and the implications for natural resource management
- (ii) have access to a range of tools and explicit guidelines at spatial and temporal scales relevant to management.

We talk of precision pastoralism as shorthand for a set of activities which together provide pastoralists with a better ability to do the right thing in the right place and at the right time. Precision pastoralism is about bringing management ideas and supporting technologies together into a management toolkit that managers can dip into for new ideas.

Among other activities, some of the management approaches and tools available to capitalise on this opportunity for change include:

- Knowing the value of the different pasture resources
- Understanding stock distributions and grazing patterns

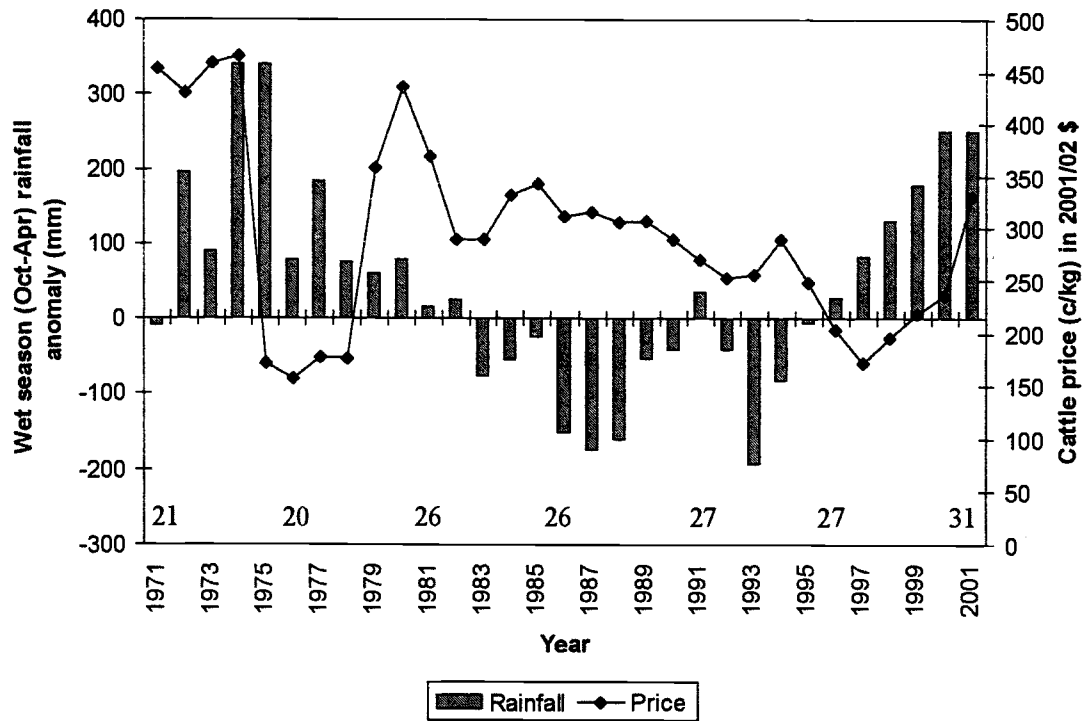


Figure 1. Time series of rainfall (expressed as the difference from long-term average wet season rainfall), cattle price, and cattle turnoff percentage for Qld (numbers shown at bottom of graph for 1971, 1976, 1981, 1986, 1991, 1996 and 2001).

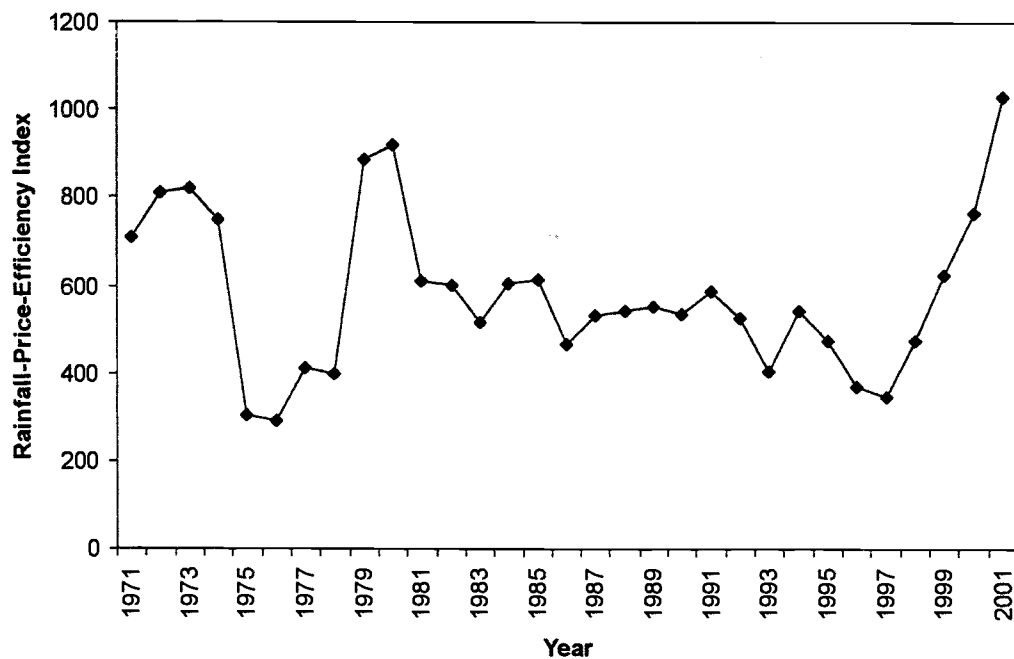


Figure 2. Combined index of wet season rainfall, price and efficiency of production (cattle turnoff percentage). Index was calculated by multiplying wet season rainfall (mm), price (c/kg in 2001/02 \$) and turnoff (%) and dividing the product by 10,000.

- Adjusting stocking rates to the available pasture, monthly and yearly
- Being predictive about budgeting (both production and financial), using seasonal climate forecasts
- Managing long-term pasture condition
- Managing for environmental impacts

Examples of opportunities are:

(a) Finding the best use for different areas of land

Productivity within a rangeland enterprise in northern Australia is often highly variable with some parts of the landscape having inherently high productivity while other areas that may have low fertility soils or are poorly watered have low productivity. The gross margin on these low productivity areas or paddocks is often negative. It may be better to retire these areas/paddocks from production or use them at discrete times to allow increased management inputs and effort in the more productive parts of the enterprise. Areas that are retired or rested could become conservation reserves, which could contribute to regional biodiversity goals and provide other benefits to the grazing enterprise. Biodiversity management could be rewarded in the market place (Pringle and Tinley 2001), or these areas could be used in severe droughts as a fodder reserve.

(b) Sustainable utilisation rates, carrying capacity and grazing systems

Animal numbers are a key driver of productivity, profitability and land condition. Knowing the ecological threshold utilisation rates of different pasture communities is important for determining carrying capacity. The technical basis for doing this is available (Novelly and Baird 2001, Quirk et al. 2002) but is only now being implemented in practice.

Grazing strategies and systems have been receiving considerable attention over the last decade as a means of sustainably managing the pasture resource and increasing livestock productivity. Research results indicate that some form of rotational grazing that includes wet season spelling benefits the pasture, allows a modest increase in carrying capacity and is economically sound (Ash et al. 2001). An alternative approach is to vary stocking rates on an annual basis according to the available forage. This grazing strategy responds to seasonal conditions better than continuous grazing but it requires considerable management acumen to apply on a property basis because of implications for herd dynamics and marketing of cattle (Stafford Smith et al. 2000). A more proactive approach to coping with climate variability is to use seasonal climate forecasts. Where seasonal climate forecasts are reasonably accurate, north-east Queensland, simulation modelling suggests profitability can be increased but not at the expense of resource condition carrying capacity and is economically sound (Ash et al. 2000). As seasonal climate forecasts improve in accuracy there is potential to increasingly apply them across northern Australian rangelands.

2. Environmental management systems

The pastoral industry in northern Australia has traditionally been a price-taker rather than a price-setter. There is an opportunity to reverse this trend with overseas markets if the northern industry can that demonstrate responsible land stewardship is a core part of their production system. The rangelands have an advantage over more intensive agriculture in that production is based on relatively intact ecosystems and use of chemicals is relatively limited. Consequently, rangeland enterprises should be viewing environmental management systems as not just a means of improving environmental sustainability of their enterprise or as a compliance mechanism that further constrains their business but, rather, as a marketing tool to give them an advantage over competitors (Stafford Smith and Foran 1993).

The ISO14001 standard is one environmental management system component by which performance improvements can be assessed and certified through third party validation. This validation may be important in gaining market access but the greatest potential benefit of an environmental management system may not be in certification but rather the insights gained through regular review, monitoring and adaptive management of the production-environment system. This is also likely to gain wider community confidence that environmental issues are being taken seriously.

3. Technology and Communications

Over the last 20 years there has been considerable effort devoted to developing computer decision support systems of agricultural production or farm economics to assist in property planning and management decisions. There were high expectations of commercial applications of these decision support systems to greatly influence farm management but these expectations have not been realised. A limitation 10-15 years ago was computer ownership and it was believed that the development of decision support systems and farm business accounting software would be a catalyst for increased ownership of computers by farmers and pastoralists.

However, this has not occurred and it has been advancements in communication technologies such as email and internet which has led to much greater ownership of computers on properties. Email and the internet have allowed pastoral businesses to operate more efficiently but poor connection speeds have limited the opportunities to make greater use of this technology. However, the availability of satellite connectivity at speeds of 600KB/sec to 1.2MB/sec and which is affordable provides a whole new array of opportunities for pastoral businesses. For example, the opportunities to diversify income through off-farm investments is greatly enhanced, new marketing opportunities for cattle and beef can be developed and satellite monitoring of rangeland condition and wildfires is now possible.

Despite the greater use of computers in the rangelands the application of decision support and expert systems for on-property management decisions remains elusive (Parker 1999). Participatory action research where models are used in discussions between pastoralists and professionals to facilitate exploration of different management scenarios is overcoming some of the earlier limitations of decision support systems (McCown 2001). Given the whole of system approaches (climate, resource management, production, economics people) now considered necessary to achieve sustainability these systems analyses using simulation are very complementary to adaptive management approaches. With much better connection speeds, participatory action research can be used via video-connections thus overcoming many of the distance problems that currently limit such approaches in northern Australian rangelands.

There are a number of other areas in which technology can greatly improve pastoral operations in the remote areas of northern Australia e.g. remote monitoring of bores and troughs, invisible fences, electronic animal identification, etc. In most cases the technology exists but it has not been developed in a cost-effective form that makes it viable on most pastoral enterprises.

4. People, regions and institutions

Big distances, little news and mythologised bush used to mean that pastoral communities were tight-knit but poorly linked to other local interests and broader national and international opportunities. Communications have forced an increased awareness of the outside world's concerns, and regionalisation of funding has overcome the transaction costs of talking to the other stakeholders in regional communities. The distances are still there, but producers are increasingly looking for new markets and new enterprises, and functioning as more effective self-help groups, whether in LandCare, beef marketing cooperatives or tourism networks.

At the same time, the community at large has begun to recognise the institutional constraints on good management (Stafford Smith et al. 2000), whether in tax and tenure instruments, governance arrangements, or public expectations on our land managers. Although there is still a distance to go – for example in changing tenure arrangements to permit sensible on-property diversification – policy-makers are admitting the need for institutional reform. This is often associated with devolution of responsibilities, not always as yet matched with rights and responsibilities.

COPING WITH EXTERNAL DRIVERS

“You can be on the right track, but if you stay in the same place too long, you can still get run over”

Even if pastoralists, regional communities and institutions can drive change in the rangelands towards a sustainable and prosperous future, there are ever present risks that external drivers will “run over” pastoral communities. It is important that pastoralists are aware of these external drivers so they can develop strategies that will maximise benefits and minimise negative impacts. Some of these external drivers include (Foran and Howden 1999):

- *Human population growth* – world population will nearly double in the next fifty years and the demand for products from the rangelands will place pressure on their ecological integrity. Within northern Australian rangelands the population is likely to increase significantly because of the high birth rate in Aboriginal communities. This increase in population will provide both opportunities and challenges.
- *Globalised trade and product prices* – there is likely to be a continued downward pressure on prices for agricultural and mineral commodities but the potential to access niche markets with clean, green products may buffer this trend for pastoralists in northern Australia.
- *Energy futures and greenhouse gas emissions* – a predicted decline in readily available and inexpensive fossil fuels over the next 20 years could have a significant impact on the rangelands in terms of pastoral management and transport of cattle. However, the rangelands in northern Australia should be able to make increased use of renewable energy sources (solar, wind, biofuels) to offset these impacts. Livestock enterprises are relatively large emitters of greenhouse gases because of methane emissions from livestock. Whether Australia ratifies the Kyoto Protocol or not, the likely emergence of carbon trading could negatively affect rangelands. There is potential to offset some of these emissions through improved vegetation management (Ash et al. 1996, Henry et al. 2002).
- *Climate and atmospheric change* – Increases in atmospheric carbon dioxide levels and associated climate change will affect the northern rangelands. In terms of predicted rainfall changes, northern Australia fares much better than southern Australia with little change or a slight increase in rainfall predicted over the next 30-70 years (CSIRO 2001). Warming of between 2 and 6°C by 2070 will make summers more uncomfortable in the north and will increase heat stress in cattle. Increases in CO₂ will make plants more drought tolerant which may help offset some of the effects of highly variable rainfall (Howden et al. 1999).

Rangeland communities are not powerful enough to influence these external drivers. Their best approach is to try to predict how these drivers will affect their lives and begin to adapt early. This, combined with seizing the opportunities outlined in this paper, provides the most likely path to a successful and sustainable future for the pastoral industry in northern Australia.

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