

# Meat Production from Ruminants in Australia's Arid Zone

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Before the advent of the white man to Australia, climate, vegetation and grazing animals were presumably in equilibrium, with minor, relatively short term changes occurring only through the influence of natural phenomena such as drought, flood and fire. European man and his collection of introduced animals were to change this stage of equilibrium more often than not, irreversibly. It is in the vast arid and semiarid region that these effects are now assuming such importance for it is here that approximately half of Australia's land area is still being utilized under a pattern of extensive grazing in which livestock are directly dependent upon rangelands. Virtually the whole of inland Australia, apart from the unoccupied deserts, is grazed by sheep or cattle under an extensive open-range grazing system (Squires 1981.)

It is generally recognised that arid zone plant communities now produce less desirable forage per unit area than previously and fewer animals are supported. With the continuance of present grazing practices this downward trend is more likely than an upward trend. Projections for livestock industries do not suggest an expansion of arid-zone produc-

tion. This may seem anomalous in a world already suffering from widespread malnutrition and indeed facing large-scale starvation in the years to come.

In this article I will try and sketch the dilemma which we face in trying to equate the needs of a protein-hungry world and the need for landscape stability. In short, to attempt to answer the question: how long can the land go on giving?

## The Lessons of History

The history of human occupation of the semiarid and arid lands of the world is largely one of progressive deterioration and loss of productivity. Many of the world's dry areas have deteriorated under the influence of man. With its shorter history of occupation, the Australian arid zone is generally less degraded than similar lands overseas. But they are nonetheless degraded. Deterioration is worst in the areas with the longest history of stocking; viz. western New South Wales, north-eastern South Australia and the Gasgoyne Basin in Western Australia. Long-term trends in carrying capacity in some arid regions of Australia show livestock numbers rising rapidly and then crashing to establish a new equilibrium. The optimist can argue that in these areas a new ecological balance is being developed, admittedly with a

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*The exploitation of much of the inland of Australia has been dependent on man-made waters.*

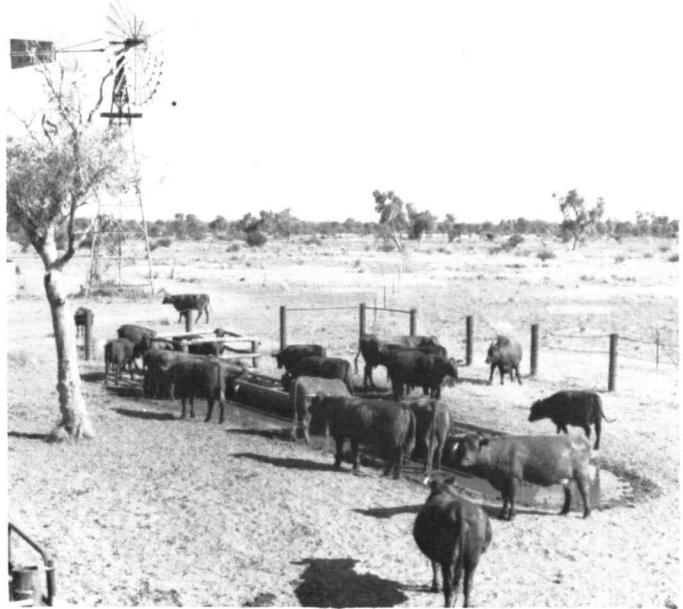
smaller plant biomass and at a lower level of productivity than in the pre-European period. But one might ask "when will they ever learn?" The grim experiences of repeated droughts should have taught even the most incurable optimist the need for restraint in stocking rates, which should be adjusted to the feed supply available in droughts rather than in good years. Yet overgrazing still occurs.

Of great importance to Australia's future are the answers to the following questions: In the semiarid rangelands is the grazing system self destructive? Are the pressures exerted during drought periods leading inevitably to desertification? Is it already too late to halt or reverse the decline, as the recuperative capacity of the ecosystems has already been severely impaired? In short, must grazing inevitably create a desert?

Desertification proceeds at two levels, starting with a change in the vegetation from long-lived perennial species, acceptable to the domestic livestock, to short-lived annual species or undesirable (inedible) perennials. Soil losses, exposure of the subsoil and soil redistribution through gully-ing and mounding may accompany or follow the vegetation changes. Not only is the overall carrying capacity reduced, but there is a greater oscillation in stock numbers between years of abundant rain and drought years. The soil losses associated with heavy use tend to push the rangeland in a xeric direction, because water runs off the exposed subsoil instead of being absorbed in the top soil and transmitted to the underlying subsoil. Subsoil also offers a poorer nutrient base than does top soil. If a stable pastoral industry is to be maintained the process must be arrested and reversed. What we want to know is whether a new ecological balance can be established which will enable an economically viable livestock industry to persist indefinitely. If the answer is no, then perhaps we should withdraw these lands from pastoral occupation and concentrate on more suitable areas of the continent. Perhaps the answer will be conditional—a viable industry is possible provided institutional changes are initiated such as enlargement of holdings or redistribution of land. Still another very real possibility that must be faced is that arid rangelands can only be used for pastoral purposes as a slow mining proposition. In other words range deterioration might be inevitable if the land is to be used at all. Given the private and social capital already invested in the arid zone such a policy could be politically attractive despite its long-term implications. This serves to illustrate the fact that in social issues of this kind, it is rare that there is a single clear cut goal. Clearly though there is need for research into ways and means of achieving landscape stability. There is a challenge for research to develop management standards which maximise for long-term ecosystem stability rather than short-term animal production.

#### What is the Potential for Animal Production?

Although occupying a vast area and having considerable numbers of livestock, the arid zone supports less than one quarter of Australia's sheep and cattle. The grazing lands carry about 30 million sheep and 6 million cattle but these numbers are reasonably static and are declining in importance relative to livestock numbers in the more humid areas (Wilson 1978). The prospects for the future expansion of the livestock industries in Australia was the subject of a symposium sponsored by the Australian Society of Animal Production, and it is clear that most potential exists in the tropical (non-arid) northern regions. It was concluded that there was



Shorthorn cattle (*Durhams*) are the most common breed in central and northern inland Australia. Herefords and Zebu cattle are also common.

no prospect for greatly increased animal production from the arid zone. The limiting factors are economic. The cost /price squeeze is, if anything, going to favour the more humid areas, especially as higher fuel prices make transport expensive. The arid zone has in the past had a considerable comparative advantage and the extensive nature of the operation made for a high efficiency per man and per dollar invested. Some of this advantage may be lost in the future. Intensification of production is not a viable option without greater safeguards to environmental stability. Multiple use of these arid rangelands will assume greater significance in the future with mining, recreation, tourism and aboriginal lands competing for space in the arid interior. Even today the revenue from non-pastoral pursuits is high. About 37% of the total value of mine production in Australia is derived from the arid zone. In 1976 the arid zone carried 20% of Australia's sheep and 22% of its cattle. In the same year it produced 82% of Australia's copper, 95% of its lead, 93% of the iron ore and 28% of the natural gas. Urban prosperity is now less dependent on rural income and the livestock products of arid Australia than ever before. What is critical to the future of arid zone land management at this time is that rangeland livestock industries are in a severe and enforced adjustment period at a time when rural and urban economies are obviously uncoupled.

#### What Is the Future?

Australia's arid zone is an export economy. The principal rural products are beef and wool. Australia is a major exporter of beef and veal, usually second only to Argentina, with 40% of her total production sold overseas. Australia is also the world's major producer of apparel wool.

Despite a widespread optimistic view that markets will always exist for farm products the current market situation is far from favourable. The extreme fluctuations in prices received and severe cost pressures are creating a difficult and uncertain situation for ranchers. The sudden closure of markets overseas for beef is but one example. The prospects for domestic markets to take up the slack are poor. It would require a human population of 25 million to consume all the



*Large, aged bullocks are the favoured end-product in the more extensive production systems, where ranch size may exceed 2 million acres. They are perhaps the hardiest of all cattle for they have achieved full growth in stature and they come under no strain of reproduction or lactation. They are safest in drought because generally they will outlast other classes of livestock.*

beef currently produced at the present consumption rate of 110 grams per person per day. There is a likelihood that consumption will decline as it has done over the past 30 years. The daily per capita beef consumption in Australia decreased steadily from 178 g in 1939 to 153 g in 1962, and to 110 g in 1971 (Alexander and Carrail 1973). The decline was partly compensated for by an increase in other red meat products but overall red meat consumption fell from 304 g to 285 grams per day over the past 30 years. Even so Australians rank among the world's biggest meat eaters.

Market prospects in the longer term may be better. Because of the combination of consumer preference, price elasticity and rising income, there is at present a rapidly increasing demand for animal products throughout the world. As such products are favoured by the public, the amount spent for their purchase tends to increase in proportion to the average disposable income, which is now rising in many regions.

Australia's capacity to produce red meat in the light of the anticipated global shortage and food crises can now be briefly examined. It has been estimated that the upper limit for cattle numbers in Australia might in the long run be about 45 million, an increase of 15 million on 1980 population. Sheep numbers are likely to decline from their present level

of 136 million as more sheep properties switch to beef. Agricultural practices requiring large energy inputs may become uneconomic unless viable alternatives to the rapidly depleting stocks of oil are developed. Cultivation, fertilization, pest control and transport all require energy. In this context range-fed animals would be favoured over crop-fed animals or synthetic meats during the next few decades. Australia with her vast arid interior (75% of the total mainland area) has theoretical potential, but the reality is less comforting. Even if this potential was realized, it seems unlikely that protein from domestic animals will contribute significantly to the widespread alleviation of hunger. Red meat can therefore be expected to be consumed more for its contribution to quality of life rather than to sustaining life.

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