

East Kimberley Impact Assessment Project

PASTORAL RESOURCE USE IN THE
KIMBERLEY : A CRITICAL OVERVIEW

M.C.Dillon

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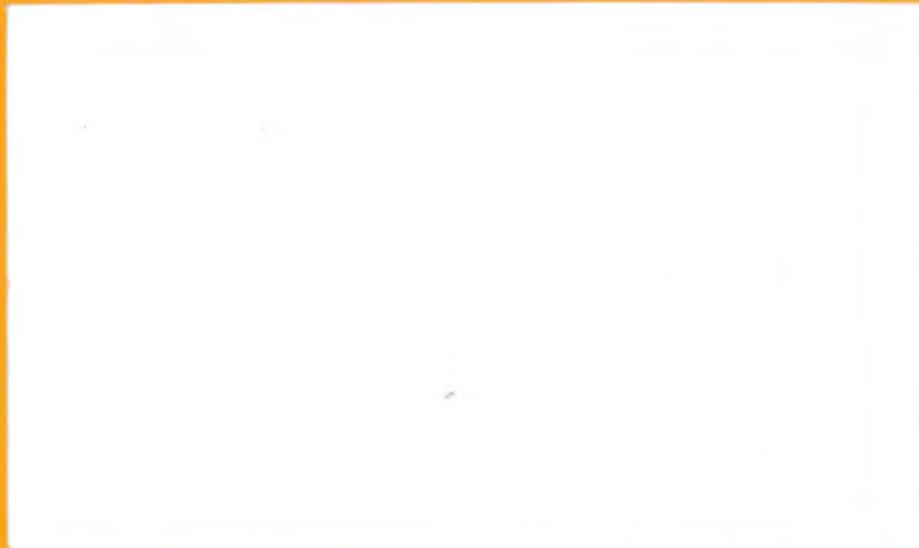
A Joint Project Of The:

Centre for Resource and Environmental Studies
Australian National University

Australian Institute of Aboriginal Studies

Anthropology Department
University of Western Australia

Academy of the Social Sciences in Australia



The aims of the project are as follows:

1. To compile a comprehensive profile of the contemporary social environment of the East Kimberley region utilising both existing information sources and limited fieldwork.
2. Develop and utilise appropriate methodological approaches to social impact assessment within a multi-disciplinary framework.
3. Assess the social impact of major public and private developments of the East Kimberley region's resources (physical, mineral and environmental) on resident Aboriginal communities. Attempt to identify problems/issues which, while possibly dormant at present, are likely to have implications that will affect communities at some stage in the future.
4. Establish a framework to allow the dissemination of research results to Aboriginal communities so as to enable them to develop their own strategies for dealing with social impact issues.
5. To identify in consultation with Governments and regional interests issues and problems which may be susceptible to further research.

Views expressed in the Project's publications are the views of the authors, and are not necessarily shared by the sponsoring organisations.

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PASTORAL RESOURCE IN THE KIMBERLEY : A CRITICAL OVERVIEW

INTRODUCTION

Economic activity in northern Australia has for a century been based almost exclusively on the pastoral industry. This pattern is now under intense pressure from a number of directions. Chief among them are economic problems related to the need for industry reconstruction, disease eradication, rangeland regeneration and improvement of labour force problems which have been described as a 'vicious circle of inexperience, inefficiency, long working hours, low payments and high labour turnover' (Holmes 1985: 23). Consequently, land use in northern Australia is once again on the political agenda, and an essential starting point for any analysis of regional settlement patterns and economic activity in the north.

The Kimberley region, centred on the Fitzroy River basin, the Ord River basin and the North Kimberley plateau is characteristic of much of northern Australia. The region has had its share of unfulfilled hopes, realised potential, and crushing failures. As well, it has always been a testing ground for grand strategies and schemes, a status it maintains to this day.

This paper attempts to outline the broad parameters which determine the scope for rational policy development in relation to the pastoral industry. This requires the identification of the fundamental constraints operating on the industry, and evaluation of the options available both to Government policy makers and the industry.

TABLE 1 : AREA, LOCATION, PASTORAL VALUE AND NOTIONAL CARRYING CAPACITY OF THE KIMBERLEY REGION

Location	Area sq. km	Percentage of survey area	Pastoral value	Carrying capacity ha/large stock unit	Potential carrying capacity large stock unit
North Kimberley	580	0.7	High	10	5,800
	14,700	16.7	Moderate	16	88,200
	50,000	56.6	Low	33	151,500
	23,000	26.1	Very low	125	18,000
	88,280				263,500
West Kimberley	13,700	11.0	High	10	137,000
	11,700	9.4	Moderate	16	70,200
	61,600	49.2	Low	25	246,400
	38,000	30.4	Very low	125	30,400
	125,000				484,000
East Kimberley	6,660	10.3	High	10	66,600
	4,240	6.6	Moderate	16	25,400
	16,780	26.0	Low	33	50,600
	36,870	57.1	Very Low	125	39,500
	64,550				172,100
Total Kimberley	20,940	7.6	High	10	209,400
	30,640	11.0	Moderate	16	183,800
	128,380	46.2	Low	33	448,500
	97,870	35.2	Very low	125	77,900
	277,830				919,600

Source: KPII 1985: 31; Hacker 1982: 12

THE KIMBERLEY PASTORAL INDUSTRY INQUIRY

The recent Kimberley Pastoral Industry Inquiry (KPII) has made a major contribution to knowledge of the industry and its operation. In particular, it has made a large store of aggregated data available, data which is essential to any attempt to understand the situation of the industry. Despite its flaws (discussed below), it is the compulsory starting point for any informed discussion and analysis of the industry.

The history of pastoral activity in the region is well documented elsewhere (Bolton 1954, KPII 1985). Suffice to say there has been since early this century a steady decline in the number of pastoral enterprises, and an increasing concentration of land ownership across the whole Kimberley region.

The region's pastoral resources have been classified by the Western Australian Department of Agriculture into categories of high, moderate, low and very low, equated with carrying capacities of one large stock unit (LSU) to 10, 16, 25/30 and 125 hectares respectively. Table 1, indicates the proportionate distribution of these resources within the region. The Pastoral Inquiry also noted that the variability in carrying capacity across the region was also evident within pastoral leases (KPII 1985: 32).

TABLE 2 : PROPORTION OF RESOURCES BY OWNERSHIP TYPE

Ownership	Absentee owners		Owner-operator %	Aboriginal %	Total %
	W.A. %	Other %			
Land area	18.0	42.1	30.1	9.8	100.0
Lease number	16.2	37.6	50.8	14.2	100.0
Business number	12.7	30.2	52.9	14.2	100.0
Cattle numbers	31.9	30.3	31.4	6.4	100.0
Cattle turn-off	33.9	34.6	26.6	4.9	100.0

Source: KPII 1985: 36.

The Report also presented data related to the involvement of absentee owners, owner operators and Aboriginal communities in the industry. Table 2 summarises that information.

Kelly (1971) argued that the extent of absentee ownership, particularly overseas interests was a crucial determinant of land degradation in the region. The Inquiry found that local owner-operators and station managers argued that smaller land-units under local ownership, and with more secure tenure would have a positive impact in reducing land degradation. However, the data presented on land utilisation by the Report appears to undermine the view that land degradation is primarily a function of land ownership patterns. Table 3 indicates the degree of resource utilisation across the Kimberley by ownership class.

Aggregating the data for Western Australian and other absentee owners gives a resource utilization figure of 58.1%. Aggregation of the owner-operator and Aboriginal community categories gives a resource utilization figure for non-absentee owners of 61.3%. The difference is clearly not significant. It is not even clear that Western Australian based absentee owners, with a resource utilization figure of 82.4%, are primarily responsible for land degradation since it may well be that stocking concentrations and not stocking levels are the crucial determinant. To evaluate this proposition, data on estimated safe carrying capacity by ownership type (see Table 5) would be required, as would a standardized measure for levels of herd control facilities. The Inquiry report does suggest, however, that Western Australian absentee owners have selected properties in the more productive regions (KPII 1985: 42) and that the worst areas of degradation are on the most valuable pastoral lands (KPII: 123). There is certainly scope for further research on this question.

In relation to ownership status and future prospects, the pastoral inquiry survey did make an (admittedly subjective) evaluation of the financial state of the industry. Their conclusions are presented in Table 4 where it is shown that ownership status is of no significance with each ownership category including a spread of varying future prospects.

TABLE 3 : UTILISATION OF THE RESOURCE BASE

Ownership type	Estimated Carrying Capacity Cattle nos.	Actual Cattle nos.	Prop. %	Turn-off %
WA absentee owners	230,281	189,750	82.4	16.2
Other absentee owner	406,473	180,000	44.3	17.4
Owner-operators	278,837	186,540	66.9	12.9
Aboriginal communities	87,870	38,100	43.4	11.7
TOTAL	1,003,461	594,390	59.2	15.3

Source: KPII 1985: 41 and 46.

The Inquiry (KPII 1985: 107-109) proceeded to outline a threefold dilemma facing the pastoral industry:

First, even properties able to achieve a 'viable steady state' are not able to balance their utilisation of short-term economic and longer-term environmental land resources.

Secondly, many pastoral businesses are not currently economically viable because the land unit is too small, or is unproductive, the beef herd is too small, they lack managerial capacity, or they lack adequate financial resources.

Thirdly, 'there is little objective commercial evidence to show that productivity, hence surplus income, will increase from adopting a more sophisticated production system' since increases in capital expenditure and annual operating costs might outweigh increases in gross income. 'The challenge lies in finding more finance and resources for potentially viable properties to gain further cattle control, hence profitability from the existing production system or from a newer more efficient production system' (emphasis added).

The Report goes on to argue that it should be accepted that the owner is responsible for the economic consequences of his financial and management decisions.

What the Inquiry appears to be trying to say, but was not able to articulate, is that a significant proportion of the industry is not 'potentially viable'. Moreover, it is presumably this section of the industry which is least able to focus resources on achieving a longer-term environmental balance. The clear policy prescription arising from this analysis is for government to ensure that non-economic land units are not subsidised or insulated from market forces, and thus are eventually forced out of production.

TABLE 4 : CURRENT STATUS OF KIMBERLEY PASTORAL STATION BUSINESS
(as determined in December 1983)

Ownership type	Little Capacity to survive	Future Prospects Strong Capacity to survive	Potential Prospects to consolidate	Potential to grow	Total
WA absentee owners	2	2	3	1	8
Other absentee owners	5	8	4	2	19
Owner-operators	6	10	7	4	27
Aboriginal communities	-	8	1	-	9
TOTAL	13 21%	28 44%	15 24%	7 11%	63

Source: KPII 1985: 105.

Certainly the Inquiry Report identifies three broad areas as being of inherent low productivity twenty-one leases in the northern Kimberley comprising an area of 4.4 million ha and two smaller areas in the Southern Halls Creek (.69 million ha) and Broome Pindan (.58 million ha) regions (KPII 1985: 199). However it stops short of recommending that

these lands be transferred to alternative land uses, and instead recommends that the Government should 'evaluate the future of these pastoral leases in terms of the interests of the lessees specifically, and the Kimberley region generally'.

In relation to the first identified dilemma facing the industry, namely, the achievement of a balance between environmental and economic considerations, the Inquiry appears to make little headway. The Report produces no clear criteria which might assist an independent observer to assess where such a 'balance' has been achieved. Implicit in the review's approach is an attempt to maintain the dominance of pastoral values in the face of any restructuring exercise. Thus, when the review, in relation to disease and environmental problems, states:

A solution offering equitable arrangements between the Government and the pastoralists is presented. The aim should be to strike a balance between economic viability and environmental stability,

it fails to address the possibility that (a) some pastoral land-units may not be economically viable, and (b) some pastoral land units may not be ecologically and environmentally stable. In either case, the land should be taken out of long-term pastoral production.*

In relation to soil and range degradation, the review's report raises a number of questions and apparent inconsistencies. In the East Kimberley region, the Ord River catchment basin, an area of 4.5 million ha, constituting a prime pastoral resource, has suffered extensive soil erosion and range degradation. This problem has been recognised at least since Maze (1945) described the geography of the region. The major policy initiative on this problem was the resumption of a number of pastoral leases and gazettal of the Ord River Catchment Regeneration Project reserve in 1960, covering an area of approximately 10,000 sq.km (or 1,000,000 ha). The impetus for this decision was not the severity of the

* It is recognised that economic viability and ecological stability are not merely functions of the land unit, but may also depend on management expertise. In the long-term, market forces should ensure that competent management practises are applied to any particular land unit.

problem per se, but the realisation that the estimated sediment load of the Ord and its tributaries of 24 million tonnes per annum would reduce the storage capacity of the Lake Argyle reservoir by one-third over a period of 100 years (DNR 1976: 69)

The regeneration project involved an extensive destocking and reseedling program, and has led to a gradual improvement in range condition in the areas treated. Even so, after twenty years of work, a 1982 Department of Agriculture traverse assessment of range conditions in the regeneration area found that 28 per cent was in good condition, 46 per cent in fair condition and 27 per cent in poor condition (KPII 1985: 121). In other words, it might reasonably be expected that 270,000 ha were still in poor range condition. These figures are broadly comparable to those applicable in the West Kimberley.*

The Inquiry report notes that 'no published report highlights the condition of pastoral leases within the Ord River catchment' (KPII 1985: 122), but does admit that air travel in the region indicates that areas outside the Ord Regeneration Area 'have varying degrees of soil erosion and vegetation degradation'.

Notwithstanding this pessimistic situation, the Inquiry was somewhat equivocal in presenting this data. Instead it gave prominence to a table titled, 'Regeneration areas as a proportion of the Kimberley' which indicated that the land requiring urgent attention totalled only 40,000 ha in the East Kimberley, a mere 0.2 per cent of the total area of the Kimberley (see KPII 1985: 126; Table 2) and somewhat ingeniously concluded that only 130,000 ha of land [across the Kimberley] needs specific attention. (KPII 1985: 132).

Moreover, the review went on to present the following Agriculture Department data (Table 5) relating to estimated safe carrying capacity across the Kimberley.

* West Kimberley range condition:

poor to very poor	- 30%	26,700 sq kms
fair	- 51%	45,400 sq kms
good	- 19%	17,500 sq kms

Source: KPII 1985: 122.

This data indicates that across the whole Kimberley region, estimated carrying capacity is potentially 948,000 large stock units, but in fact is only 616,000 units given the present condition of the pastoral resource. In other words, on average, the maximum productivity of Kimberley rangeland is only 65 per cent of its potential. This is a much more sober indicator of rangeland degeneration than the position outlined elsewhere in the Inquiry report, especially when it is realised that active regeneration work is proceeding only on a very small proportion of the total area of the Kimberley region. A 1982 Departmental report concluded that not only had the most productive postoral lands suffered 'massive degradation', but that it was possible that the economic pressures facing the industry were such that cattle numbers could rise:

to a point where a secondary long-term cycle of pasture degradation could be initiated. If present management practices are maintained, the result would be a permanent contraction in size and profitability of the industry. (Hacker 1982: 51).

The problem of range degradation clearly requires serious attention by policy-makers.

TABLE 5 : CURRENT STOCK NUMBERS (1982) AND ESTIMATED SAFE CARRYING CAPACITY FOR KIMBERLEY SHIRES

Shire	Total stock March 1982	LSU March 1982 (a)	Estimated safe CC (LSU) present condition (b)	Estimated safe CC (LSU) good condition
Wyndham-East Kimberley	135,300	115,000	139,645	217,225
Halls Creek	233,600	198,560	198,641	308,997
West Kimberley	308,400	262,140	233,497	347,662
Broome	70,200	59,670	54,440	84,684
Kimberley Total	747,500	635,375	616,223	948,568

Source: WA Department of Agriculture Technical Report No.6, Division of Resource Management. KPII 1985: 127.

A further issue raised by the data in Table 5 relates to the relationship between resource utilisation and overgrazing. The report fails to address this issue cogently, arguing on the one hand that resource utilisation across the Kimberley is less than ideal (see Table 3 above), with actual cattle numbers of 594,000 representing an average of 59 per cent of estimated carrying capacity, and on the other hand arguing that current stock numbers of 635,000 represent a potential environmental threat given the estimated 'safe' carrying capacity of 616,000 for the Kimberley.*

Nor does the report specifically address the relationship between land unit size and pastoral degradation. Some writers have argued that as land unit size increases, owner/managers become more risk averse, and adopt lower stocking levels. Young (1979: 284) endorses this view, and implies that smaller land units are more likely to lead to environmental degradation, because they adopt higher stocking rates than larger land units.

This argument is based on the assumption that stocking levels are the crucial variable in land degradation; without denying the relevance of stocking levels, it may be in the Kimberley, with its shortage of stock control mechanisms, that stock concentrations are a more important factor in the initiation of land degradation. If this is so, then smaller land units (with smaller capital requirements for stock control measures such as fencing, yards and watering points) may be potentially less destructive of the resource base than larger land units.

Clearly, in relation to any given land unit there is a functional relationship between skilled management, herd control mechanisms and land degradation; so too is there one between drought, fires, vermin infestation and land degradation. But a major discretionary variable in the equation is resource utilisation i.e., the number of cattle placed/left on the land unit. A major shortcoming in the report is the failure to establish the parameters (even in a broad sense) of that

* The discrepancy in actual cattle numbers is probably due to the different dates of estimation. Data in table 3 was obtained in 1983 while table 5 refers to the situation in March 1982.

equation on a regional or subregional basis. The emphasis on a station by station evaluation, based on 'a whole station business approach' (KPII 1985: 133) is not enough. A regional evaluation approach is required based on a model which identifies businesses which are viable on the basis of environmentally stable land-units.

Woods (1983: 88) argues that there are three broad political options available in relation to arid land degradation:

- (i) non-intervention which allows desertification to continue;
- (ii) public intervention aimed at improving land use management and adoption of investment measures; and
- (iii) 'land use change in critical areas and possible compensation of landholders'.

To date, public policy has been directed to the public intervention option, but this has been completely unsuccessful except in the limited areas (such as the Ord Regeneration reserve) where it has been politically feasible to allow destocking to take place. The non-intervention option has become the defacto policy in relation to land degradation in the Kimberley. The question for policy makers and the wider public then becomes one of cost comparisons: what are the costs of allowing an increasing amount of the pastoral resource to become irreversibly degraded, as against the cost of improving land management and/or effecting land use changes.

In the long-term, land resources that will not sustain pastoral operations without irreversible pastoral degradation will be forced out of production anyway. This process is already occurring in relation to pastoral leases on the edge of the desert. The rational course of action for policy makers must be to maximize the net social and economic benefits of land use on a long-term basis. The review quoted the Department of Conservation and Environment submission which advocated the development of land management criteria which 'maximise long-term eco-system stability rather than short-term animal productivity' (KPII 1985: 150). However, it fails to recommend any mechanism to implement such a strategy, but merely recommends that 'the potential of existing pastoral leases to be used in an economically viable and environmentally stable manner should be

identified ...' by the Pastoral Board and the Department of Agriculture, and that land identified as having 'a long-term future in pastoral pursuits' should be given a more secure title. In fact, the data presented, properly organised and analysed, would constitute a cogent and persuasive argument for taking a significant proportion of Kimberley land out of pastoral production completely. This need not involve the imposition of costs on particular pastoralists, since the cost of resumption and adequate compensation should be taken into account in deciding which land to take out of production.

The report does at least admit that this conclusion is rationally possible, though only in the context of a discussion of the rationale for mining corporations owning pastoral leases over mineral deposits (KPII 1985: 175). The Bungle Bungle Working Group Report discussed below, recommends that one small lease, and a portion of another, be taken out of production.

There is a strong analogy between the pastoral and mining industries: they are both exploiting resources owned by the Crown on behalf of the State's citizens. In the case of non-renewable mineral resources, the State has an obligation to appropriate the resource rent (the surplus profits after deducting a reasonable return on capital invested) on behalf of its citizens. Similarly, in the case of the renewable pastoral resources, the State must, as a minimum obligation, ensure that the resource is renewed. This condition should be the premise upon which leases which grant access to the State's land resources are granted. To not accept this argument is to implicitly support the only logical alternative, namely, that the State should allow the lessees of its land to transform the State's fundamental asset, the land, into desert for the sake of private profits. An appropriate analogy would be a landlord who allowed his/her tenants to sell the timber floorboards of his/her house for firewood! Alternatively, in the absence of any alternative social or economic use of the land (either now or in the future), it may be that the pastoral resource should be treated at a non-renewable resource, and 'mined' until exhausted. If this is the case, there is a straightforward case for public sector collection of the resource rents arising out of the short-term pastoral production. The likelihood that this strategy would be optimal seems quite slim given the range of alternative land use interests in existence across the Kimberley.

The specific conclusion of this analysis of pastoral land use in the East Kimberley must be that the region's pastoral resource is much more limited than is generally accepted. The case for a restructuring of the industry is unquestionable. A rational restructuring exercise would firstly ensure that pastoral activity takes place on the basis of resource renewal (rather than resource depletion), and secondly ensure that pastoral enterprises which are not financially viable on a renewable resource basis are taken out of production. Thirdly, even where pastoral businesses are viable, alternative land use options should be periodically considered. To this end, there may be a case for more security and flexibility in land titles issued by the State. A review of pastoral tenure is currently taking place in Western Australia.

Implicit in the recognition of the limited nature of the pastoral resource is the possibility of alternative land use activity. The possibility of more intensive agricultural/pastoral activity on smaller land units exists. The establishment of substantial wilderness areas, conservation reserves and national parks are obvious alternatives. The growing movement in North America toward privately owned conservation land resources might be explored. Aboriginal aspirations for access and title to their traditional lands is another option. All of these options have potential for development of tourism enterprises. Furthermore, there may well be a number of multiple land use options which provide increased scope for achieving a solution to the political conflict between various interests over land use in the region.

The broad conclusion highlighted by the analysis is that the solutions to the pastoral industry's problems are not to be found solely within the bounds of the existing, widely accepted land-use assumptions for the region, but must actively evaluate the alternative values and assumptions which might form the foundation of a land-use policy which has both economic and environmental viability as prime objectives.

POLITICS OF PASTORAL REFORM

It is not completely surprising that a joint industry and government report should not articulate unequivocally the need to ensure pastoral resources are renewed since pastoralist's incomes are at stake.

A more interesting question relates to the nature of the public sector vested interests involved. Have the pastoral 'regulators' been 'captured' by their clients? What are the political ramifications of far-reaching pastoral reform? The political costs of reform may well outweigh the perceived political benefits especially as the incremental economic costs of pastoral resource degradation are quite small during any one government's term. The cumulative cost over the last century of pastoral resource use in the Kimberley have nevertheless been substantial.

A recent example of bureaucratic competition between pastoral based interests and other interests is the Report of the Bungle Bungle Working Group to the Environmental Protection Authority.

In early 1983, the Western Australian Environmental Protection Authority established a working group "to investigate and report on the status, vesting and purpose of Bungle Bungle and adjoining land". The working group comprised representatives of the Department of Conservation and Environment, Fisheries and Wildlife, Lands and Surveys, Agriculture, Mines and Tourism, the WA Museum, the WA National Parks Authority and the Warmun Aboriginal Community.

The working group's draft report dated October 1984 established a 'study area' of approximately 350,000 ha. which includes the north-west portion of the Ord Regeneration Area (total area is 8960 square kilometres), and the Osmond Valley Pastoral lease and a portion of Texas Downs Pastoral lease, both of which expire in the year 2015.

In relation to the area determined for study, paragraph 1.2 of the draft report notes:

'Bungle Bungle' was not defined, though it is understood that the National Parks Authority, in asking the EPA to consider establishing the working group, were referring to the Ord River Regeneration Reserve (No. 28538) or a substantial part of it....

After an initial on site investigation of the area in June 1983, the working group defined its core area of interest as the north western portion of the Ord River Regeneration reserve, (No. 28538) roughly delineated in the south and east by the Ord and Panton Rivers and a unnamed tributary of the Panton. However, it recognised that the existing cadastral boundaries were essentially arbitrary in location and that some adjacent areas should also be considered. After further analysis the working group became of the view that the Study Area should also include

the Osmond Valley pastoral lease, the adjacent southern portion of Texas Downs pastoral lease and extend to include the full length of the Panton River within the Regeneration Reserve. (Bungle Bungle Working Group 1984: 1)

Unfortunately the draft report offers no persuasive rationale for its decision in relation to the size and boundaries of the study area. The report identifies the following "key issues which should be considered in determining the future land use and management options in the area" (BBWG 1984: 30). They are (i) conservation of biotic and landscape resources; (ii) Aboriginal interests (cultural, social and economic); (iii) tourism; (iv) mineral exploration; and (v) soil and vegetation rehabilitation requirements. The report considered the question of pastoral usage, but rejected it as a criterion as inappropriate given the lack of suitability of the study area for pastoral operations.

What is clear from the report, however, is that the working group did not assess the land included in the regeneration area, but excluded from the study area in terms of the "key issues", but only in terms of its pastoral and rehabilitation criteria. This is clearly in line with Department of Agriculture views; the report refers specifically to negotiations with the Sarawak Government to lease part of the regeneration reserve for pastoral purposes (BBWG 1984: 55).

In 1977, the Conservation Through Reserves Committee (CTRC) presented its report on the Kimberley region's conservation requirements to the Environmental Protection Authority. It made a number of recommendations regarding specific proposed reserves in the East Kimberley, and made a specific point of highlighting the absence of reserves in the south-east Kimberley. It went on to nominate the regeneration reserve as a potential National Park, under the management of the National Park Authority.

The reason the CTCRC recommendation was not implemented was, according to the Bungle Bungle Working Group (BBWG 1984: 31), because of the Agriculture Department's involvement in the regeneration program, and the lack of appreciation of the diversity and scenic attraction of the terrain. The Working Group notes that no reserves exist or are planned for for the Ord basin, and concludes that:

the proposed reserve system is still deficient, particularly with respect to representation of areas of high pastoral potential, notably heavy alluvial plains and riverine areas associated with the major sedimentary basins of the Kimberley". (BBWG 1984: 31)

Thus, even where a persuasive justification for an alternative land use has been made, in the face of serious potential soil erosion problems, and in a situation where there are no private pastoral interests involved, the Department of Agriculture worked to ensure that alternative land use values and options were not considered for the bulk of the regeneration area. Instead, through a clever legerdemain, it was conceded that pastoral options should not be considered for the smaller Bungle Bungle study area due to its lack of suitability. A much more preferable procedure would have been for all values (pastoral, mining, tourist, conservation and Aboriginal) to have been considered over all of the regeneration area.

The Bungle Bungle bungle is symptomatic of the pressure on the Western Australian Government on the Kimberley pastoral industry front. The industry has only one major market, the export manufacturing beef market and is characterized by an unstable low input - low output system of production. (Hacker 1982: 51) The major political problem for the government is related to the structure of the industry. On the one hand, it is clear that the core of the industry is based on only a relatively small area of high quality pastoral land. Table One indicates that only 17.6 per cent of Kimberley land has a high or medium pastoral value, and thus a comparative advantage in pastoral production. On the other hand, it is not clear to what extent less viable production units are required to maintain the turn off and production levels which keep the meatworks and transport firms operating, and which provide significant employment in Wyndham and Broome. Certainly there will be strong political pressure on any Government which attempts to take pastoral land out of production; there will also be strong pressure on a Government which oversees the demise of the industry.

Consequently, the Government has moved to take the initiative with the purchase by the State owned EXIM Corporation of the Emmanuel

Brothers' stations in the West Kimberley: Go Go, Christmans Creek, Cherrabun and Meda. The proposal has yet to be finalized by the Government; the broad terms of the proposal were initially for the Emmanuel leases, along with a number of Australian Land and Cattle Company (ALCCO) leases which were forfeited, to be broken up into smaller parcels and returned to private enterprise (West 16 April 1985: 'Exim to manage stations'). Another element in the original proposal was to provide Aboriginal groups with the possibility of obtaining land in the Fitzroy valley, albeit as small pastoral enterprises. (Seaman 1984: 32)

The Government's options are somewhat limited. Any move to a small land-unit must also move towards a more intensive beef cattle production system, involve the development of new markets, probably in South East Asia, and rely on a substantial infusion of capital and Government support services. The Exim lands straddle the very best pastoral land in the Kimberley, and are thus an ideal focus for capital investment. What is not known is whether the Government intends to expand the Exim approach across the Kimberley (it probably does not know itself, as yet), maintain the status quo on lesser quality land, or move towards encouraging non-viable land to be taken out of production.

The major pressure on Government policy making is perhaps the progress of the Brucellosis and Tuberculosis Eradication Campaign (BTEC) which is currently aimed at achieving its objectives by 1992, Australia wide. Because it requires substantial capital investment in fencing and mustering for individual pastoralists, and because it is an externally imposed constraint, there is likely to be severe financial pressure on the operators of smaller, and lesser quality leases, with concomitant pressure on the maintenance of sound ecological practice on those leases. The West Australian Government will have the choice of either increasing subsidization of the industry through provision of financial support across the board, or standing back so as to allow market forces to force the marginal producers out.

The move to smaller land units is not necessarily related solely to factors within the industry. Holmes (1984: 213 ff) has argued that large stations are a response to isolation and remoteness, and developed from the need for internalised self-sufficiency and concentration of demand for services. Holmes extends this analysis further, arguing that

the large self-sufficient stations had a negative impact on regional economic growth because the multiplier effects of their operations were directed either internally, or to major urban centres outside the local region. This argument is certainly a persuasive explanation of the existence of the 'nucleated' settlement pattern based on large cattle stations characteristic of the Kimberley until relatively recently. A number of ongoing recent developments are already placing pressure on this traditional Kimberley settlement pattern. The first is the substantial improvement in communications in recent years: improved roads, use of helicopters and air charter firms, improved access to roads, television and telephones have all contributed to a lessening of the sense and reality of isolation across much of the region. Secondly, the establishment of a series of new Aboriginal communities across the region since the late 1960's has undermined the focal dominance of the large stations. The more recent development of an extensive network of Aboriginal outstations, serviced by resource agencies based either in towns or the new settlements has only reinforced the shift away from large stations as the focus of settlement patterns within the region.

If Holmes' locational thesis is the basis for the existence of relatively large land units in the Kimberley, then these latter developments may presage a move toward smaller pastoral land units. The Kimberley Inquiry did point out that a constraint on smaller sized land units was the capacity of such units to generate surplus income for property development or debt servicing (KPII 1985: 246). This constraint, along with others such as the requirements of the Brucellosis and Tuberculosis Eradication Campaign, and the labor-force and marketing problems facing the industry, will mean that any changes in land-unit size will necessarily be accompanied by changes in pastoral production systems.

There is scope for further research in the development of new systems in two directions: one, based on a capital intensive operation is discussed briefly by the Kimberley Inquiry (KPII 1985: 252), the other possibility, suggested in broad terms by Dillon and Virmani (1985: 529) is the possibility of Aboriginal enterprises further developing what has been termed the 'modified hunter-gatherer' model based on a small killer-herd which is already the economic basis of many Aboriginal outstations, i.e. production for exchange and consumption and not sale. Requirements for capital investment would be relatively low, labour costs would be zero in

monetary terms. Research needs to be directed to optimum herd sizes and slaughter rates, optimum sized land units and the possibility of alternating herds between two (or more) land production units in a bid to reduce the ecological impact of pastoral activities. In contrast to land subdivision based on capital intensive production systems which as Holmes (1984: 229) points out, are likely to involve increased public sector financial contributions, an 'outstation model' production system may be much less costly.

The Pastoral Inquiry recommended the establishment of a major Land Use Study of pastoral operations across the region co-ordinated by a senior executive working to the Land Resources Policy Council comprising the heads of the Government Department concerned with land use in Western Australia. The objective of the study would be to evaluate the land resources of the region so as

to achieve a realistic balance between conservation of the region's environment and development of its economic potential. (KPII 1985: (iii))

As pointed out above, this 'balance', reasonable as it sounds, need not ensure resource renewal, and thus may violate the fundamental assumptions of a rational land use policy. Even providing resource renewability is made a firm objective, the concept of a land use study appears quite useful, but in reality may only serve to provide a forum for vested political interests. Rural adjustment policy is best implemented by the market.

CONCLUSION

Pastoral resource use in the Kimberley is based on a set of widely accepted assumptions which are no longer tenable as the basis for a long-term industry. This paper argues that any reconstruction of the pastoral industry must be based on the rejection of the ubiquitous assumption that pastoral activity is automatically consistent with rational land-use. Rather, pastoral activity must be based on the twin criteria of economic and ecological viability. Land units that are not

capable of supporting pastoral activity consistent with these criteria should be taken out of pastoral production, and allocated to an alternative land use.

Attempts to argue that the twin criteria should be balanced must come to terms with the economic cost to the public at large of substantial (perhaps irreversable) land degradation. It may well be that there are substantial economic benefits (and minimal opportunity costs) in the implementation of alternative land use options such as national parks and wilderness areas in the less productive pastoral areas.

High and medium quality pastoral lands should be the focus of Government efforts to introduce more intensive production systems. This appears to be the approach which the current Government is adopting. A non-selective approach by Governments will result in much of the potentially available funds available for pastoral development being directed to low quality pastoral resources, and effectively wasted.

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