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Discussion Paper



**Native title and indigenous
Australian utilisation of wildlife:
policy perspectives**

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ABSTRACT

The *Native Title Act 1993* specifically recognises indigenous property rights in indigenous species; if there is one legislative event that could alter indigenous utilisation of wildlife in the future it is provisions in this statute. This legal framework means that indigenous people may in the future hold property or resource rights not just over currently vacant Crown land, but also in national parks or pastoral leasehold land. Some threshold legal issues, currently before the Federal Court, will clarify the significance of native title for indigenous utilisation of wildlife. In this paper the use of wildlife by indigenous Australians is assessed from an economic perspective using a standard production function framework in which output is determined by the variable combination of three input factors - land, labour and capital. The assessment shows that wildlife use for subsistence purposes is clearly of economic importance. Although inequalities exist in relation to the allocation of land between States, under the *Native Title Act 1993* and the operations of the Indigenous Land Corporation it is possible there will be a significant increase in the amount of land owned or available for use by indigenous people. This may not only increase access to wildlife resources and provide opportunities for indigenous people to add to their incomes, but also add to the growing recognition of their ability and right to participate in environmental management. However, indigenous people will need continuing access to cash to underwrite a subsistence lifestyle. Informed debate is needed to decide whether indigenous use of wildlife is an economic option worth supporting and what benefits and costs might accrue from such facilitation both for indigenous people and the wider Australian community.

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The Commonwealth Government is committed under the Aboriginal Employment Development Policy to improve the economic wellbeing of indigenous Australians to levels commensurate with other Australians, while also allowing them the choice of where to live, under the broad ambit of self-determination policy (Australian Government 1987). These policy aims were advanced by the High Court's Mabo decision in 1992 and the enactment of the *Native Title Act 1993* both of which mark a potentially fundamental shift in the recognition of indigenous property rights in land in Australia. The statute, however, does not provide immediate access to land or resources for indigenous people. Under the *Native Title Act 1993*, rights in land do not equate with rights to resources. It is possible for indigenous people to have native title rights over an area, but only limited resource rights, for example, to hunt in a national park. On the other hand, under s.211 of the *Native Title Act 1993* it is possible to have specific resource rights without full property rights in land.

In this paper, the use of wildlife by indigenous Australians is considered from an economic perspective within this legal framework. Many indigenous people live in rural areas, remote from mainstream labour markets and mainstream commercial opportunities; under these circumstances options for involvement in subsistence or 'own account' production are of considerable significance in economic terms. In this context, subsistence activities are 'primary' work and income generating, although the economic return from such activity is usually predicated on continual access to income support programs. Subsistence production is conceptualised using a standard production function framework: output is determined by the variable combination of three factor inputs, land, labour and capital. In the contemporary Australian context, access to land and its resources occurs primarily via land rights law; access to land also occurs on Aboriginal leasehold and reserve lands. Labour is provided by that proportion of the indigenous population that participates in wildlife harvesting. The role of capital is limited to a requirement for low-level Western technology and to some continued use of traditional technology.

A number of case studies clearly demonstrate statistically that with access to land-based or coastal resources indigenous Australians can reconstitute production systems which exploit wildlife both for subsistence and commercial purposes. Expansion of output from the indigenous land and resource base is, however, not a simple process. It is affected by a number of significant issues, including sustainability of resources, geographic and environmental variability in land ownership and resource availability, potential resource depletion, the role of introduced technology, and the effects of introduced species and pests. Many of these issues can be construed as setting limits on wildlife utilisation. In conclusion, policy implications are discussed, the need for further research is emphasised and the urgent need to more clearly define property rights in resources is highlighted.

Two issues must be emphasised at the outset. First, this discussion intentionally takes a social sciences approach in a field which overlaps with the many biological sciences: for example, economic concerns about sustainability have clear parallels with ecological issues (see Bomford and Caughley 1995). A multiplicity of disciplinary approaches to similar issues should facilitate, rather than hamper, informed debate about indigenous wildlife utilisation, as there is no one disciplinary perspective that is superior to others in this area of research. Second, this paper unashamedly returns to a number of issues previously raised in the literature in the past decade: in particular, issues concerned with the economic significance of indigenous wildlife utilisation, especially at outstations (Altman 1987; Altman and Taylor 1989); the inability and ineptitude of official statistics in recognising this economic activity (Altman and Allen 1992a); and the variability in laws and regulations that limit access to wildlife resources (Altman and Allen 1992b). This is premised on a view that some issues need to be revisited many times over many years before they attain a degree of mainstream acceptance.

Factors of production

Utilisation of wildlife by indigenous Australians can be conceptualised as a production function, with output determined by the three factors of production: land, labour and capital. Such a production system can be typified as land intensive in the sense that considerable land inputs are a prerequisite. However, output is not just dependent on quantitative land inputs; the quality of the land, in terms of its wildlife carrying capacity is also of great importance. Few data exist on the intensity of wildlife distribution in Australia and its correlation with indigenous access to land, although numerous maps of the geographic distribution of species are available (Wilson et al. 1992).

Land and resources

While the South Australian State government recognised a limited form of land rights in passing the *Aboriginal Lands Trust Act 1966-1975*, the modern land rights policy era only dates from 1972. The Whitlam Labor Government set up the Aboriginal Land Rights Commission and set in train passage of the *Aboriginal Land Rights (Northern Territory) Act 1976*. This remains the most comprehensive land rights regime Australia-wide. Subsequently most States, except Western Australia and Tasmania, have passed more restrictive forms of statutory land rights.

Indigenous Australians currently own 677,000 sq kms of land under inalienable communal freehold title (Altman 1994). Variations in Commonwealth and State legislation have led to inequalities between indigenous groups and the amount of land they hold, and the types of tenure under which land is held. This is demonstrated, at the State/Territory

level, in Table 1. It can be seen, for example, that while 15 per cent of Australia's indigenous population resides in the Northern Territory, it accounts for 67 per cent of land held under Aboriginal freehold title. While Aboriginal people account for 23 per cent of the Northern Territory population, land held under inalienable title currently accounts for 34 per cent of Northern Territory land.

Table 1. Aboriginal freehold land ownership and population, by State and Territory, and land rights regimes.

State/Territory	Aboriginal freehold (inalienable freehold)		Aboriginal population		Land rights regime	
	Proportion of State (1)	Australian share (2)	Proportion of State (3)	Australian share (4)	Cwth (5)	State (6)
Northern Territory	33.7%	67.2%	22.6%	15.0%	Yes	No
South Australia	18.8%	27.3%	1.2%	6.1%	No	Yes
Queensland	2.1% ^a	5.4%	2.4%	26.4%	No	Yes
Australian Capital Territory	0.2%	<0.1%	0.6%	0.7%	Yes	No
New South Wales	<0.1%	<0.1%	1.2%	26.4%	No	Yes
Victoria	<0.1%	<0.1%	0.3%	6.3%	Yes	Yes
Western Australia	<0.1%	<0.1%	2.6%	15.7%	No	No
Tasmania	<0.1%	<0.1%	2.0%	3.3%	No	No
Total	8.3%	100.0%	1.6%	100.0%		

a. Assuming all trust areas are transferred to indigenous ownership.

Source: Altman (1994).

Table 2. Aboriginal land in Australia and its distribution.

State/Territory	Aboriginal land (,000 sq kms)	Proportion of State (per cent)	Aboriginal population (1991 Census)	Land per capita (sq kms)
Northern Territory	536.0	39.8	39,910	13.43
South Australia	189.6	19.3	16,232	11.68
Queensland	42.2	2.4	70,124	0.60
Australian Capital Territory	<0.5	<0.1	1,775	0.00
New South Wales	1.5	0.2	70,019	0.02
Victoria	<0.5	<0.1	16,735	0.00
Western Australia	325.5	12.9	41,779	7.79
Tasmania	<0.5	<0.1	8,885	0.00
Australia	1,094.8	14.3	265,459	4.12

An alternative perspective on land ownership is presented in Table 2 which looks at all indigenous land holdings as a proportion of each State/Territory currently available to indigenous Australians, and the availability of land per capita. About 66 per cent of all Aboriginal land is freehold; the balance is reserve and leasehold. The last column is not intended to suggest that land is equitably distributed, but rather to highlight inter-state variability. In contrast, other Australians occupy the non-Aboriginal component of the continent at a rate of 0.5 sq kms per capita.

Native title: The High Court Mabo judgment recognised native title rights based on the traditions of the indigenous people of Australia, where these people have maintained their connection with the land and where title has not been extinguished by acts of government. The *Native Title Act 1993* provides for the validation of past acts; the protection of native title rights in the future; a process for establishing native title rights, determining compensation, and making determinations with regard to future acts; and establishing a National Aboriginal and Torres Strait Islander Land Fund.

The amount of land that might be subject to native title currently remains unclear. At 1995, of the total area of Australia, 20.5 per cent is privately owned and immune from native title claim because the law has determined that native title is extinguished; 13 per cent is held under some form of Aboriginal title either freehold, leasehold or reserve as shown in Table 2; and 43 per cent is pastoral leasehold. The most likely land for native title claim is vacant Crown land that accounts for 13 per cent of Australian land, and leasehold and reserve land held by, or for, indigenous interests that accounts for another 5 per cent; much of this land is remote, uninhabited desert. While vacant Crown land accounts for a significant portion of a number of States (34 per cent of Western Australia, 6 per cent of the Northern Territory and 6 per cent of Tasmania), in terms of the total area available in Australia almost all such land is in Western Australia (90 per cent) and the Northern Territory (9 per cent). It remains unclear if native title has been extinguished on all pastoral leasehold land and this issue is currently being examined by the courts. There is a possibility that residual native title rights to forage may exist on pastoral stations especially in those States where a reservation recognising customary rights was incorporated in leases.

In relation to increasing the land and resource base available to indigenous people, s.211 of the *Native Title Act 1993* is crucial as it recognises not only native title ownership of land, but also a prior interest in subsistence resources:

the law does not prohibit or restrict the native title holders from carrying on the class of activity, or from gaining access to the land or waters for the purpose of carrying on the class of activity, where they do so:

- (a) for the purpose of satisfying their personal, domestic or non-commercial communal needs; and
- (b) in exercise or enjoyment of their native title rights and interests.

The National Native Title Tribunal may determine that a native title exists in terms of a specific right or interest in land, suggesting that native title holders may have resource rights. This could mean that indigenous people might hold resource rights in a national park or resource rights in an existing pastoral lease, especially where these are identified in reservations made in lease agreements. Alternatively, indigenous people might utilise resources on vacant Crown land as they deem appropriate without a formal native title determination by the National Native Title Tribunal. These possibilities suggest that specific native title rights or interests may become a major factor in expansion of the land and resource base for indigenous people.

Indigenous Land Corporation: The ATSIC Amendment (Indigenous Land Corporation and Land Fund) Act 1995 provides an important means of expanding the indigenous land base beyond those lands where native title has not been extinguished and might be established by a National Native Title Tribunal determination. The Indigenous Land Corporation (ILC) is empowered to draw down resources from the National Aboriginal and Torres Strait Islander Land Fund to buy land for indigenous peoples and provide resources for its management. Almost \$1.5 billion over ten years has been allocated to the fund for the long-term financing of the acquisition and management of the land by indigenous people (Commonwealth of Australia 1995a).

Although inequalities exist in the allocation of land between States and there are uncertainties about the total amount of land that can be vested with indigenous groups under native title legislation and the ILC, it is possible that the amount of land owned or available for utilisation by indigenous people will increase in the future. This will increase indigenous people's access to, and their ability to manage and protect, subsistence resources.

Resource rights: Prior to the Mabo decision, Australian common law had never specifically recognised indigenous hunting and fishing rights; indigenous Australians had the same right as other Australians to utilise these resources (Australian Law Reform Commission 1986). In the second half of the nineteenth century legislation was enacted that recognised indigenous rights to forage in the colonies of Western Australia, Queensland, New South Wales and South Australia (then including the Northern Territory). Since Federation most legislation has been amended, resulting in a considerable reduction in the rights of Aboriginal people to hunt and fish for food. Fisher (1984) provides a comprehensive summary of the range of highly variable Commonwealth, State and Territory wildlife and fisheries laws. The extent of legislative variation both between States and Territories, and in some cases within them, is of concern in terms of equity: if Aboriginal people are to live off the land then they are better off in some States or Territories (especially the Northern Territory) than in

others. The recent report by the Aboriginal and Torres Strait Islander Commission on Native Title Social Justice Measures indicates that the Commonwealth, State and Territory Governments approach to recognition of hunting, fishing and gathering rights continues to result in ad hoc and uneven outcomes (Commonwealth of Australia 1995b).

The *Native Title Act 1993* referred only to native land title, but does not preclude the possibility that rights at common law in relation to the sea and its resources may exist. Indigenous ownership of the sea and its resources have not yet been recognised in either common law or statutory law in Australia. The likelihood that native title can exist and has persisted in marine environments is supported by legal commentators including the Office of General Counsel of the Commonwealth Attorney-General's Department (Smyth 1993).

The Northern Territory and Queensland have the most formal legislation relating to indigenous subsistence utilisation of the sea. The Northern Territory situation provides Aboriginal people with the greatest options. Under Commonwealth and Northern Territory law Aboriginal people are able to hunt, unrestricted by conservation laws, on Aboriginal land (Fisher 1984). This Aboriginal land includes major national parks like Uluru, Kakadu, Nitmiluk and Gurig which are all leased back to Commonwealth and Territory park authorities. Similarly in the Northern Territory Aboriginal people are unrestricted by fisheries laws and regulations when fishing for subsistence. In Queensland, the Torres Strait Protected Zone was established under the Torres Strait Treaty ratified in 1985. It extends from the southern shores of Papua New Guinea to just north of the Prince of Wales group of islands in southern Torres Strait. One of the purposes of the Protected Zone is 'to acknowledge and protect the traditional way of life and livelihood of the traditional inhabitants including their traditional fishing' (Smyth 1993: 30). The Commonwealth *Torres Strait Fisheries Act 1984* provides statutory recognition for the traditional way of life of indigenous people, including the unrestricted utilisation of regional fisheries for subsistence use. In Torres Strait a continuum exists between commercial and traditional fishing as, by registering with Community Councils, Torres Strait Islanders may practice community fishing, which may either be used for subsistence purposes or sold. Although current mechanisms for formal involvement in coastal management by Torres Strait Islanders are more comprehensive than for Australians elsewhere these arrangements do not adequately recognise Islander interests; Islanders believe that the activities of commercial fishers impact adversely on the subsistence resources of island communities (Smyth 1993).

Coastal Aboriginal people in Queensland do not yet have the same structural involvement in fisheries management as do Torres Strait Islanders. In 1988 the Kowanyama Aboriginal community on Cape York held a conference on the recognition of Aboriginal sea rights, including the

formal recognition of an 'Aboriginal Subsistence Fishing Sector' within the government structure for the management of Queensland fisheries. Since the conference, Kowanyama has developed extensive controls on recreational fishing on Aboriginal land. The recent report of the Queensland Government inquiry into recreational fishing supported recognition of indigenous fishing and the need for indigenous involvement in management. The Queensland Fish Management Authority has made indigenous fishers exempt from bag and size limits and has agreed to indigenous representation on all relevant management committees (Smyth 1993).

People and labour

In Australia, there are currently no data that indicate on a national level the correlation between indigenous ownership of land and access to resources and the distribution of the indigenous population. A number of recent studies have focused specifically on indigenous people residing in different contexts. Hence while it is recognised that indigenous Australians participate in subsistence activities in many varied situations, this discussion will concentrate on just four: outstations, pastoral stations, the coastal zone and national parks. This focus is partly based on the relative significance of these four, at times overlapping, jurisdictions. It is also based on an assumption that subsistence activities for many indigenous Australians in urban contexts has more recreational and cultural value than economic significance, in much the same way as recreational fishing has for non-indigenous Australian.

Population distribution on lands that might be utilised for subsistence does not mean that indigenous labour is devoted to such activity. Some available information on work effort in subsistence is provided but it should be noted that most quantitative evidence about indigenous participation in subsistence is available from information on output rather than labour inputs. Similarly, there is significant evidence in the literature that indigenous people demonstrate the significant knowledge and skills necessary to successfully hunt and fish. However, such information is largely presented in a descriptive qualitative manner, rather than as quantified skills audits. Certainly there is no means by which to quantify such skills in official statistics, as in the five-yearly Australian Bureau of Statistics census that establishes the formal educational status and skill levels of all Australians (see Altman and Allen 1992a).

Outstations: Outstations are small, relatively permanent communities of closely related individuals, established by indigenous people with a strong traditional orientation generally on Aboriginal land (Blanchard 1987). There are no recent data on the indigenous population of outstations, but there is a prevalent view that these people are the most actively involved in wildlife harvesting. It was estimated in the Blanchard Report that 10 per

cent of indigenous people live at approximately 500 outstations, with nearly three-quarters of outstations being located in the Northern Territory. The environments in which outstations are located vary. In the Northern Territory they are concentrated in the monsoonal Top End. They are also located in similar environments in the north of Queensland, the Kimberley region of Western Australia and throughout the inland savannas of the south Kimberley, the Pilbara and the Northern Territory and desert regions in the south of the Northern Territory, the north of South Australia and the east of Western Australia (Altman and Taylor 1989).

Pastoral stations: Many groups residing on pastoral stations can be regarded as outstation communities, as people in such situations are also involved in high levels of subsistence activity especially where the reservation which allows customary activities is honoured. This is particularly the case as more of these groups in the north of Western Australia are vested with 99-year leases over living areas. In the Northern Territory, a large number of excision communities will be little different from outstation communities when they finally receive formal title to living areas (Altman and Taylor 1989).

The coastal zone: The recent Coastal Zone Inquiry by the Resource Assessment Commission focused attention on indigenous residence in this zone. Nearly one-half of the indigenous population of Australia lives in the coastal zone. There are approximately 100 coastal indigenous communities occupying land under Aboriginal or Torres Strait Islander leasehold, freehold, reserve or native title. Approximately 200 outstations (a significant subset of all outstations) are associated with these communities. Indigenous people form the majority of the population in a number of coastal regions, including Torres Strait, Cape York Peninsula, Arnhem Land, Groote Eylandt, north-western Australia and parts of southern Australia (Resource Assessment Commission 1993).

Coastal, estuarine and marine resources are of major economic and cultural importance to many indigenous people in these areas (Resource Assessment Commission 1993; Cordell 1994). The economic importance of marine resources here is demonstrated by the dietary patterns and calorific intake of these communities as indicated by Meehan's (1982) study of an Arnhem Land outstation community. Poiner and Harris (1991) indicate the significance of marine resources for inhabitants of Yorke Island in Torres Strait, Arthur (1990) for Islanders throughout the Strait and Davis (1995) for the inhabitants of Saibai Island (see also Altman et al. 1994).

National parks: Aboriginal-owned land includes national parks like Kakadu and Uluru. Indigenous participation in the management of parks in which they have an interest is increasingly a mandatory requirement of

lease-back arrangements. Aboriginal people's rights to utilise the resources of parks for subsistence varies according to the park management plans and the resilience of subsistence production systems. Several of the studies discussed below focus on indigenous utilisation of wildlife for subsistence in national parks. The constraints created by legislation, tourists, and lack of data on wildlife resources are particularly relevant where indigenous landowners have rights to utilise wildlife (Altman and Allen 1992b). The Great Barrier Reef Marine Park is the only marine park in which indigenous people have an opportunity to participate in management, primarily in an advisory capacity (Smyth 1993).

Labour: The only quantitative time allocation data on subsistence work effort available in Australia were collected by Altman (1987) in 1979-80. These data indicate that over a 253-day survey period, adults residing at Momega outstation in Arnhem Land spent an average 2.6 hours per day (or 18 hours per week) in subsistence production and 3.6 hours per day (or 25 hours per week) in productive activities if market exchange activity (art and craft production) is included. On average, subsistence work effort represented 72 per cent of productive work effort. Altman and Taylor (1989) used these data to argue that if employment were re-defined to include Aboriginal work effort in wildlife utilisation (and gathering) then indigenous people at outstations such as Momega were as fully employed as people in the wider Australian society. At Momega, all adults participate in work effort, in comparison to the wider society where labour force participation rates are only in the region of 60 per cent. At Momega outstation adults work 25 hours per week, whereas in the wider society all Australian adults work an average of 24 hours per week (see Altman and Taylor 1989). This comparison is very imprecise and indicative only, but it does demonstrate that in some specific (and now historical) contexts indigenous people are fully employed. Additional information is urgently needed on indigenous participation in wildlife utilisation (Altman and Allen 1992a).

Labour input is not enough; it must also be appropriately skilled for the particular task. Numerous studies, especially by anthropologists and prehistorians, refer to the subsistence skills of indigenous Australians. Meehan (1982) studied coastal Anbarra people of Arnhem Land, noting the depth of traditional knowledge and skills in relation to subsistence activities. Altman (1987) examines the wide range of subsistence activities undertaken by Gunwinggu people and also analyses the variable productivity of individual men and women. Walsh (1992) indicates that Martu people of the Great Sandy desert have the knowledge of the landscape and the skills to utilise numerous animal species of the region, including feral cats, sand goannas and pythons. Johannes and MacFarlane (1991) provide detailed information on skills involved in traditional fishing in Torres Strait, from hunting dugong from outboard-powered aluminium dinghies with harpoons to catching fish by line, spear, trap and gillnet.

Devitt (1988) studied the role of indigenous women on remote outstations in the Sandover River region of arid Central Australia and provided data indicating the extent of their environmental knowledge.

Capital

Capital plays a minor role in the wildlife utilisation production function. Relatively simple technology is required for most purposes. It is of significance that even today an amalgam of modern and pre-contact technologies are used. Modern technology is now of primary significance. Undoubtedly the most valued item on land is motor transport and on sea outboard motor-driven boats. Other important items include guns and ammunition, fishing lines, nets and hooks, and other simple items like knives and axes. Most of these latter items have pre-contact equivalents like the spear and spearthrower, conical fish traps, hand-held nets, harpoons, and so on (Meehan 1982; Altman 1987; Arthur 1990; Johannes and MacFarlane 1991; Young 1995).

There are two major issues of significance here. First, modern technology is almost invariably more efficient and more popular than traditional technology. This means that wildlife can be more effectively utilised with such technology, but this can have an impact on sustainability. Second, modern technology always needs to be purchased. Besides staple foodstuffs like flour, sugar and tea, modern technology is a key expenditure category for modern hunter-gatherers and is generally purchased from social security income or less frequently from income generated from the sale of arts and crafts (see Altman 1987). The contemporary dependence on modern technology perpetuates a reliance on transfer payments from the state.

Output

There has been little effort in Australia to rigorously quantify the economic significance of wildlife harvesting for indigenous Australians. This is surprising because, according to conventional social indicators, indigenous people living in rural and remote areas are invariably more disadvantaged than those in metropolitan and urban situations, despite predominance of land ownership in remote regions (see Altman and Liu Jin 1994). Yet one of the economic arguments made for indigenous land rights is that it will improve the economic status of indigenous people. Under such circumstances there is a real policy need for data that establish whether or not land rights, and associated opportunities to harvest wildlife, are of economic significance.

A key problem that has been highlighted by Altman and Allen (1992a) is that there are no mechanisms available in official surveys to estimate the economic significance of wildlife harvesting. Three problems predominate.

First, there is no agreed methodology for assessing the value of subsistence as output is variably measured in dietary terms (kilojoules, protein, weight), by imputing market replacement dollar value to subsistence output; or by assessing its importance with reference to work effort (as demonstrated above). Second, data available have almost invariably been gathered by researchers whose disciplinary focuses include anthropology, prehistory, biology, zoology or botany, but not economics. These researchers rarely use similar methodologies and at times do not adequately describe their particular approach. Finally, gathering data on wildlife utilisation is invariably very labour-intensive, hence expensive, and focuses on particular regions or groups, which limits its potential for wider extrapolation.

These limitations indicate a need for a great deal more conceptual and empirical research in this area. In the absence of a significant database, we focus here on only two aspects of output: economic value and dietary significance. The first, is assessed from available information; the second is obtained from a number of case studies about the dietary significance of subsistence. It should be noted that the latter exercise does not generally differentiate wildlife and fisheries utilisation from gathering of other local resources.

The value of subsistence output

In his study at Momega outstation, Altman (1987) converted information on subsistence production to imputed dollar value. This exercise, undertaken over one annual seasonal cycle (296 days) in 1979-80 collected information on all hunting, fishing and gathering activities among a small group of Gunwinggu people. Social accounts were established for the outstation economy that divided it into three sectors: subsistence, market exchange and welfare. In this exercise, subsistence output was given a valuation based on the cost of proxy goods at the nearby township of Maningrida. Altman demonstrated that when bush food production was valued at market replacement prices it accounted for a very significant 64 per cent of total (cash and imputed) income. Although the results of this study are not applicable to all areas where subsistence activity is undertaken, Altman's study clearly indicates that wildlife utilisation, when converted to imputed dollar value, was a very economically important activity.

Fisk (1985) used Altman's data to estimate the contribution of subsistence activities at a national level, but with lower factor prices based on Sydney rather than Momega replacement rates. His estimate of indigenous subsistence output at the national level for 1981 was about \$7.5 million. This figure was a gross underestimate, most significantly because it assumed that such activity was only undertaken at outstations rather than in the variety of situations outlined above. Even for outstations, Altman and Allen (1992a) have argued that using more realistic assumptions about

factor prices and more up-to-date information, subsistence output was worth in the region of \$25 million per annum in 1986, or nearly 3 per cent of total indigenous income. For the Torres Strait alone, Arthur (1990) estimated the value of subsistence fisheries at \$2 million in 1989-90.

In terms of contribution to total indigenous income, these estimates do not appear to be especially significant. It should be noted, however, that this contribution frequently occurs in situations devoid of any other economic opportunities.

Dietary analysis case studies

A variety of case studies have gathered detailed information on the dietary significance of wildlife utilisation. The case studies presented here are primarily those well known in the literature. The approach taken is inductive, aiming to build a picture on the basis of numerous cases rather than analysing cases in depth.

In 1972-73 Meehan (1982) collected data on wildlife utilisation and other subsistence food production at Kopanga outstation in coastal central Arnhem Land. Meehan calculated that 49 per cent of energy intake and 82 per cent of protein intake came from bush and sea foods. In 1979-80 Altman (1987) collected data at Momega outstation, 80 kilometres southwest of Kopanga, that generated estimates of a similar magnitude, indicating that 46 per cent of energy intake and 81 per cent of protein came from the bush. Both Meehan and Altman suggest that the contemporary diet has a seasonal/dietary resemblance to that of precontact times. Both studies extended over an annual seasonal cycle.

A brief study of Aboriginal diet by Beck (1986) in the Alligator Rivers region, which includes Kakadu National Park, shows that hunted bush foods (primarily meats) contribute a minor part of the total food intake. However, feral buffalo meat is supplied weekly by the Gagudju Association to residents of the Park. Thus bush foods are the major portion of the diet. Beck estimated that approximately 3.15 kg gross weight/head/day of bush food was consumed.

Walsh (1992) conducted ethnobiological research over seven months at two Aboriginal communities, Punmu and Parnngurr in Rudall River (Karlamilyi) National Park in the Great Sandy Desert. The quantitative data collected showed that Martu people make extensive use of the resources of the region. They have a contemporary lifestyle in which subsistence activities are significant. The Martu diet is dominated by animal food, with at least 24 species utilised.

Devitt's study of Aboriginal people at outstations in the Sandover River region of arid central Australia, Northern Territory showed that wildlife utilisation (hunting for kangaroos, bush turkeys, perentis and lizards)

contributed the major amount of energy and protein from subsistence foods. At Angwele outstation in June 1981, Devitt estimated that 31 per cent of total dietary energy and 74 per cent of total protein was supplied from subsistence activities (Devitt 1988). Cane and Stanley (1985) estimate that in Central Australia bush foods made a major dietary contribution at two camps out of 32 visited; at 14 camps bush foods made a moderate contribution and at 16 a minor contribution. Their methods were based on random observation of meals rather than on weighing and measuring foods.

Palmer and Brady (1991) undertook four surveys over a year at Oak Valley, an outstation located in the Maralinga lands in South Australia. Their study indicates that bush food is consumed at the rate of 605 grams/person/day. Wildlife consumption is exceptionally high compared with other contemporary hunter-gatherer societies. Kangaroo is the most commonly consumed meat (560 grams/person/day), followed by rabbit, turkey, grubs and reptiles.

Poiner and Harris (1991) conducted a survey on Yorke Island in the Torres Strait during 1984-86. The average consumption of locally caught seafood comprising fish, molluscs, turtles, crustaceans and dugongs was 191-214 grams per person per day. This underestimates the nutritional significance of fishing, however, as 31.8 per cent of fishing produce was sold and some of this income used to purchase food items, including canned mackerel. A major study of total catch and fishing effort throughout the Torres Strait Protected Zone by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) Division of Fisheries in the period 1990-93 has quantified the extent of utilisation of numerous species (Harris et al. 1994).

Limits of production

The above data, especially on the economic and dietary significance of wildlife utilisation would suggest that indigenous Australians should focus on expanding production possibilities. An expansion of the indigenous land base could provide the impetus for such enhanced production. However, such optimism must be tempered with realistic consideration of a range of factors that might limit options to increase output.

Ecological issues

The issue of sustainable yields of wildlife resources is an important one for indigenous people. There is an absence of comprehensive data on indigenous people's long-term utilisation of species creating difficulty in making definitive statements about both wildlife management and sustainability. Land and resource managers cannot operate effectively in an information void, and research on a continuing basis is required to take account of seasonal and long-term fluctuations. An example of data

collection and utilisation for management of a species of uncertain status in terms of sustainability are the species management plans and education programs in relation to dugong populations in Torres Strait (Marsh 1995); Torres Strait Protected Zone Joint Authority 1993; Williams 1994). One difficulty with data collection is the problem of natural fluctuation in the numbers of some species over time. The study by the CSIRO Division of Fisheries in the Torres Strait is an exemplar of the sort of research that needs to be undertaken (Harris et al. 1994).

Indigenous resource management

It is clear that there is a need for indigenous participation in species management and in the monitoring of species utilisation. Indigenous people have the potential to bring a particular type of expertise to management, especially with interventions such as fire to increase stocks of indigenous species. The issue that must urgently be addressed is how such involvement can be facilitated (see Young et al. 1991). In Canada, for example, the Income Security Program (ISP) established for Cree hunters in north Quebec provides guaranteed income to allow Cree to hunt. With the ISP, production is linked to people's need and there is no incentive to over-exploit. Indeed there is a voluntary decrease in hunting in overused areas, and other wildlife conservation practices such as monitoring the numbers of certain game are recognised as hunting-related work under the ISP (Altman and Taylor 1989).

With increasing access to land and resources indigenous involvement in the development of conservations strategies and resource management will increase. In the Torres Strait there have been concerns expressed by Islanders about current consultation processes in relation to fisheries management and recommendations have been made for some structural reform in this regard (Smyth 1993; Altman et al. 1994).

National parks and other areas

A consequence of unsubstantiated concerns about sustainability is that indigenous people's access to resources may be unnecessarily limited. Watarrka National Park is divided into zones, with one being specifically for Aboriginal hunting and foraging. Similarly at Nitmiluk National Park only two areas of the Park are zoned for hunting. It is difficult to determine if such restrictions will be effective, especially when national parks adjoin Aboriginal land (as at Nitmiluk) where hunting is unrestricted. Zoning restrictions could result in the overuse of particular areas (see Altman and Allen 1992b).

Tourists to national parks can have both direct and indirect negative impacts on Aboriginal subsistence activities. Direct impacts occur at locations like Kakadu National Park where Aboriginal people who are harvesting resources for a livelihood are in direct competition with recreational fishers. It is interesting in this regard that in national parks

aquafauna is regarded as different from other fauna. Hence in Gurig National Park, by-laws limit harvesting of plants and animals to traditional owners or permit holders (safari operators), but fish and marine invertebrates are excluded from such by-laws (Conservation Commission of the Northern Territory 1987). At Kakadu there is concern about the impact of fishing (Australian National Parks and Wildlife Service 1991) but authorities are reluctant to prohibit such activities for political reasons even though it is acknowledged that some species will respond slowly to current controls like catch limits.

The indirect impact of tourism may be greater than the direct pressure. At Kakadu, as visitor numbers grow, park authorities disperse visitors to ameliorate environmental impacts. Such dispersal can run counter to the economic interests of Aboriginal park owners and residents who wish to undertake hunting and gathering activities, but are reluctant to do so within view of tourists for both public relations and safety reasons (Altman 1988). The tourist pressure on the Great Barrier Reef Marine Park, local indigenous peoples concern over this, and the restrictions they have placed upon themselves because of this has been mentioned above. There is an inverse relationship between tourism growth and Aboriginal access to subsistence resources. Concern about outsiders exploiting local resources is not limited to tourists; at Kakadu there has also been continual concern about non-local Aboriginal people hunting in the Park (Altman 1988).

Introduced species

The issues of introduced species of flora and fauna and introduced technology have both positive and negative implications for Aboriginal subsistence. The introduction of feral species has resulted in important resource shifts. In Arnhem Land, for example, Aboriginal people utilise feral water buffalo (Altman 1987); in central Australia rabbits are exploited for both subsistence and commercial use (Wilson et al. 1992); in Western Australia Walsh (1992) documents the exploitation of feral cats in Rudall River National Park; and in Purnululu National Park feral cattle are extensively utilised. Rose's (1995) report indicated that indigenous people have varying attitudes towards feral animals, including that feral animals belong to the country, that there are plenty of feral animals so they should be used, that there are too many and it would be better if there were more native animals, that feral horses and camels should be eradicated; and that camel meat could be sold.

A problem associated with introduced species is their negative impact on the environment, such as water buffalo degrading wetlands. However, with the eradication of feral species (like feral cattle at Purnululu or feral buffalo at Kakadu) important economic resources for indigenous people can disappear. In Kakadu National Park traditional owners have negotiated with the Australian National Parks and Wildlife Service (now Australian Nature Conservation Agency) to maintain a small herd of buffalo in the

Park for utilisation. There is some evidence of shifts to exploit indigenous fauna after the eradication of introduced species. In Kakadu, there has been an increased exploitation of estuarine crocodiles by some indigenous residents in place of feral buffalo (Altman and Allen 1992a, 1992b). Some introduced floral species like *mimosa pigra* and *salvinia* and introduced fauna like the cane toad only have a negative impact on wildlife resources and local people are keen to eradicate such species.

Introduced technology

Introduced technology has both positive and negative impacts. The introduction of modern equipment, especially guns and vehicles, has increased hunting and gathering efficiency and the geographic range that can be utilised. This could prevent a species being overexploited in one area (Altman 1987); on the other hand modern technology also opens up the possibility of over-exploitation, because of its efficiency. This has led to legislation in Queensland limiting Aboriginal exploitation of marine products or fauna to traditional means only (Australian Law Reform Commission 1986). These 'traditional' means are not specified: it is not clear, for example, whether spears have to be made of stone or steel or whether guns have been in use long enough to be regarded as 'traditional'. In any case, the crucial point is surely the level of sustainable resource exploitation: stocks of marine turtles or dugong can be depleted quite effectively with a dug-out canoe and ironwood harpoon.

Subsistence and commerce

Most regulations that allow indigenous utilisation of wildlife specify that it must be for customary use and not commercial objectives. The basis for such restrictions appears to be that commercial exploitation will result in depletion of species and that while subsistence activities can be justified on the grounds of being 'traditional', commercial exploitation of species cannot fall into this category.

The issue of commercial exploitation of species is fraught with contradictions. Kangaroos can be hunted for subsistence purposes but not for commercial sale; there is often such an oversupply of the resource that an eradication program is required (see Wilson et al. 1992). In Kakadu National Park commercial fishing is prohibited (Australian National Parks and Wildlife Service 1991), while in the nearby Cobourg Marine Park where the Conservation Commission regulates conservation under the Northern Territory *Territory Parks and Wildlife Act 1976* commercial fishing is not prohibited. Also, one can find positive views expressed about eradication of feral water buffalo or rabbit populations, but a negative view of their commercial exploitation. The issue of commercial exploitation of species in national parks is obviously contentious with indigenous interests, park authorities and the general public.

Conclusion and policy implications

Although inequalities exist in relation to the allocation of land between States and there are uncertainties about the total amount of land over which native title rights will be determined, it is likely that there will be an increase in the amount of land owned or available for utilisation by indigenous people in the future. This will increase indigenous people's access to, and their ability to utilise, manage and protect, wildlife resources. It is important to recall, on the one hand, that rights to land (and sea) do not necessarily mean access to subsistence resources. On the other hand, in some situations there might be opportunities for access to subsistence resources without full land rights.

Wildlife utilisation for subsistence purposes is clearly of economic importance and will become more so as native title, the ILC, and legislation providing property rights in resources expand opportunities for more indigenous people to live off the land or the adjoining seas. Living off the land will provide opportunities for indigenous people to add to their incomes. Another issue for policy makers is appropriate income support for subsistence producers, since indigenous people will need continued access to cash to underwrite a subsistence lifestyle.

The issue of sustainability is a central concern for policy makers. There is an urgent need for research on levels of subsistence resources and their utilisation as sustainability is currently impossible to assess. The problem may be under-utilisation or over-utilisation of resources. For example, research could indicate that some resources could be exploited commercially while others need protection. The question, what are sustainable levels of resource use, remains. This question can only be answered when research provides quantitative data on present levels of resources and resource use. The environmental impact of tourism, noxious weeds and feral animals are also very pertinent policy issues.

Growing recognition of indigenous people's rights to resources and leverage that can provide an increased indigenous voice in environmental management will remain key policy issues. Indigenous interests will continue to seek involvement in the design and implementation of management plans and research programs, and the monitoring of wildlife populations. Indigenous environmental management and control of resources is beginning to occur at the local level with the establishment of land and resource management strategies. The Marine Strategy for Torres Strait (Mulrennen et al. 1993) and the Arnhem Land Dhimurru Land Management Corporation are examples of these.

Subsistence activities have high cultural and economic value. Land claimed or purchased under native title legislation or via statutory land rights regimes will result in an expanding indigenous land base. This in

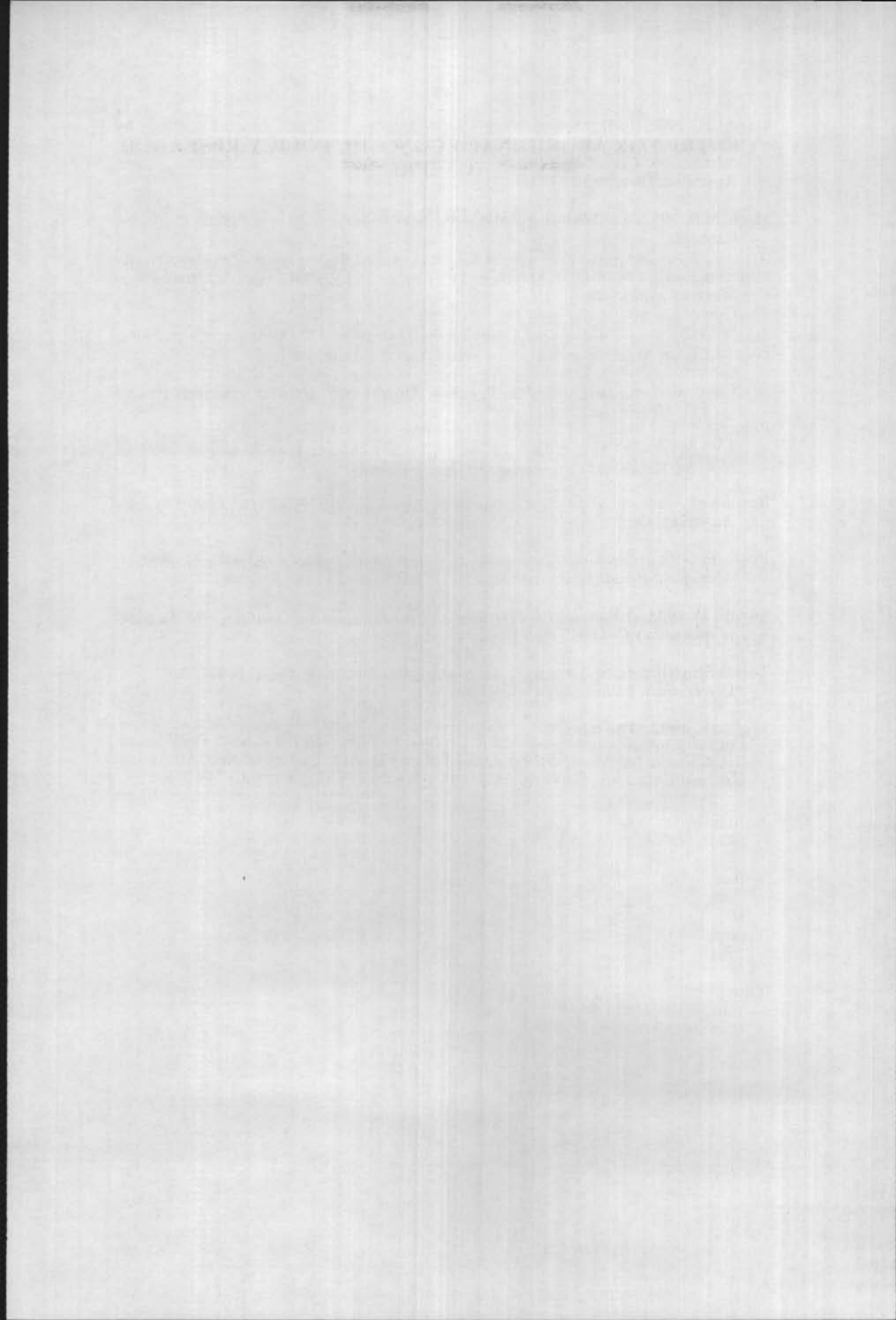
turn will mean that indigenous people could choose to live off the resources of their land. It is important from a policy perspective that the choices of indigenous Australians remain open, allowing new possibilities to expand subsistence activities in these changing circumstances without limiting indigenous people in the long term by tying them irrevocably into a production system predicated on the availability of wildlife. Government, and informed debate, needs to address whether indigenous utilisation of wildlife is an economic option worth supporting and what benefits and costs might accrue both for indigenous people and the wider Australian community.

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