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The value of non-agricultural land use in some Namibian communal areas: a data base for planning

by

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Abstract

Current and potential non-agricultural resource use was assessed in 37 zones in four study areas in northern communal areas of Namibia. These data were linked to work being done on the financial and economic value of natural resource use activities in Namibia. Profiles were developed, for each zone, which indicated the value of these uses in terms of net contribution to National Income and in terms of benefits to local communities. The results are presented in a complete data base for planning and upgrading purposes and in terms of selected specific findings. The results can be used for several purposes including:

- *to provide estimates of economic values of resource stocks for use in regional environmental profiles and national Natural Resource accounts,*
- *to locate areas where non-agricultural resource use has high (or low) economic value,*
- *to assist with protected area planning, regional planning, and tourism sector planning,*
- *to locate areas where non-agricultural resource use has high (or low) impact on local community incomes,*
- *to examine and test development options and policy options, and*
- *to develop and test economic and financial cost-benefit models for different investment options and community initiatives.*

The results indicate that non-agricultural resource use has significant potential to contribute to economic growth. The aggregate net economic value for all study areas is currently N$ 8.5 million. With realisation of potential this could increase by some 2.5 times. In the north west, generally, the highest current and potential non-agricultural economic resource use values, as measured per unit area of land, are found outside but adjacent to the protected areas. In Caprivi current economic use values are also highest adjacent to protected areas but the potential values are higher within these areas. The findings support the concept of buffer zone creation where land adjacent to protected areas is zoned for predominantly non-agricultural use. Many of the use values measured in these buffer zones are dependent on the integrity of the associated protected areas, and the use values therein, being maintained.
Generally, tourism is responsible for the bulk of the current and potential economic use values recorded. In the two, dry but scenic, north western study areas non-consumptive tourism dominates current and potential values. In Caprivi region, with higher biological productivity and variable potential for wildlife viewing, non-consumptive tourism is also dominant but less so. In "former Bushmanland" conditions are such that consumptive tourism (safari hunting) dominates the potential values.

Estimates of current and potential local community income show patterns similar patterns to those for economic value. There is significant potential for generation of these values through community-based initiatives, particularly adjacent to protected areas. For maximum viability, these initiatives need to be linked to developments within the protected areas, perhaps through a "parks and neighbours" programme. The data base needs to revised on a regular basis and expanded to include other areas.

1. Introduction

Namibia still has significant stocks of wildlife and other natural resources in many of its northern communal lands. Entrenched within the country's constitution is policy which promotes the use of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future. Furthermore, one of Namibia's development objectives is to alleviate poverty and create employment opportunities.

The Ministry of Environment and Tourism coordinates a national Community-based Natural Resource Management (CBNRM) Programme which aims to enable rural communities in the communal areas of the country to conserve and manage common property natural resources for their own well being and development (Jones, 1995). The LIFE Programme, funded by USAID and managed by World Wildlife Fund (US), provides support within specific CBNRM target areas and also supports a resource economics programme in the Directorate of Environmental Affairs, Ministry of Environment and Tourism.

The resource economics programme in the Directorate of Environmental Affairs aims to ensure that allocation of resources in relation to the environment is optimal. One resulting objective is to determine which use of natural resources optimises both economic benefits to Namibia and also benefits to communities.

A recent working document from the Directorate of Environmental Affairs (Barnes, 1995) presents a detailed data base describing such values for 37 zones in four study areas in Caprivi, western Kunene, north western Erongo and eastern Otjozondjupa regions. The zones were analysed according to their physical potential for natural resource use other than livestock and crop production. First the *current* natural resource use activities in the zone were analysed. Then the *potential* for these and new uses was analysed, assuming either existing or improved resource stocks and also assuming implementation of community-based resource use initiatives.

Two basic, but very different, measures of value were used to indicate use value. First was the net contribution of the resource use activities to the national economy measured in *economic* values and the second was the contribution of these activities to local community income, measured in *financial* values. These values were extracted or extrapolated from financial and economic models of resource use activities, being produced in the Directorate of Environmental Affairs. The methodology is described in more detail below. Results are presented as profiles for each zone.

The complete data base can be upgraded and used as a basis for planning on a broad front as well as for more specific purposes. The purpose of this document is to highlight and discuss some of these uses.

2. Methods

Four study areas, comprising mainly target areas for the CBNRM Programme and including associated protected areas, were chosen and divided into 37 zones based roughly on their relative homogeneity in terms of natural resources, human settlement and land use (Figure 1). Where possible division was made between inside and outside protected areas and between coherent units of land management. Thus zone boundaries tend to follow larger rivers, watersheds and administrative boundaries.

The physical conditions in each zone were assessed. This was based on notes from field visits to many of the zones, discussion with persons knowledgeable about the technical characteristics of zones, and from documented data (for example, Brown and Jones, 1994; Botelle *et al*, 1994; Carter, 1990; Cumming, 1990; Hitchcock, 1992; Jones, 1992; Naeraa *et al*, 1993; Tapscott *et al*, 1993; Tvedten *et al*, 1994).

Estimates were made, for each zone, of the extent of natural resource use and the potentials for this, within the context of recent developments in strategy and policy (for example, Ashley and Garland, 1994; Jones, 1995; Brown and Jones, 1994; Hoff and Overgaard Planning Consultants, 1993). Resource use activities were categorized and estimates were made of their *net economic contribution* and their contribution to *income within local communities*. These two are both net measures and do not refer to gross income. No account was taken of non-use values associated with the natural resources in question, some of which may be significant. Also, with either measurement no account was taken of any consumer surpluses. Consumer surpluses are known to be associated with tourism activities but are mostly foreign and do not affect national welfare.

For these estimates, use was made of the financial and economic enterprise models being developed in the Directorate of Environmental Affairs. Estimates based on financial and economic models of representative activities in the *same region* were accurate. Other estimates were fairly rough, being based on extrapolation from models of the same enterprise or activity from *different areas*. Still other estimates were more rough, being based on extrapolation from models of similar but *different enterprises or activities*. The costs of damage to crops, livestock and water points caused by wildlife were also estimated for each zone (using data from O'Connell, *pers. comm.*) and included as a negative value in each profile. Commercial marine fisheries were not included, for areas with coast lines, although shore-based recreational angling was. Estimates for each zone were made using multiples of standardised activity "units" for each category of resource use.

The net economic contribution (or contribution to national welfare) is a measure of the *net value added to National Income*[1] as defined by Gittinger (1982). This was derived by subtracting

1 This measure can be defined as: the return to internal factors of production (labour and capital) less depreciation, valued at opportunity cost, or: the value of the gross output less intermediate goods and services and depreciation, all valued at opportunity cost. It is the annual net contribution of the capital invested to the national economy.

economic costs (including costs of capital) from economic benefits for the activity. In the process financial values were converted to economic values, using the suggested shadow pricing criteria of Barnes (1994). The net economic contribution is also

FIGURE 1: THE FOUR STUDY AREAS AND 37 ZONES
A: LOCATION OF THE FOUR STUDY AREAS

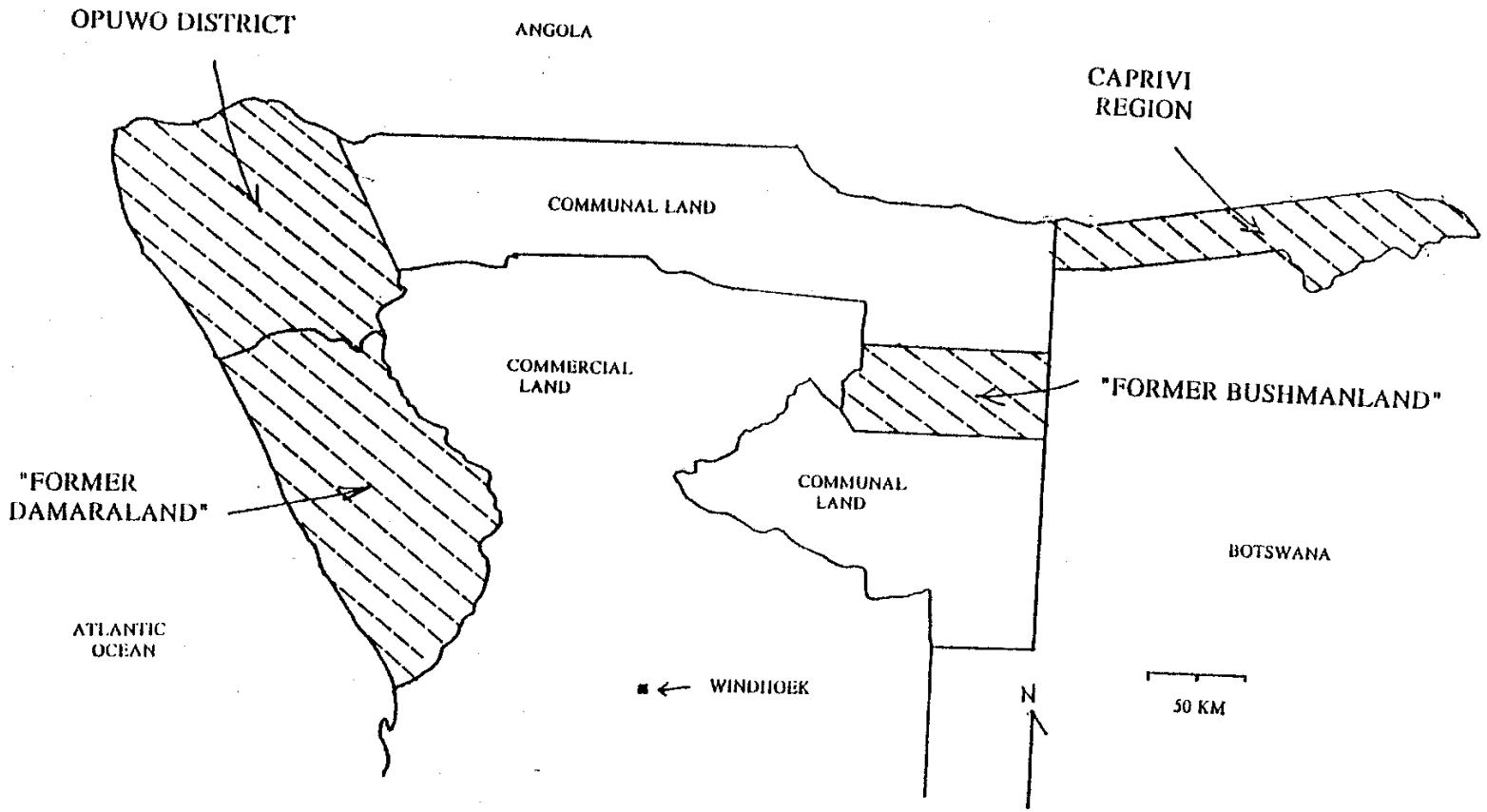
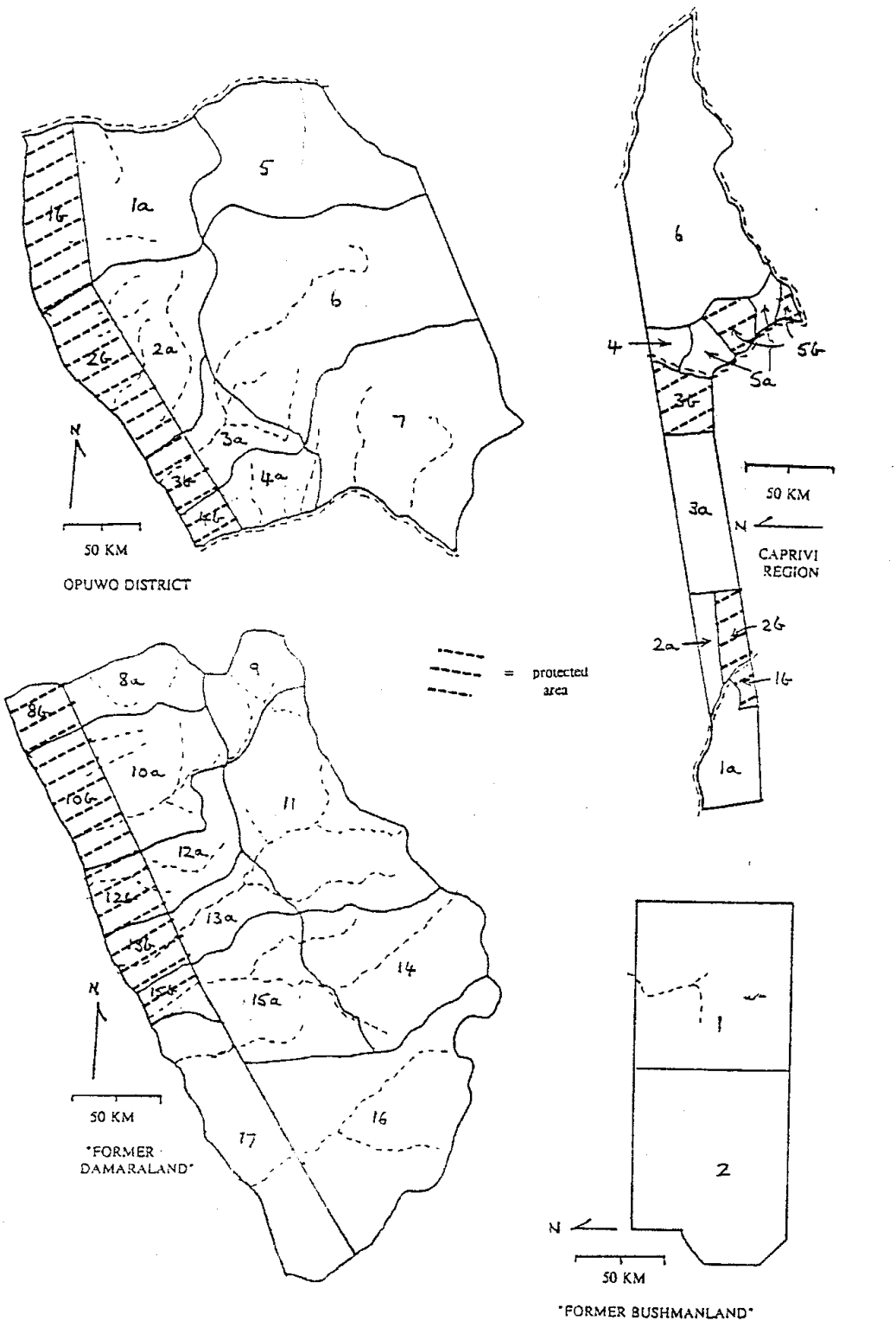


FIGURE 1: THE FOUR STUDY AREAS AND 37 ZONES (cont.)
B: LOCATION OF ZONES WITHIN THE FOUR STUDY AREAS



a measure of the return to land and government investment, because the opportunity cost of land and the economic costs of government expenditures were not deducted.

The income within local communities is a measure of net income from marketed or consumed output of natural resource-derived goods/services and also any wage earnings. Net income represents the return to the resource user, measured in financial prices, before income tax and after deduction of variable and overhead costs (including the annualised cost of capital, other taxes, fees and land rentals). That part of community income made up of wages was also listed separately as an indicator.

Several basic assumptions underlie the analysis. Estimations of natural resource use were made *superimposed* on existing human settlement, livestock keeping and crop production patterns. That is, the scale and patterns of agricultural activities were assumed to be constant and complementary to the natural resource uses assessed. Initial potential estimates were made with the assumption that resource stocks would remain constant but that community-based resource management initiatives will have been successfully implemented. Optimistic potential estimates were made with the assumption that resource stocks would have grown as a result of the successful implementation of these initiatives. Where assumptions had to be made about development possibilities in protected areas, it was assumed that the emphasis would be on low impact, non-consumptive tourism. Another assumption was that, community benefits do not include any revenue sharing from private sector and government tourism facilities (except in the case of joint ventures).

3. Planning applications for the data base

The detailed results for the analysis (444 profiles in all) make up the basic planning tool and bear scrutiny and comments with a view to improvement. Appendix A contains an example of these (current values for four profiles in five zones, 1a, 1b, 2a, 2b and 3a, in Caprivi). Below selected uses for this planning tool are identified and discussed.

3.1. Economic value

3.1.1. Aggregate economic values

The data base can be used to develop estimates of the economic value of natural resource stocks. The resulting aggregate values for different uses of current and potential stocks of resources can be used in the development of regional environmental profiles and national natural resource accounts (NRA). In this way regional, sectoral and national planning can incorporate consideration of the stocks and changes in stocks of natural resources. Table 1 shows the current aggregate net economic contribution to the economy for the four study areas depicted in Figure 1. Table 2 shows the potential aggregates for use of the existing resource stocks.

The total *current* estimated net value added to National Income in the study areas for non-agricultural resource use is some N$ 8.5 million. In Table 1 it can be seen that study areas vary in

their average productivity per unit area. The value is N$ 260 per square kilometre in Caprivi, N$ 33 per square kilometre in former Damaraland, N$ 24 per square kilometre in Opuwo District, and only N$ 12 per square kilometre in former Bushmanland. Figure 2 gives an indication of how these values vary between the 37 zones within the study areas.

Table 1: The current contribution to National Income of non-agricultural natural resource use in four areas of communal land (with associated protected areas) (N$, 1994)

Area	Caprivi Region	Former Bushmanland*	Opuwo District	Former Damaraland**
Extent (sq.km.)	18,800	17,877	61,585	58,105
Resource use				
Non-consumptive tourism				
Community run	32,700	17,400	20,100	41,775
Private Sector run	1,897,600	0	1,312,850	1,071,300
Government run	78,850	0	63,500	303,750
Safari hunting tourism	1,548,120	0	0	333,680
Angling tourism	420,900	0	0	105,225
Community activities				
Hunting	8,925	47,817	15,225	23,772
Fishery	585,375	0	0	0
Timber	21,000	7,875	12,600	28,350
Thatch grass sales	23,625	0	0	0
Other veld products	77,438	92,925	25,463	14,700
Craft production	82,919	27,118	37,548	33,376
Craft marketing	88,982	32,471	32,783	15,611
Commercial timber	129,980	0	0	0
SUBTOTAL	4,996,413	225,606	1,520,068	1,971,539
LESS Wildlife damage costs	109,947	14,222	13,675	30,085
TOTAL	4,886,466	211,384	1,506,393	1,941,454
TOTAL per sq. km.	260	12	24	33

* "Former Bushmanland" refers to Tsumkwe District, eastern Otjozondjupa region, north of latitude 22

** "Former Damaraland" refers to the whole of Khorixas District in Kunene region, the western communal land in Erongo region and the West Coast Tourist Recreation Area

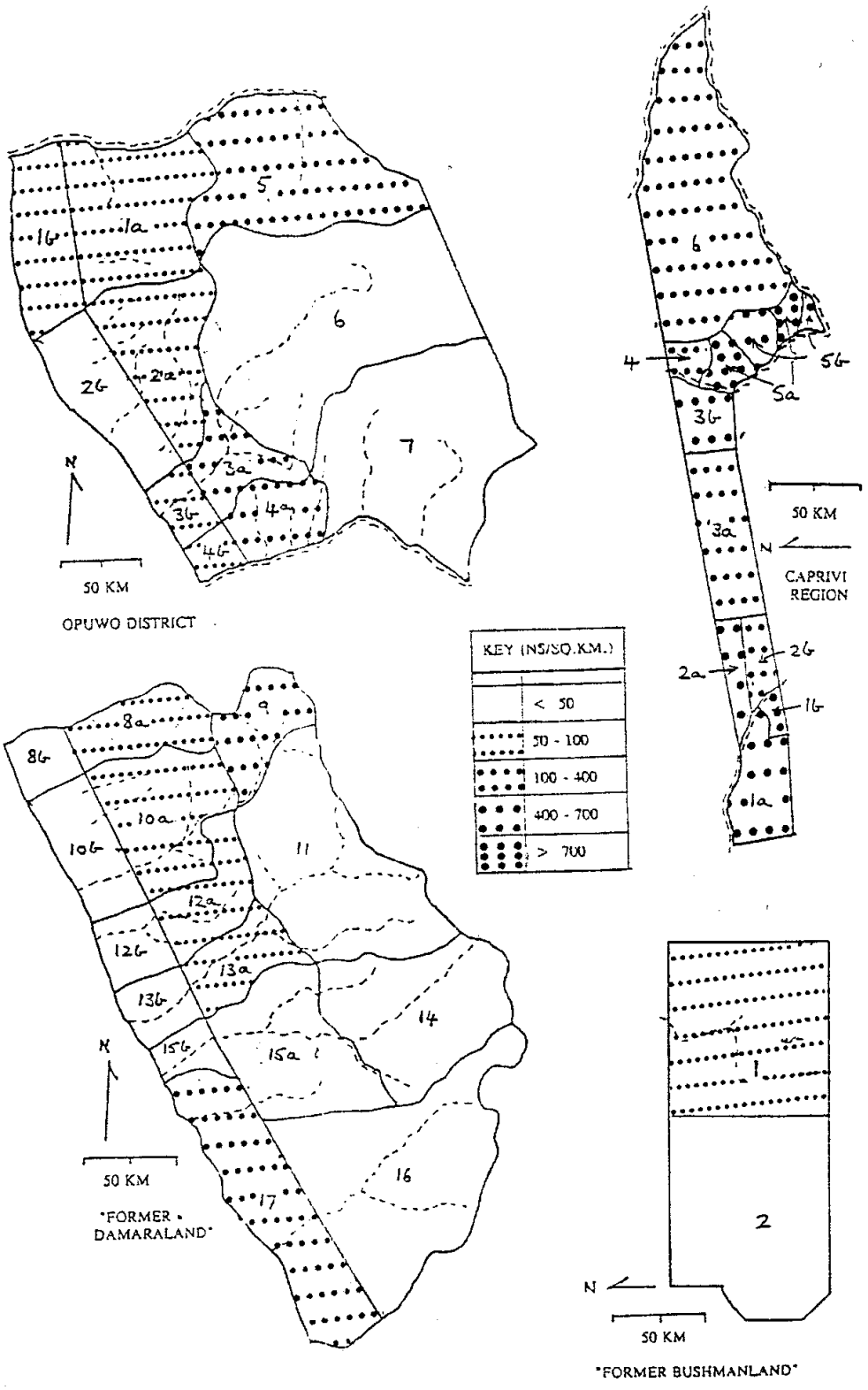
Table 2: The potential contribution to National Income of non-agricultural natural resource use in four areas of communal land (with associated protected areas) (N$, 1994, assuming constant resource stocks)

Area	Caprivi Region	Former Bushmanland*	Opuwo District	Former Damaraland**
Extent (sq.km.)	18,800	17,877	61,585	58,105
Resource use				
Non-consumptive tourism				
Community run	220,915	145,950	146,025	68,650
Private Sector run	3,886,500	220,500	2,938,500	3,238,150
Government run	475,200	0	444,500	771,110
Safari hunting tourism	1,548,896	388,000	0	250,260
Angling tourism	631,350	0	0	420,900
Community activities				
Hunting	2,100	59,771	8,925	5,775
Fishery	609,000	0	0	0
Timber	31,500	47,250	16,013	30,450
Thatch grass sales	36,750	2,625	0	0
Other veld products	102,113	123,480	33,390	22,050
Craft production	135,590	108,472	45,449	58,903
Craft marketing	142,372	129,883	47,746	55,419
Commercial timber	506,922	64,990	0	0
SUBTOTAL	8,329,207	1,290,921	3,680,547	4,921,667
LESS Wildlife damage costs	54,974	17,066	13,675	30,085
TOTAL	8,274,234	1,273,855	3,666,872	4,891,582
TOTAL per sq. km.	440	71	60	84

* "Former Bushmanland" refers to Tsumkwe District, eastern Otjozondjupa region, north of latitude 22

** "Former Damaraland" refers to the whole of Khorixas District in Kunene region, the western communal land in Erongo region and the West Coast Tourist Recreation Area

FIGURE 2: RELATIVE POTENTIAL NET CONTRIBUTION TO THE ECONOMY FOR EACH OF 37 ZONES



The total estimate of *potential* economic contribution (net value added to National Income) of non-agricultural resource use (assuming no growth in resource stocks) in the four study areas is some 2.2 times higher than at present, at some N$ 19.2 million. The difference between current and potential values varies between study areas. Caprivi has potential for a 1.6 fold expansion, the two areas in the north west could expand by 2.5 times and the resource use values for Bushmanland could increase by an estimated 6 fold. If the optimistic estimate of potential is taken (i.e., resource stocks are assumed to increase), then the total economic contribution for the four areas, at some N$ 21.9 million, would be 2.5 times that at present.

The results in Table 1 suggest that tourism activities are responsible for the bulk of the use values estimated. In the two north west study areas tourism currently contributes around 95 percent of the value added to the economy and in Caprivi this figure is some 80 percent. In former Bushmanland, however, only 8 percent of the current estimated value added is from tourism. Generally, with the realisation of potential (Table 2) the contribution of tourism activities remains stable or increases (from 8 to 59 percent in the case of former Bushmanland). Community-run tourism activities only make up a small proportion of tourism economic value but this proportion would tend to increase slightly with realisation of potential.

3.1.2. Identification of high (or low) potential areas

The data base can be used to identify zones or areas which have high potential to contribute to the national economy in terms of use value. This can be very useful for land use planning. For example, allocation of land for complementary or competing land use, such as livestock production would best be where potential economic value of non-agricultural resource uses is low.

Table 3 shows some results where net value added economic data from the two north west study areas have been pooled to compare relative proximity to protected areas (Skeleton Coast Park and Etosha National Park). Generally, the highest current and potential non-agricultural resource use values (as measured per unit area) are found outside but adjacent to protected areas. A four to five fold increase in use values appears possible here with realisation of potential. Economic use values within protected areas (the Skeleton Coast Park only) have been very low due to restrictions on development. Here there is potential for a eight fold increase in use values but these would still remain low, within a restrictive development framework.

In areas *not* adjacent to protected areas, higher densities of people and livestock and less wildlife result in fairly low use values with potential for only a 2.5 fold increase. These results support the concept of buffer zone creation where land adjacent to protected areas is zoned for predominantly non-agricultural resource use, and land further away is zoned for mixed or agricultural use. Such a pattern also makes sense for livestock keeping, since the "not adjacent" areas have more rain and are better suited for this purpose. Traditional settlement has tended to follow this logical pattern as have preliminary land use proposals drawn up for parts of the north west (R. Loutit, *pers. comm.*).

Table 3: Comparison of current and potential net value added to the economy from non-agricultural, natural resource use on land inside, adjacent to and not adjacent to protected areas* in north west* Namibia (N$, 1994)**

Item		Inside protected areas	Adjacent to** protected areas	Not adjacent to protected areas
Extent (sq. km.)		16,815	34,598	61,453
Current value (1994)				
Net economic benefit	per sq. km.	10	41	22
Potential value with stable resource stocks				
Net economic benefit	per sq. km.	66	125	39
Potential value with improved resource stocks				
Net economic benefit	per sq. km.	84	170	57

* North west refers to both Opuwo region and "Former Damaraland" which in turn refers to the whole of Khorixas District in Kunene region, the western communal land in Erongo region and the West Coast Tourist Recreation Area

** The term "adjacent to protected areas" includes zones in communal land adjacent to Skeleton Coast Park and Etosha National Park; it excludes the West Coast Tourist Recreation Area

Table 4, similarly, shows some specific results from the Caprivi region, comparing the current and potential net value added from inside and outside protected areas (West Caprivi core areas and East Caprivi National Parks). The Mahango Game Reserve has been left out because it currently supports safari hunting which is based on elephant stocks from a wider area and is considered anomalous. Potential economic use values from non-agricultural resources (as measured per unit area of land) appear to be higher within protected areas than outside them. The high potential values within parks is mostly attributable to non-consumptive tourism. They are not being realised as yet and represent a six fold increase on current values. The potential use values outside parks are, to a larger extent, derived from consumptive use and occur in competition with agricultural resource uses. They represent a 1.6 fold increase over current use values. The results highlight the importance of the protected areas as potential contributors to economic growth, in addition to the non-use values associated with them and for which they are well known.

A further consideration which can be used to illustrate the land allocation principle is that of linkages. The high values in areas adjacent to the protected areas are to some extent dependent on the maintenance of the protected area, and *vice versa*. In the north west (Table 3) the value of scenery and wildlife in adjacent areas is enhanced if the coastal environment in the protected areas can be added to the tourism experience. In Caprivi region (Table 4) there are also strong linkages, with many of the use values measured outside the protected areas being dependent on the integrity of the protected areas and the use values therein being maintained.

Table 4: Comparison of current and potential net value added to the economy for non-agricultural, natural resource use on land inside and outside protected areas* in Caprivi region (N$, 1994)

Item		Inside protected areas*	Outside protected areas
Extent (sq.km.)		3,400	15,100
Current values (1994)			
Net economic benefits	per sq. km.	110	265
Potential values with stable resource stocks			
Net economic benefits	per sq. km.	567	364
Potential values with improved resource stocks			
Net economic benefits	per sq. km.	694	441

* "protected areas" include West Caprivi core areas, Mudumo and Mamili National parks but *exclude* Mahango Game Reserve

3.1.3. Protected area planning, tourism planning and examination of trade-offs

The data base provides a useful starting point for planning within protected areas and for general tourism development planning within communal areas. Zones within protected areas with high potential for generation of economic use values can be identified. This information can be overlaid with spacial information about non-use values to arrive at a set of zones which optimise combinations of use and non use values. Similarly outside protected areas, data on tourism use values can be separated into different categories such as consumptive, non-consumptive, community run and private sector run, to see which zones have high potential for which category. These can be overlain with data on non-tourism uses, agriculture and livestock uses, and non-use values, to result in allocation of land, which maximises economic value.

Table 5 contains data derived from Tables 1 and 2 illustrating the relative importance of selected resource use categories. In Caprivi region non-consumptive forms of tourism make up only 40 and 55 percent of the current and potential totals respectively. Private sector tourism dominates within this category but, with realisation of potential, community and government (or parastatal) contributions increase significantly. The economic potential for increased natural resource use in Caprivi is primarily for development of non-consumptive tourism and secondly, to a much lesser extent, for small scale, consumptive use and processing of plant-based products.

In "former eastern Bushmanland", Tsumkwe district, realisation of potential non-agricultural resource use values would involve significant expansion of all facets of tourism, including significant private sector investment. It would raise the share of tourism to 68 percent of the total economic contribution. Non-consumptive tourism would be likely to make up only 28 percent of

the total. More specific analysis on the possible trade-offs is needed, but it is expected that optimum allocation of resources in Bushmanland would involve *both* safari hunting and non consumptive tourism.

In the two north western study areas (Opuwo District and "former Damaraland"), for example, non-consumptive tourism activities are very important, making up between 72 and 92 percent of the total current economic value and between 83 and 96 percent of the potential value. Low biological productivity and spectacular scenery make it likely that the optimal combination of resource use activities should be dominated by non-consumptive tourism.

Table 5: Relative proportions of different categories of non-agricultural resource use in four study areas in communal land in Namibia (% of study area contribution to National Income, 1994)

Item	Resource use category				Total
	Tourism (non-consumptive)	Tourism (consumptive hunt./fish.)	Non-tourism small scale (community)	Non-tourism medium scale (private)	
Caprivi Region					
Current	40 %	41 %	16 %	3 %	100 %
Potential*	55 %	28 %	11 %	6 %	100 %
Former Bushmanland**					
Current	8 %	14 %	78 %	0 %	100 %
Potential*	28 %	40 %	26 %	5 %	100 %
Opuwo District					
Current	92 %	2 %	6 %	0 %	100 %
Potential*	96 %	1 %	3 %	0 %	100 %
Former Damaraland***					
Current	72 %	23 %	5 %	0 %	100 %
Potential*	83 %	15 %	2 %	0 %	100 %

* Potential based on current resource stocks

** "Former Bushmanland" refers to Tsumkwe District, eastern Otjozondjupa region, north of latitude 22

*** "Former Damaraland" refers to the whole of Khorixas District in Kunene region, the western communal land in Erongo region and the West Coast Tourist Recreation Area

The information on net value added in the data base provides the building blocks for development of cost-benefit models, examining the economic value of alternative investments by government, NGOs, communities, and donors.

3.2. Community income

3.2.1. Identification of high (or low) potential areas

Economic value is the fundamental indicator of use values, since this reflects, as closely as possible, their true value to society as a whole. Policy should be guided primarily by this measure. However, financial values are important in that they reflect the incentive (or not) for individuals or communities to engage in use activities. To some extent financial values can be manipulated through policy (for example, by imposition of taxes and subsidies), and this is also relevant. Government can, for example, manipulate financial prices to make an activity which is economically viable more attractive to investors. In the data base a specific financial value has been extracted and this is the net effect of the use activity on the income of local communities.

Table 6 is similar to Table 3, but it depicts community income instead of contribution to the economy. The pattern emerging in Table 6 is similar to that for economic value, with zones adjacent to protected areas having the highest current and potential values and the protected areas (Skeleton Coast Park) having the greatest potential for increase. Increase in community income within protected areas is primarily made up of wages.

Table 6: Comparison of current and potential community income from non-agricultural, natural resource use on land inside, adjacent to and not adjacent to protected areas* in north west* Namibia (N$, 1994)**

Item		Inside protected areas	Adjacent to** protected areas	Not adjacent to protected areas
Extent (sq. km.)		16,815	34,598	61,453
Current value (1994)				
Community income	per sq. km.	4	14	10
Potential value with stable resource stocks				
Community income	per sq. km.	26	58	20
Potential value with improved resource stocks				
Community income	per sq. km.	31	75	29

* North west refers to both Opuwo region and "Former Damaraland" which in turn refers to refers to the whole of Khorixas District in Kunene region, the western communal land in Erongo region and the West Coast Tourist Recreation Area

** The term "adjacent to protected areas" includes zones in communal land adjacent to Skeleton Coast Park and Etosha National Park; it excludes the West Coast Tourist Recreation Area

Table 7 shows the pattern for community income corresponding to that for economic contribution in Table 4. Again the comparative pattern is similar. The potential for growth is slightly greater as a result of the assumption that expansion in activities would be to a large extent community-based. If revenue sharing is brought into the analysis (i.e., if bed levies, paid to communities from private sector tourism operations are included) then the community benefits will tend to be higher. In this case community benefits would be up to 20 percent higher than the estimates given for the protected areas. The inclusion of sustainable consumptive uses in protected areas, where these do not jeopardise the non consumptive uses (as is being tried in the Mahango Game Reserve), would enhance the potential use values even further.

The results in Table 7 suggest that protected areas in Caprivi have potential to generate high values for communities. The importance of linking the development of these protected areas with the community-based initiatives outside of them is highlighted. This applies particularly in East Caprivi, where potential for expanded resource uses outside protected areas is limited. In some cases the location of wildlife viewing lodges just outside, rather than inside parks, would allow them to be structured as joint ventures, while still making maximum use of the parks. In addition, without these core areas many of the current and potential use values from outside the parks would not be possible.

Table 7: Comparison of current and potential community income from non-agricultural, natural resource use in land inside and outside protected areas* in Caprivi region (N$, 1994)

Item		Inside protected areas*	Outside protected areas
Extent (sq.km.)		3,400	15,100
Current values (1994)			
Community income	per sq. km.	35	138
Potential values with stable resource stocks			
Community income	per sq. km.	226	201
Potential values with improved resource stocks			
Community income	per sq. km.	259	264

* "protected areas" include West Caprivi core areas, Mudumo and Mamili National parks but *exclude* Mahango Game Reserve

Table 8 shows comparative community income data from the Tsumkwe district, eastern Otjozondjupa region study area. The potential for community income from non-agricultural resource use is almost twice as high in the east as it is in the west. Potential for expansion in the east is some four fold while that in the west is some three fold. This is a reflection of the richer and greater wildlife community in the east which would permit significant expansion of all facets

of tourism, including significant private sector investment. More specific research is needed, but it is likely that optimum allocation of resources in Bushmanland would involve *both* safari hunting and non consumptive tourism. To some extent the lack of wildlife use potential in the west is counteracted by this zone having some commercial or small scale timber use potential.

With the inclusion of revenue sharing, potential income flowing to communities could be enhanced by some 20 percent over those given in the table. The introduction of large scale private sector tourism investments in Eastern Bushmanland should be approached with caution to ensure that the possibilities for joint venture are maximised and that community-based activities are not undermined.

3.2.2. Examination of trade-offs and cost-benefit analysis

The data base can be used as a starting point for specific refinement to test the effect of implementation of different policy options on the levels of community income possible and also the amount of this that is earned as wages or net income/consumption. Similarly, the data on community incomes can form the building blocks for financial cost-benefit analysis of community investments in resource management. These would provide an indication of the financial profitability for communities and would be combined with economic cost-benefit analysis to determine the economic worth of the community initiatives.

Table 8: Current and potential community income from non-agricultural, natural resource use in the eastern and western zones of "former Bushmanland"* study area (N$, 1994)

Item		Zone 2. West	Zone 1. East
Extent (sq.km.)		9,300	8,575
Current values (1994)			
Community income	per sq. km.	14	22
Potential values with stable resource stocks			
Community income	per sq. km.	42	85
Potential values with improved resource stocks			
Community income	per sq. km.	48	94

* "Former Bushmanland" refers to Tsumkwe District, eastern Otjozondjupa region, north of latitude 22

Conclusions

The data base (Barnes, 1995) described above, in which twelve resource use value profiles have been developed for each of 37 zones in four study areas in the northern communal areas, is a multi-purpose planning tool. The profiles indicate the value of non-agricultural resource uses in terms of net value added to National Income and in terms of income accruing to local communities. The results can be used as a base for further, more specific analysis, as a base for physical and policy planning and as a source of aggregate values for resources.

Certain general findings resulting from the data base have been highlighted. The aggregate net value added (economic value) for all four study areas is currently N$ 8.5 million. With realisation of potential the existing resource base could generate some 2.2 times this (N$ 19.2 million). Even more, some 2.5 times current value, could be generated with a feasible increase in the resource base. The potential for expansion of economic use value varies from 1.7 times current value in Caprivi region, to 2.5 times current value in the two north western study areas, to 6 times current value in "former Bushmanland".

In the north west, generally, the highest current and potential non-agricultural economic resource use values, as measured per unit area of land, are found outside but adjacent to the protected areas. In Caprivi current economic use values are also highest adjacent to protected areas but the potential values are higher within these areas. These findings support the concept of buffer zone creation where land adjacent to protected areas is zoned for predominantly non-agricultural use. Many of the use values measured in these buffer zones are dependent on the integrity of the associated protected areas, and the use values therein, being maintained.

Generally, tourism is responsible for the bulk of the current and potential economic use values recorded. The two north western study areas are very dry with low biological productivity, but impressive scenery. Here non-consumptive tourism emerges as dominant in current and potential values. Caprivi region has highest biological productivity of all study areas and high potential for wildlife viewing in localised sites. Here non-consumptive tourism is also dominant but less so than in the north west. In "former Bushmanland" conditions for non-consumptive tourism are relatively poor, and consumptive tourism (safari hunting) dominates the potential values.

The figures for current and potential, local, community income, in the form of net income, consumption and wages, generally tend to show patterns similar patterns to those for economic value. In Caprivi the protected areas have potential to generate significant income for communities, and this highlights the importance of linking development within these areas to CBNRM initiatives outside.

The usefulness of the data base, described above, for more specific analysis of policy options has been illustrated by Ashley (1995) who examined the relative value of different policy options in community-based tourism development. The data needs to be made available to planners for this purpose. In addition the data base needs to revised on a regular basis to ensure that new information on resources, land potential, economic value and financial value can be incorporated. The data base also needs to be expanded to other areas in the communal areas, protected areas and commercial land.

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APPENDIX A

AN EXAMPLE OF ONE PAGE OF THE 47 PAGE DATA-BASE: CURRENT NATURAL RESOURCE USE VALUES FOR FIVE ZONES, 1A, 1B, 2A, 2B, AND 3A, IN CAPRIVI REGION

CURRENT ENTERPRISES AND BENEFITS PER ZONE - CAPRIVI
(PAGE 2)

No: number of enterprises NE: net economic benefit p.a. CY: community income CW: of which, wages

ACTIVITY	ZONE 1A	1950	sq km.		ZONE 1B	300	sq km.		ZONE 2A	600	sq km.		ZONE 2B	950	sq km.		ZONE 3A	2400	sq km.	
	No.	NE	CY	CW	No.	NE	CY	CW	No.	NE	CY	CW	No.	NE	CY	CW	No.	NE	CY	CW
Up-market wildlife-viewing lodge	2	441000	162000	162000	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Up-market tented camp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Community campsite - developed	0	0	0	0	0	0	0	0	1	12700	12400	5400	0	0	0	0	0	0	0	0
Community campsite - very basic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Restcamp inside park	1	66150	24300	24300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exclusive campsite inside park	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Simple campsite inside park	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Joint venture lodge	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fishing lodge	1	105225	24300	24300	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Craft production	0	0	0	0	0	0	0	0	4	2086	2980	0	0	0	0	0	5	2608	3725	0
Craft marketing outlet	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Community guided walks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Community guided mokoros	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Traditional village	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enclosed walking area on border	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trophy hunting concession	0.62	240560	31000	27280	1.31	508280	65500	57640	0.62	240560	31000	27280	0	0	0	0	0.58	225040	29000	25520
Small-scale (own use) hunting	0	0	0	0	0	0	0	0	2	1050	1500	0	0	0	0	0	5	2625	3750	0
Timber production- commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0
Small scale timber	5	2625	3750	0	0	0	0	0	2	1050	1500	0	0	0	0	0	5	2625	3750	0
Sale of thatching grass	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Palms	5	1313	1875	0	0	0	0	0	0	0	0	0	0	0	0	0	1	263	375	0
Reeds	5	2625	3750	0	0	0	0	0	0	0	0	0	0	0	0	0	5	2625	3750	0
Other veld products, own use	8	4200	6000	0	0	0	0	0	20	10500	15000	0	0	0	0	0	50	26250	37500	0
Fishing	30	15750	22500	0	0	0	0	0	5	2625	3750	0	0	0	0	0	0	0	0	0
Urban hotel/lodge (Katima M)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
COSTS in crops/stock damage	20	10940	10940	0	0	0	0	0	20	10940	10940	0	0	0	0	0	2	1094	1094	0
TOTAL		868508	268535	237880		508280	65500	57640		259631	57190	32680		0	0	0		260941	80756	25520
TOTAL PER SQ.KM.		445	138	122		1694	218	192		325	71	41		0	0	0		109	34	11