

Chapter 2

The economic value of the MFMP area

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Chapter details

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1 Executive summary

The study estimated the direct and indirect use value and explored the option value. The combined annual use value is estimated to be P 510 million. The direct use value is roughly two-thirds while the indirect use value is a third. Mining generates around 55% of the direct use value and carbon sequestration represents around 85% of the indirect use value. Together, mining and carbon sequestration account for two thirds of the use value. The option value is considered to be substantial, but no quantitative estimate could be made as part of this study. Below, the main findings for each value component are summarised.

1.1. Direct use value

Livestock, crops and natural resources

For direct use values pertaining to household activities (cropping, livestock and natural resource harvesting), the study area was divided into two zones (north and south). The southern zone, which also wraps around to the west of the pans, has more settlements and a larger population, particularly in the south-west. Through the focal group discussions it was found that in most villages government assistance programmes, such as *Ipelegeng*, the destitute and orphans programme, the Old Age Pension programme, and the Remote Area Dweller Programme are very important.

Most households are involved in livestock and crop production. Livestock is considered to be the most important agricultural activity, providing cash income as well as meat, milk, draught power, and social status. Livestock tend to be kept at cattle posts, where they are less susceptible to disease and cause less damage to crops, but small herds are often kept around the villages. Households in the north have on average 35 cattle, 20 small stock (goats and sheep), and 7 donkeys. In the south, households have on average 29 cattle, 45 small stock, and 7 donkeys. Overall, the value of cattle is estimated to be some P 15.4 million in terms of net private income, with an estimated direct economic value (gross value added) of about P 10.7 million. It was not established how much of the grazing value is derived from grazing around the pans versus upland habitats.

Some 76% and 83% of households are engaged in crop farming in the northern and southern zones, respectively. Most of the crops are farmed for subsistence purposes, with relatively little production being converted into cash income. Most of the crop farming is dryland cropping with a small amount of molapo farming in the south west (Rakops village). The main crops were millet, maize and sorghum (staples) which are grown together with a variety of other crops such as ground nuts, sweet reeds and melons. Crop farming in the study area has an estimated net private value of about P 19 million and a direct economic value of about P 15 million. Very little of this value is attributed to the pans, possibly about 8% of the value of agriculture in the south, but this requires further investigation.

A number of natural resources are utilised, many of these being used by a high proportion of households in each area. Grass and firewood are the most commonly used and collected natural resource. Grasses are collected by 68% of households in the north and 88% in the south. Households in the north collect on average 525 bundles of grass per year and sell almost 90% of this. In the south households collect grass mainly for own use and only sell roughly 10%. Firewood is used by approximately 90% of households across the study site, and most of these households collect for household use only. There are a very few number of dealers that collect firewood to sell. These dealers make approximately P500 – P1 100 per month depending on the area and the number of head loads sold. A large quantity of wild fruit is harvested every year. This activity is more prevalent in the north with 90% of households being involved. In the south, approximately 48% of households

harvest wild fruits. Mopane worms are a very important resource that generates a substantial amount of income for households involved in collecting them. On average some 48% of households in the north and only 20% of households in the south are engaged in collecting the worms. This activity is worth P 10 million to households, much of which is realised as cash income. Most of the value of natural resources is probably derived from upland habitats. It is doubtful that the pans hold significant value in this regard, apart from harvesting of salt, which happens on a very small scale. In addition, rivers have a small, but unknown, fishing value.

The total annual private use values and direct value added derived from agriculture and natural resources in the study area are summarised in Table 1.

Table 1: Net private values and economic values associated with household natural resource use and agricultural activities in the two zones (in Pula millions per year)

	North: Zone 1		South: Zone 2		TOTAL	
	Net Private Value	Direct Value added	Net Private Value	Direct Value added	Net Private Value	Direct Value added
Livestock	6.6	4.3	8.7	6.4	15.4	10.7
Crops	15.3	13.3	3.9	1.4	19.2	14.7
Grasses	7.2	9.1	24.8	24.5	32.0	33.6
Wild Fruits	14.0	18.1	15.1	17.5	29.1	35.7
Firewood	1.0	1.3	1.7	2.3	2.7	3.6
Mopane worms	5.8	6.6	4.0	4.4	9.9	11.0
TOTAL	61.3	52.7	58.3	56.5	108.2	109.1

Tourism

Tourism in the MFMP area occurs primarily as nature-based activities based in accommodation facilities, including serviced hotels/motels, wildlife viewing lodges/camps, safari hunting operations and campsites. Typical wildlife viewing lodges/camps in the MFMP area can be expected to be financially attractive as investments, with a ten year internal rates of return of between 10% and 15%, notably more than the 8% cut-off rate. They could be expected to contribute significantly in terms of land rentals and resource royalties to land holders in the area. A typical lodge might be in a position to contribute up to P400 000 per annum to community trusts or land or district authorities.

Typical safari hunting enterprises in the northern parts of the MFMP area, where there are elephant bulls in the quota, can be expected to generate ten year internal rates of return for investors of between 10 and 15%, and contribute rentals and royalties of up to P 1 million to community trusts or other land holders. Without elephant on the hunting quota the venture would be unlikely to be attractive for the investor without considerable economies of scale.

Tourism in the MFMP area directly contributes some P 55 million annually in gross value added to the national income. Some 65% of this is generated by game lodges/camps, and 42% of it is generated by the few up-market establishments. About 22% of the direct Gross National Income contribution of P55 million is from the few safari hunting enterprises in the area. The P55 million above is use value attributable to tourism inside the MFMP area, but the *total* impact on the Botswana economy from these activities is larger. This total impact includes the effects of lateral and backward linkages and it is estimated to be P 226.7 million. This is significantly higher - four times higher - than the P 55 million directly generated by the accommodations within the MFMP area, and it shows the importance of linkages in the modern, demand driven tourism sector. The tourism

activities within the MFMP area result in an estimated 350 full time jobs, and annual salaries and wages payments of some P 22 million.

CBOs play an increasing role in the tourism sector in the area, as local communities around the protected areas have formed CBOs (Trusts) to access custodial rights to manage and use their natural resources. This is expected to ensure increased investments in the natural asset base and to ensure sustainable common property management of these resources.

Mining

There is one mine in the area which extracts soda ash and salt from brine in Sua Pan. The estimated direct value added to the gross national income from this mine amounts to some P 190 million, and some 440 people are employed. The income or value added multiplier results in a wider impact on gross national income country wide and the total gross value added to the national income, including the effects of all backward linkages, is estimated at some P 467 million.

Overall direct use value

Table 2 summarises key direct use values for the MFMP study area.

Generally, while agriculture and natural resource use in the MFMP area contribute importantly to livelihoods, they are less important as contributors to the economy. Tourism on the other hand contributes only a small proportion of its income to local livelihoods, but has a much more significant economic contribution, particularly in the broader economy.

The base line livelihood and economic direct use values associated with tourism in the MFMP area reflect only partial development of the ultimate potential for the area. There appears to be considerable potential for expansion, intensification, and diversification of tourism in and around the protected areas. Investments made in protecting and enhancing the tourism asset base will have the effect of enhancing future use values.

The significant potential for expanding tourism in the MFMP area within a sound framework of property rights could significantly increase the contribution of tourism to local livelihoods through employment, CBNRM rentals and community tourism ventures. Associated with this, and resulting from the large tourism value added multiplier, would be a significant increase in the contribution of tourism to the economy. Agriculture and natural resources use are very significant for local livelihoods, as expected. This could be enhanced with more efficient use of resources with property rights, and with more commercialisation of these activities the contributions made by these activities to the economy could also be increased substantially.

Table 2: Livelihood and economic use values for the MFMP area (Pula/annum, 2010)

Category	Local livelihoods contribution*	Direct gross value added**	Total gross value added***
Agriculture and natural resources use			
Livestock	15 380 537	10 656 741	20 780 645
Crops	19 209 452	14 707 613	28 679 846
Grasses	31 953 922	33 565 717	55 047 776
Wild Fruits	29 075 714	35 659 475	58 481 539
Firewood	2 689 926	3 558 990	5 836 744
Mopane worms	9 851 101	10 993 389	18 029 159
Subtotal	108 160 653	109 141 926	186 855 708
Tourism			
Serviced hotels/motels	Not measured	7 087 700	31 086 500
Game lodges/camps	Not measured	36 362 900	159 487 800
Safari hunting	Not measured	5 807 700	25 472 600
Campsites	Not measured	82 800	145 300
Mobile operators	Not measured	5 999 900	10 526 200
Subtotal	14 732 000	55 341 000	226 718 400
Mining			
Soda ash and salt	74 250 000	190 000 000	467 000 000
TOTAL	197 142 653	354 482 926	880 574 108

*Income to households within the MFMP area

**Gross value added directly to gross national income within MFMP area

***Gross value added within MFMP area as well as in wider economy as a result of use activities in MFMP area

1.2. Indirect use value

Given the large number of assumptions that had to be made, the estimated figures are indicative and should be reflected as a range in possible values. The results are summarised in Table 3. The annual indirect use value is estimated to be P 155.4 million with a mix-max range from P 73.6 million to P 253.4 million.

Table 3: Estimated indirect use value of the MFMP area (Pula)

	Category	Best estimate	Low estimate	High estimate
1	Wildlife refuge			
	1.a hunting	3 070 200	1 541 600	4 598 800
	1.b ecotourism	2 849 000	712 300	6 410 300
2	Carbon sequestration	136 451 100	60 000 600	229 351 500
3	Science & education	2 256 900	2 256 900	2 256 900
4	Water purification	0	0	0
5	Groundwater recharge	10 800 000	9 100 000	10 800 000
	Total indirect use value	155 427 200	73 611 400	253 417 400

Carbon sequestration contributes over 90% of the indirect use value of the MFMP area. Wildlife refuge is second ranked at a distance (around 7% of carbon sequestration). The range of values is very large, showing the sensitivity of the results for the assumptions that have been made. Carbon sequestration is the most 'valuable' ecological service. As firm data are missing, there is need to do more research on the importance of carbon sequestration in the Makgadikgadi. Details of the estimation of each indirect use value are provided in chapter 3.

1.3. Option value

Option value is a component of non-use value, but it is linked to use value in that it represents the willingness to pay for preservation of the resource with the option of using it later. There are no data on the extent of non-use values in the MFMP area, but it seems clear that the investments made by DWNP in the Makgadikgadi Pans and Nxai Pan National Parks were made with the aim of preserving the natural resources and biodiversity in these parks. Given the objectives and policies associated with these protected area developments it would seem that the willingness of the public sector to make these investments is the result of several values, some of which are described elsewhere in this report.

On the one hand there is the aim of preserving the biodiversity and natural system simply so that it is not lost (existence value). Then, given the utilitarian policy environment some of the investments in the protected areas are aimed at enhancing the value of current use of these areas for tourism (direct use values). Further to that, investments in preservation of the wildlife stocks in these parks is also aimed at strengthening the indirect use value or refugia function of the parks, where use of wildlife migrating or dispersing outside them is enhanced. Lastly some of the investment in protecting the national parks is likely to be so that they could be utilized sometime in the future, when, for example, market conditions allow. This last value is option value.

Outside the protected areas of the MFMP area, government and donors have been able to mobilize local communities through the community-based natural resources management (CBNRM) programme to form CBOs (Trusts) aimed at preserving the wildlife and natural attributes in their areas. The investments here, by government, donors and communities, are also aimed at securing manifestation of several values. While investment for direct use values is dominant, some is aimed at preservation of natural assets for non-use values, and particularly option value.

2. Direct use value

2.1. Overall valuation approach

The economic value of the project area was studied within the framework of the total economic value, which includes direct use, indirect use, and non-use values. These values were considered at various scales from local (e.g. contributions to livelihoods) to national or regional (e.g. effects on national economic growth and employment), as appropriate. The use values were treated in a way that ensures compatibility of the results with the DEA's natural resource accounting system, and the national economic accounting system. The study is based on primary data collection using focus group discussions (FGD) and in-depth interviews and similar valuation work that was carried out in the Okavango Delta Ramsar site for the Okavango Delta Management Plan (ODMP) project. Interview surveys were conducted both in the study area and in the region generally to inform direct use and non-use values, respectively. Values were estimated using financial and economic enterprise models, explained in more detail below.

To measure direct use values, use was made of standard financial and economic models, such as those derived for the Okavango Delta valuation study. They have been used widely in the analysis of direct use values in Botswana, by Barnes (1998), Barnes *et al.* (2001) and Turpie *et al.* 2006. The models measured a number of use values, key to the valuation in hand. They measured the livelihood values derived by communities from the activity in terms of income, the income accruing to landholders through rentals, and the income accruing to government through taxes, and the overall direct contribution to Gross National Income. In addition they measured private profitability or the return to the investor, in terms of annual net income, the internal rate of return on investment (FRR) over five and ten years, and the net present values for investments (NPV) over five and ten years.

The private values were converted to economic values, through a shadow pricing procedure, with the aim of measuring the incremental value added to the national income from the activity, as well as the economic internal rate of return (IRR) and the economic net present value (NPV) in terms of national income. The measure of economic value used was the *gross national income* which was the sum of the income accruing to all the internal factors of production in the enterprise or activity concerned. It thus included profits and their dispersal (returns to entrepreneurship), wages and salaries (returns to labour and entrepreneurs), rentals and royalties (returns to land and natural resources), payments to and of capital (returns to capital) and rents captured as taxes (returns to government). The enterprises generated gross national income directly, but they also induced the generation of gross national income indirectly, such as in enterprises from other sectors that supply inputs to the enterprise. The generation of indirect value added to national income was measured by tracing the backward linkages to the enterprise. It is the result of the value added multiplier effect, which is determined using the social accounting matrix (SAM) model of the Botswana economy. The multipliers used in this study were those estimated by Turpie *et al.* (2006). The types of values are explained in more detail in Box 1 and Table 4.

2.2. Detailed methods

This study was undertaken within a limited timeframe and budget that did not permit a survey among resource users. The valuation study was based on data from key informants and focus group discussions in four villages and collation of available information from government departments and resource users in the area. Data were analysed using spreadsheet models. Where data were lacking, assumptions were taken from models developed for other parts of Botswana.

2.2.1. Zonation of the study area

Box 1:

What is the difference between private value and value added?

The private values reflect the actual benefits and costs as experienced by the investor or operator in a particular activity. Thus an entrepreneur, household or community might initially invest in developing the facilities for a campsite, spend money annually, running, maintaining and marketing the campsite, and earn revenue annually from visitors' camping fees. The total annual revenue makes up their gross private value or turnover. The difference between their gross private value and their annual expenditures is their net profit or net private value. Private values are measured using simple financial or in-kind transactions.

Value added reflects the value of the particular activity to the national economy. It includes all income generated in the activity, and not just the net profit for the investor or household or community. Thus it also includes net profit which goes to government and owners or shareholders, remuneration which goes to employees and managers, payments of interest, repayments of loans, and payments of rentals such as land. All these things together represent the annual contribution made by the activity to the national income. The basic question posed is: by how much does the activity change the national income each year? Financial or in-kind transactions are assessed as opportunity costs to the national economy.

For the purpose of this analysis, the study area was divided roughly horizontally into two zones which correspond to both the veterinary and agricultural zonation of the area. The northern zone (Zone 1) has a significantly lower population and average household size than the southern zone (Zone 2; Table 5). The southern zone, which also wraps around to the west of the pans, has more settlements, particularly in the south-west. Both zones contain a portion of pans and associated grassland areas. The settlements tend to lie within the shrubland habitats beyond these areas. The northern zone is dominated by mopane woodland. Mopane is not common in the southern zone, except towards the eastern edge of the zone.

2.2.2. Livestock grazing, crop production and natural resource gathering

The consumptive use of resources is usually either assessed by means of surveys of users or using monitoring data, which seldom exist in reliable form in developing country contexts (Eaton & Sarch 1997, Emerton 1998, Turpie *et al.* 1999). User surveys usually include a combination of key informant and/or focus group discussions, whereby information of a general nature is gathered, and household surveys, in which quantitative data are collected. Due to the resource limitations of this study, direct use values were estimated on the basis of focus group discussions in conjunction with existing information in the published and unpublished literature, and in existing economic models. Some information was also obtained from the livelihood survey conducted prior to this aspect of the study.

Focus group discussions were held in two villages in each of the northern and southern zones of the study area, described above: Nata and Gweta villages (both in Tutume sub-district) in Zone 1 (North) and Rakops and Mmatshumo (both in Boteti sub-district) in Zone 2 (South). Information regarding household use that was not given during the focus group discussions was sourced from the livelihoods survey, census data and other statistics.

In this study, focus group discussions were held to collect information of a generally applicable nature, e.g. on seasonality, markets and prices, as well as to collect sufficient information to be able to make a preliminary quantitative estimate of natural resource harvesting and processing and associated economic values. Focus group discussions were held on the following topics in each village:

- Crops;
- Livestock;
- Natural Resources typically harvested by men: wood products, hunting and honey, and associated products;
- Natural resources typically harvested by women: medicinal and wild foods, fuelwood, grasses, palms, clay and associated products.

The discussion was semi-structured in that it followed a questionnaire as a guide, but could deviate from this, or concentrate on a particular aspect, as appropriate. The basic structure of focus group discussions is outlined in Figure 1.

Table 4: Explanation of the types of value described in this study

Measure of value	Explanation
Gross private value	The market value of the total output per year (quantity of production multiplied by market price)
Net private value	Gross private value less the annual cost of capital, labour and other fixed and variable input costs; with own (household) labour valued at the minimum wage rate (P600/month)
Gross output	Gross private value, slightly adjusted through shadow pricing, so that it reflects opportunity cost to the economy
Direct gross value added	Direct contribution to gross national income (GNI), calculated as gross output less inputs from outside the enterprise, leaving income earned by internal factors. It reflects opportunity costs to the economy and includes shadow pricing adjustments to account for market distortions, taxes and subsidies
Total gross value added	Direct <u>plus indirect</u> contribution to gross national income, calculated as direct gross value added plus an estimate of the indirect value added as a result of multiplier effects
Resource rent	The excess profit or economic rent generated annually by the enterprise, calculated as the gross output less production costs and a reasonable return on capital

Table 5: Population, average household size and composition in the two zones of the study area based on 2001 Population Census data.

	Zone 1 North	Zone 2 South
Population	12,032	19,374
Average household size	3.9	4.6
Number of households	3,070	4,167
Number of females	6,464	11,023
Number of males	5,568	8,351
Female headed households	1,537	2,245
Male headed households	1,533	1,922

Source: Population Census 2001.

Based on data gathered from the focus groups and existing data sources, the value of each resource was then estimated using a spreadsheet model. This model is similar to the one originally developed by the Namibian Directorate of Environment Affairs (e.g. Ashley *et al.* 1994 and Barnes 1996) and since adapted for use in Turpie *et al.* 1999 (Zambezi basin), Turpie 2000 (Rufiji, Tanzania), Turpie & Egoh 2003 (Caprivi) and Turpie *et al.* 2006 (Okavango Delta). The model estimates the current annual financial (private) and economic (societal) costs and returns to natural resource use and

agricultural activities as well as total annual production of each type of product. The above model was also designed to estimate total household income and the contribution of different areas of production (e.g. natural resources) to this income.

Figure 1: General structure of focus group discussions

FOCUS GROUP DISCUSSIONS	
A. Introductions	The purpose of the discussion was explained, and members of the group were encouraged to be as open as possible about the issues to be discussed.
B. Household Livelihood	People were asked how various sources of livelihood (crops, livestock, woodland resources, tourism, and government) contribute to household livelihood and wellbeing.
C. Resource description	All species of natural resources were named and described in detail, giving where they occur or are grown. Their treatment and uses were also described.
D. Rules of access	The group was asked to describe how households gain access to each resource, and any limitations on use.
E. Who is involved?	People were asked about the role of men, women and children in the production or harvest of the resource.
F. Equipment	The group was asked about the type of equipment used, its price, durability, and whether it is shared among households.
G. Seasonality	The group was usually first asked to describe seasonality in the availability and harvesting of certain resources. Some groups were also asked about seasonality of different agricultural activities (e.g. cultivating, harvesting).
H. Returns to effort	The group was asked how much could be harvested in a day or week during different times of year.
I. Typical household production	The group was asked how much was harvested or produced per year by a typical producer household.
J. Prices and inputs	Selling prices were obtained for each resource and for products made from these resources. Natural resource inputs into crafts and other products were also quantified.
K. Changes in availability	Members of the group were asked to describe and explain changes in availability over time.

2.2.3. Tourism

Tourism is much less developed in the MFMP area than in the Okavango delta and Chobe River front. The potential in the MFMP area is moderate with certain local attractions having high potential. These areas have been identified in a separate MFMP report on 'Tourism and Heritage Development'. Most of the tourism establishment in the area consists of medium-scale lodges and camps which offer services such as game drives, bird-watching, walking safaris, historical tours,

horseback riding, quad-bike riding, and use of restaurant, pool, craft shop and bar facilities. Camping sites and hunting camps offering guided big game trophy hunting are also present. To some extent the area serves as a stop-over on route to the Okavango or Chobe, rather than as a primary destination.

The tourism establishments in the area can be described as follows.

- Three up-market lodges/camps, with a total of some 56 beds, and are all sited near protected areas and benefit from the resources in these.
- Two up- to mid-market lodges/camps, with a total of some 34 beds, which also make use of the natural attributes and the protected areas but, to a varying extent also serve as complementary stop-overs.
- Five mid-market lodges/camps with a total of some 182 beds making use of local natural attributes and serving as complementary stop-overs
- Two up- to mid-market serviced hotels/motels, with a total of some 46 beds in village settings, serving primarily as stop-overs for business and leisure tourists,
- One mid market serviced hotel/motel with some 20 beds,
- Several community and private campsites also serving as primary destinations as well as complementary stop-overs.
- A number of mobile tourism operators make use of most of the accommodation and camping facilities
- Two safari hunting operations are present in the area, both offering big game trophy hunting experiences, and one part of a local community joint venture partnership.

Three serviced hotel/motels, situated in Letlhakane outside the FMP area, were not included in this valuation.

The land in the MFMP area is either state or tribal Land. Local communities have in eight cases formed CBOs and leased the use rights for wildlife and tourism through the Community-Based Natural Resource Management (CBNRM) Programme, from the Ngamiland or Central District Land Boards. Table 27 and 28 show the three CBOs that are operational and the remainder which are in the process of becoming so. Where tourism establishments in the MFMP area fall under operational CBOs they pay rentals and/or royalties to the CBO through joint venture partnerships. Elsewhere rentals and or royalties are paid to the Land Boards and District Councils.

For the purpose of this valuation exercise, all tourism accommodation and service providers making use of the study area were listed. As far as possible their characteristics were recorded from field visits, available data-bases, and through websites, e-mail or telephone. These data included the number of rooms, numbers of beds, numbers of employees, average tariffs, as well as details on the types of services offered. They were classified as described, above, into serviced hotels/motels, in villages, game lodges/camps, campsites, mobile operations and safari hunting operations. Hotels/motels and lodges/camps were classified on the basis of their tariffs as to whether they were up-market, mid-market or lower market.

Use was made of standard financial and economic models. As described above, these are detailed spreadsheet budget and cost-benefit models based on empirical data. Models of investment in lodges/camps, safari hunting operations, and community trusts (CBOs), typical of conditions in the study area were developed. The CBO models are based on those of Setlhogile (2010).

Private profitability measures from the perspective of the investor, such as the annual net income, ten year internal rate of return and ten year net present value were extracted. For the CBO models,

the private profitability measures were taken for the investment as a whole (communities, government and donors together) as well as from the perspective of the communities alone. This differed in that subsidies from government and donors were subtracted as costs.

Economic measures taken from the models were the annual change in gross national income (GNI) or, in other words, the annual direct contribution to GNI of tourism in the MFMP area. Then the ten year internal rate of return and net present value measures, or the return in terms of net national income, on the investment. Also extracted were the number of jobs involved, and the amount spent on salaries and wages for employees. In the case of tourism enterprises the amount of resource rent that could be paid in the form of rentals and royalties to land and resource owners was calculated. Similarly, in the case of CBO models, the amount of resource rent that could be paid out as dividends, to CBO members, was calculated.

The base case models were used to derive basic values and then these were aggregated for 2010. The aggregation process was undertaken using the lists of enterprises for the MFMP area, and with adjustments for variation in size and income. Thus, factors were applied, such as for number of beds, tariffs, size and composition of hunting quota, data on income, etc. The base case examples of the models used for the analysis are shown in Appendices 7.1, 7.2 and 7.3.

2.2.4. Mining

The valuation of mining was confined to the Soda Ash mine at Sua Pan. While it is possible to get detailed production data, access to financial data was limited due to the confidentiality issues associated with a sole operator. However, the operator was able to provide selected aggregate figures (Mathaba, E.S., 2010, pers. comm.), which made it possible to calculate the direct annual contribution made by the mine to gross national income and to crudely estimate the resource rent.

2.2.5. Linkages with other components

Information was obtained from the survey carried out for the Livelihoods component of the study as well as for the Tourism component. The valuation findings were also examined in the context of the CBNRM programme and incentives for sustainable livelihood generation.

2.3. Results

2.3.1. Overview of household livelihoods

The communities living within the study area rely on a variety of livelihood sources. The main activities in both zones are livestock farming and arable farming. Pastoralism, which is practised by most and dryland farming, are the main types of farming practised in the study area, and molapo farming is practised to a lesser extent. From the focus group discussions it was found that in the Gweta and Nata villages (Zone 1) informal and formal employment in lodges, shops and government institutions is important. Trade in natural and agricultural products provides employment opportunities to many, especially in the village of Mmatshumo (Zone 2) where it is one of the main sources of employment. Most of the villages in each zone also rely heavily on government welfare assistance programmes.

From the focus group discussions communities explained that they are aware of the tourism sector but they feel that they are not empowered and therefore do not participate within this sector. Their only participation is in the form of some employment at lodges and mostly through village trusts. These trusts are tasked with managing natural resources on behalf of the community. However

where these trusts are not operating well there is virtually no community participation in tourism. For example, Nata village (Zone 1) residents complain of minimal or no benefit from their trust, and although the trust in Mmatshumo (Zone 2) is running, community members are of the view that the benefits are minimal.

The majority of the houses within the study area are traditional Setswana huts built with mud, wooden poles, grass, and a mixture of water, soil and cow dung. Households within the study area derive their livelihoods from a variety of sources, including livestock farming, arable farming and gathering and trade in natural resources. In Gweta (Zone 1), grazing land is congested and getting heavily over-grazed due to population growth and expansion. Arable farming is largely carried out for subsistence purposes, but there are some farmers that do sell their produce locally and to the Botswana Agricultural Marketing Board (BAMB). However, farmers from both zones are of the view that BAMB buying prices are far too low to even sustain people's livelihoods, therefore where possible farmers sell to locals for reasonable prices and attain much higher returns. Crop production is low and erratic, and mainly carried out for subsistence purposes. Low market prices and the costs incurred in the production of crops are cited as the main reasons as to why most crop farming is generally not viable as an income generating activity. Arable farming is thus far less important than livestock production in terms of generating household income.

According to the focus group discussions, harvesting of natural resources to sell and for household consumption still plays an important role within these communities. This sector has however declined in importance because of the depletion of resources and loss of natural habitats or access to resources (Bendsen & Meyer 2002, Turpie *et al.* 2006). Natural resource gatherers in most cases do not specialise in collecting a particular resource but opt to collect a variety. In areas where markets are available and the demand is high a large proportion of the natural resources that are collected are sold and a small proportion is kept for household consumption.

Unlike the areas of the Okavango Delta (Turpie *et al.* 2006) craft-oriented practices such as basket weaving (with grass and palm leaves) and woodwork, are minimal across the study area as there is said to be no market available to most of the communities.

The following sections provide quantitative estimates of the contributions made by agriculture and the use of natural resources in the study area.

2.3.2. Livestock production

Livestock is considered to be the most important agricultural activity. Not only is it a source of cash income, but cattle also provide meat, milk, draught power, wealth store and social status. Nevertheless, there are some households that are primarily crop farmers and keep only small herds of livestock or have no livestock at all. Larger herds of livestock tend to be kept away from the villages at cattle posts, which are centred around water points, mainly boreholes. Most households with small herds keep their livestock in the village area. It is considered preferable to keep livestock at cattle posts, where they are less susceptible to disease, have better grazing conditions and cause less damage to crops. Livestock production is very extensive across the project area. Various costs are incurred when keeping livestock. These include drilling and equipping boreholes, purchase of stock feeds, medicines, supplementary feeds, and labour. Some of these costs are subsidised by government.

Generally households with livestock at cattle posts have larger herds than those in villages. Herd sizes were established through the focus group surveys, from the District Livestock Census and from the Annual Agricultural Survey. In the South (Zone 2) there are some 29 cattle, 45 small stock and 7 donkeys per livestock owning household whereas in the North (Zone 1) households have on average

35 cattle, 20 small stock and 7 donkeys (Table 2). According to the focus group discussions and the Annual Agricultural Survey, on average 5% of cattle, 4% of small stock and 0% of donkeys are sold either to the local butcheries or to the Botswana Meat Commission (BMC). Both the numbers of livestock and the offtake rates obtained were very conservative and are likely to have been underestimated. These results should be verified with quantitative surveys. Higher prices were reported in Zone 1 for the sale of cattle and small stock compared to Zone 2 (Table 6).

Table 6: Average numbers, rates of off take for consumption or sale per household and average prices reported by the focus groups per livestock unit.

Livestock	Zone 1 North	Zone 2 South
Cattle	35	29
% consumed	1.3	0.9
% sold	4.7	5.1
Average price in Pula	2875	2250
Small stock (goats & sheep)	20	45
% consumed	3	4.5
% sold	4	4
Average price in Pula	550	375
Donkeys	7	7
% consumed	0	0
% sold	0	0
Average price in Pula	250	300

Livestock farming is the most prevalent in the southwestern part of the study area, within Zone 2. According to the focus group discussions and the District Livestock Census, some 54% of households in Zone 1 have livestock, compared to 65% in Zone 2. Most of these livestock owning households keep their livestock at cattle posts. According to the focus group discussions livestock kept at cattle posts rely predominantly on boreholes and dug wells for water, whereas those in the village areas rely on natural water sources or wells dug in riverbeds (Table 7).

Table 7: Different types of water sources used by the four villages (taken from focus group discussions)

	Nata (Zone 1)	Gweta (Zone 1)	Rakops (Zone 2)	Mmatshumo (Zone 2)
Borehole	X		X	
Natural water source	X		X	x
Dug well		X	X	x

A major challenge across the study area is wildlife predation on livestock (Hemson *et al.* 2009). According to the group discussions, the village of Gweta (Zone 1), which is adjacent to the Makgadikgadi Pans National Park, has a high number of cases every year (.). Wild dogs, lion, leopard and hyenas are prevalent and take livestock mainly at night at the cattle posts. In Nata (Zone 1) and Rakops (Zone 2), wildlife predation is also high, whereas at Mmatshumo (Zone 2) in the south wildlife conflict is not such a large problem. The DWNP compensates farmers for livestock killed by wild animals, however destruction by some animals is not compensated for (e.g. hyena and jackal). Hyenas are known to kill livestock each year and respondents feel that they should be compensated.

Table 8: Reported cases of wild animals destroying crops and killing livestock in Gweta village

Year	Elephant	Lion	Leopard	Wild Dog	Total
2002	138	84	3	1	226
2003	26	55	4	0	85
2004	42	86	16	3	147
2005	184	100	10	2	296
2006	59	63	31	5	158
2007	191	77	16	16	300
2009	196	68	9	12	285
2010 up to February	33	18	0	0	51

Source: Hemson *et al*, 2009.

The gross value of production included off-take for home use as well as for sale, both at reported market prices, and milk production. It was assumed that the average milk production of lactating cows was 158 litres per annum (Barnes *et al*. 2008), and this was valued at P5 per litre. Value of draught and manure were not accounted for. However, these values were assumed to be small, given the fact that most cattle are kept away from villages and that ploughing is mainly carried out by tractor. Costs were obtained from earlier models as well as this study. 75% of borehole costs and 100% of veterinary costs were subsidised. The taxes and subsidies associated with the livestock on communal land were analysed in detail by Barnes *et al*. (2001, 2008), and include subsidies on the production costs side as well as in the income side. Those which affect income in the MFMP area include the distortions in grade price and transport costs which have the effect of enhancing income for producers.

Livestock was estimated to have a net private value to households of some P 48 million per annum (Table 9). It is estimated that just under 60% of gross income is realised as cash income, the remainder being consumed by the producer households themselves. The value per producer household is higher in Zone 1 than Zone 2 because of the higher prices of livestock reported. However, aggregate value is higher in Zone 2 because of the greater proportion of households engaged in cattle production. The direct contribution to Gross National Income was estimated to be in the order of P 10.7 million. The value of livestock production is higher in Zone 2, although the cash income per user household is higher in Zone 1.

Table 9: Estimated value of livestock production

Livestock	% hh*	Produced (LSU)	Sold (LSU)	Ave Price	Gross private value	Net private value	Gross value added
Zone 1 N							
Per producer household	54	2	2	2 918	8 288	2 754	1 776
Total		5 567	4 241		19 978 577	6 637 750	4 282 371
Zone 2 S							
Per producer household	65	2	2	2 337	7 489	1 959	1 428
Total		10 704	8 019		33 423 067	8 742 787	6 374 370
TOTAL (P)		16 271	12 261		53 401 644	15 380 537	10 656 741

* Percent of households; LSU = Large Stock Units, i.e. all livestock converted to equivalent units using published conversion factors, where 1 LSU = 1 cow (Meissner 1982).

2.3.3. Crop production

Most arable farming in the study area is dryland farming. Molapo farming takes place on seasonally flooded areas or areas that are moistened by rising groundwater (e.g. river beds). According to the focus group discussions, approximately 83% of households in the north (Zone 1) and 90% of households in the south (Zone 2) are involved in planting crops. Most of the villages in both zones have dryland fields, but households in the area of Rakops village practise molapo farming as well as dryland farming. Fields are small, with an average size of 3.8 hectares for dryland fields and 1.5 ha for molapo fields (Table 10). From the focus group discussions conducted at four villages (two from each zone), it was estimated that about 41 500 hectares are planted in the study area, with two thirds of this being in the south (Table 10).

Table 10: Proportion of households with dryland and molapo fields, average area planted per household (based on focus groups) and the estimated total area planted in the four villages.

	Zone 1			Zone 2		
	Nata	Gweta	Mean	Rakops	Mmatshumo	Mean)
% households with dryland fields	80.0	85.0	82.5	90.0	90.0	90
Average dryland area planted	5.0	3.0	4	4.0	3.0	3.5
% households with molapo fields	0.0	0.0	0	90.0	0.0	45
Average molapo area planted				1.5		1.5
Dryland area planted per zone (ha)			14 942			21 861
Molapo area planted per zone (ha)						4 685
Total area planted (ha)			14 942			26 546

The main crops grown are maize, millet and sorghum, which are sown together with a variety of other crops such as sweet reeds and beans. Millet and maize are staple foods, whereas sorghum is grown mainly for brewing beer. Millet is grown in much larger quantities in the North compared to the South. Pumpkin and watermelon are also popular, but because there is less of a market they are not grown in large quantities and are mainly for local consumption. Ditoo (legume family) and ground nuts are also grown by some households but these are uncommon crops and information on these crops is not substantive. In many areas growing crops is challenging because of the diverse soil types and amount of salt in the soil. The uplands are therefore more suitable for farming as opposed to areas surrounding the pans and wetlands where the salt content is high, hence the lack of molapo farming in most areas.

The average production of crops per household, prices and input costs were obtained from the focus group discussions. Where any information was missing data were obtained from the Botswana Statistical Year Book (2008), Botswana agricultural sector review (2009), census data, and values collected from other studies in Ngamiland (Bendsen & Meyer 2002, Turpie *et al.* 2006). Farming in the north was reportedly more productive and prices were higher than in the south zone (Table 11).

Table 11: Average production per ha of the main crops grown each season in each zone.

Dryland crop	Unit	Approx. price	Approx. price	Production	Production
		per unit (P) Zone 1	per unit (P) Zone 2	per ha Zone 1	per ha Zone 2
Maize	Kg	7	5	375	282
Millet	Kg	6.5	6.5	250	29
Sorghum	Kg	3.5	2	313	286
Beans	Kg	12	13.5	86	29
Sweet Reeds	Each	2	2	125	179
Melon	Each	20	20	15	15

According to the focus group discussions, inputs into farming are relatively small. All subsistence farmers are assisted by the government through the Integrated Support Programme for Arable Agriculture Development (ISPAAD). The major thrust of the programme is to boost arable farming production and the assistance is delivered as follows:

- Government pays full costs of ploughing up to 5ha (P400/ha);
- Government pays 50% and owner pays 50% for ploughing over 5ha up to 16ha;
- Government pays for full costs of seeds up to 16ha;
- Government provides free fertilizer for up to 5ha and a 50% subsidy for up to 11ha;
- ISPAAD encourages farmers to form clusters and then pays for full costs of fencing.

In the past, farmers used donkeys and oxen to plough their fields. However, with the introduction of agricultural support programmes such as ISPAAD, farmers have access to tractors, which are hired to plough their lands. Use of a tractor is much faster and does not require a great deal of labour. There are, in certain areas, still farmers that own their own donkeys and ploughs. On the molapo farms in the Rakops village, farmers continue to use donkeys to plough since these farms are not as large as the upland fields. Therefore, the main costs that a farmer incurs are labour costs for clearing, weeding, tending and harvesting of the fields.

Farmers in some areas incur crop losses mainly due to livestock because livestock is not kept in kraals or because of poor herding practises. In Mmatshumo village (Zone 2) livestock invasion in the crop fields is very limited because most fields are fenced. Wildlife destruction of crop fields is another major challenge in some areas. Elephants can be extremely destructive, destroying entire fields in a single day. Other animals include duiker and kudu.

Cropping was estimated to have a net private value of about P 19 million to farmers and to have a gross value added of P 14.7 million. This value is relatively low because, as is the case with livestock, private values are enhanced by the high level of subsidy. Given the wetland contribution to molapo farming in the Okavango Delta area (40% more productive than upland fields – Turpie *et al.*, 2006), it is estimated that the pans contribute up to about 8% of the value of agriculture in Zone 2 in terms of production above what would have occurred under totally dryland conditions. Most crop farming is for household consumption only. If households do sell crops, it is in small quantities and to other members of the community, generating minimal income, and such sales are likely to vary significantly from year to year along with production. It is therefore assumed unlikely for households to derive any significant cash income from crops and only the value of the dryland farming was calculated (Table 12).

Table 12: Estimated average value of production of crops

Crops	% of households	Gross private value	Net private value	Gross value added
Zone 1 N				
Per producer household	76	6 928	4 481	3 897
Total		23 722 850	15 346 366	13 344 658
Zone 2 S				
Per producer household	83	3 220	678	239
Total		18 350 452	3 863 087	1 362 955
TOTAL		42 073 302	19 209 452	14 707 613

2.3.4. Gathering of natural resources

This section describes the use of natural resources within the study area, the degree to which rural households are involved in harvesting and processing these resources, estimates of quantities of harvests and production of natural resource products, and their value. The use and value of each of these products is explained and discussed in some detail in the following sections.

Participation in natural resource use

Several natural resources are harvested in the study area, many of which are used or processed by a high proportion of households in the study area (Table 13).

Table 13: The different natural resource-related activities that each village is engaged in

Activity	Nata (Zone 1)	Gweta (Zone 1)	Rakops (Zone 2)	Mmatshumo (Zone 2)
Grass	x	X	x	X
Mopane worms	x	X		X
Wild Fruits	x	X	x	X
Firewood	x		x	X
Wild vegetables	x		x	
Palm leaves	x		(x)	X
Salt harvesting	x			X
Poles	x	X	x	X
Timber	x		x	X
Fishing	(x)			
Honey	(x)		(x)	
Wild birds	(x)			
Medicinal plants			x	X
Pottery	(x)			

Note: The crosses in parentheses (x) indicate that only a very few number of households are engaged in the activity.
Source: focus group discussions

Several laws regulate the use of natural resources in Botswana. Veld products such as thatching grass and fuel wood are managed by local communities. However, these management systems have become weak as a result of loss of power of traditional leadership as well as increasing subsistence

and commercial demand for resources. Hunting is a licensed activity regulated by the 1992 Wildlife Conservation and National Parks Act. Based on the focus group discussions, all four villages maintained that they did not participate in hunting, for fear of prosecution by the Department of Wildlife and National Parks (DWNP). Some groups are able to buy game meat during the DWNP auction sale, which includes problem animals that have been shot.

There is concern that many of the natural resources in the study area are being overexploited. Many of the poorer households in the area are dependent on natural resources for survival. Some of the villages indicated that veld resources are generally declining because of the low amount of rain and the extensive veld fires, which have been more prevalent over the past two years.

Grasses

Grasses are used extensively throughout the study area for thatching, building of fences, and for traditional brooms. Grasses are mainly collected for thatching, and it was found that if the most durable grass was used and the thatching was done correctly, then it could last up to 30 years, though this may vary between areas.

Based on the discussion groups, a large proportion of households to the northeast at Nata village, to the south at Mmatshumo village, and to a lesser extent in the north at Gweta village are engaged in collecting grass. Households in Rakops village to the southwest only collect grass for thatching when needed and do not collect grass to sell. Households in the north (Zone 1) collect on average 525 bundles of grass per year, which is significantly higher than households in the south (Zone 2) who collect on average 275 bundles per year (Table 14). Households in the north also sell more, selling up to 80% of the bundles. In the south the grass is collected mostly for own use, with only 10% of the collected grass being sold. Cash income per household is approximately P 420 in the south and P 2 625 in the north. Grass harvesting is worth approximately P 18.1 million in terms of net private value to households, and just over P 21 million in terms of gross value added to national income. These differences tend to reflect spatially differing availability of grass suitable for thatch within the FMP area. Overall some 45% of the grass harvest is sold. Grass harvesting is worth approximately P 29 million in terms of net private value to households, and just over P 33 million in terms of gross value added to national income.

Table 14: Estimated household harvests and value of grass in the study area

Upland grass	% households	Produced (bundles)	Sold (bundles)	Price	Gross private value	Net private value	Gross value added
Zone 1 N							
Per producer household	68	525	420	6	3 281	2 358	2 977
Total		1 596 724	1 277 379		9 979 522	7 171 274	9 055 426
Zone 2 S							
Per producer household	88	275	28	15	4 125	3 634	4 080
Total		1 652 147	168 219		24 782 203	21 834 042	24 509 804
TOTAL		3 248 870	1 445 597		34 761 725	29 005 316	33 565 230

Wild foods and medicines

The majority of households in the study area harvest wild foods and medicines. Although this includes both rich and poor households, according to focus group discussions, poor households tend to harvest more. Women from all types of households tend to harvest fruits and leaves for food, whilst men also harvest medicinal plants. The amount of resources that are collected and then sold

versus kept for household consumption varies between the villages. In Nata village (Zone 1) most of the resources are sold and only a small portion is kept for consumption, whereas in Mmatshumo (Zone 2) most of the products are collected for subsistence purposes.

Ten of the more common wild food plants used in the study area are listed in Table 15. Use of wild foods varies throughout the year, mainly due to their availability, rather than a particular period of household shortage. According to the discussion groups, fruits are mainly harvested during June – July and December – January. The most common of the wild fruits are the *mogwana* family, which includes *moseme*, *moretlwa*, and *mogwana-wa-khadi*. These fruits are collected in vast quantities with large proportions being sold. *Moseme* and *mogwana-wa-khadi* are less perishable and are able to be kept in storage for a relatively long period. *Mogwana-wa-khadi* is used mainly for brewing the local beer known as *khadi*. The locals expressed concern that these wild fruits have been very limited over the past year, compared to previous years when they have been abundant. Other fruits which are less abundant, but sought-after, such as *mochabe*, are mainly collected for household consumption. Wild leaves (part of the spinach family), such as *thepe* and *delele*, are harvested in November and December and are mainly used for household consumption. The availability of wild foods from year to year is strongly dependent on rainfall.

Table 15: Details of wild foods collected across the study site

Resource	Local name	Local price per unit	Availability
Wild Fruit	Moseme	P5 per cup	abundant
	Moretlwa	P5 per cup	abundant
	Mogwana-wa-khadi	P5 per cup	abundant
	Moretologa		Scarce to enough, rainfall dependent
	Mochaba		
	Mokgompatha		
	Motsotsojane		
Wild leaves	Delele	Dried P5/cup	
	Thepe	Dried P5/cup	
	Rotlwe		

Source: focus group discussions

Information collected from the focus group discussions was used to estimate the number of households involved in collecting wild fruits. A much larger percentage of households are involved in collecting wild fruits in the north (90%) compared to the south (48%). According to these focus groups, an average user household will collect roughly 500kg of wild fruit annually. The only significant input into this activity is time. Households earn an estimated P 900 – P 950 per household in cash income, and derive a total net private value of some P 3400 – 4 500 per annum. In aggregate, the collection of wild foods was estimated to be worth about P 18.7 million in terms of net private income, and P 23 million in terms of gross value added (Table 16).

Table 16: Estimated household harvests and value of all wild fruit in the study area.

Upland fruits	% of households	Harvested (kg)	Sold (kg)	Price	Gross private value	Net private value	Gross value added
Zone 1 N	0	0	0	0	0	0	0
Per producer household	90	500	90	10	5 000	3 443	4 471
Total	0	2 027 585	364 965	0	20 275 855	13 960 118	18 131 779
Zone 2 S	0	0	0	0	0	0	0
Per producer household	48	550	95	10	5 500	4 586	5 318
Total	0	1 812 641	313 093	0	18 126 411	15 115 102	17 527 077
TOTAL	0	3 840 227	678 058	0	38 402 266	29 075 219	35 658 856

A few of the medicinal plants harvested by ordinary households are listed in Table 17. It should be noted that the list harvested by traditional healers would be much longer, but a detailed study of medicinal plant use was beyond the means of this study. The respondents pointed out that information on medicinal plants is not easy to get and mostly held by traditional doctors. It was difficult to obtain a reasonable assessment of value and availability in these groups.

Table 17: Details of medicinal plants.

Part Used	Local name	Local price per unit	Availability	Trend
Root	Nshongwa	Approx. P20	Enough	Stable
Root	Pheho	Approx. P20	Plenty	Increasing
	Kakwe	Approx. P20	Plenty	Increasing
Root	Monnamontsho	Approx. P20	Enough	Stable
Root	Mosiha wa poo	Approx. P20	Enough	Stable
	Ntimba	not sold		
	A-re-ye-gae	not sold		
	Zimizamaye	not sold		

Source: Focus group discussions.

Woody Resources

Woody resources in the study area are used for fuel, building materials and fencing materials. Most households are reliant on fuel wood for cooking and harvest fuel wood on a regular basis (Census data and focus group discussions). The reliance is almost 100% in the south and south-west areas and slightly lower in the other areas. In Mmatshumo (Zone 2) 96% of households are engaged in collecting firewood. The requirement of a license to harvest firewood has drastically reduced the number of households involved in the activity. According to focus group discussions, in Rakops firewood is very scarce around the village and individuals have to travel far in order to collect it. The common mode of transporting the firewood is in four-wheeled donkey carts. *Mongana* and *Mogotlho* are the most important and most commonly used species for firewood, and focus groups did not perceive any problem with the availability of this resource (Table 18).

Census data and focus group discussions were used to calculate the percentage households involved in using firewood. Firewood is collected mainly for subsistence purposes and transported as a head load. The head load is said to last 4-5 days and therefore households use on average 5-6 head loads

per month (Table 19). In each village only a small number of households are involved in selling the firewood (Table 20). Because so few households are involved in selling firewood, cash income per household was not calculated. Table 22 shows the cash income gained by those that do sell firewood in each village. It is estimated that a total of 950 000 head loads of fuel wood is harvested each year, with more being harvested in Zone 2 than Zone 1. The total harvest of fuel wood in the study area is worth a net total of some P 2.7 million to households. The values per household are similar to the values seen across the Okavango Delta study area (Turpie *et al.* 2006). Firewood trade is very limited compared with own use, and it generates a small income to sellers (Table 20). The results of the survey, suggest that less than 1% of the total firewood harvest is sold.

A fairly large number of households collect poles for house and fence construction. Actual values for the numbers of poles are unknown as it was difficult to establish the proportion of households that harvest poles. However, the respondents stated that many if not all households harvest poles because they are used in the village, in the fields and at cattle posts.

Table 18: Main species used for fuel wood and timber according to focus group discussions

	Local name	Availability	Trend
Firewood	Mongana	Enough	Increasing
	Mokabi	Enough	
	Mosu	Plenty	Increasing
	Mogotlho	Plenty	Increasing
	Matsiara	Enough	Constant
Timber	Marula	Plenty	Constant
	Motswere	Enough	Decreasing
	Mophane	Plenty	Constant
	Mosokaphala	Enough	Constant
	Mogwana	Plenty	Constant
	Mogonono	Enough	Decreasing
	Morukuru	Enough	Decreasing
	Mokoba	Enough	Decreasing
	Mokabi		
	Mokgalo		

Table 19: Estimated household harvests and value of fuel wood in the study area.

	% hh	Produced (head loads)	Gross private value	Net private value	Gross value added
Zone 1 N		0	0	0	0
Per producer household	85	89	445	248	328
Total		340 860	1 704 298	951 670	1 257 610
Zone 2 S		0	0	0	0
Per producer household	89	100	500	284	377
Total		611 080	3 055 399	1 738 215	2 301 326
TOTAL		951 939	4 759 697	2 689 884	3 558 935

Table 20: The number of firewood dealers in each village and the total cash income generated

	Nata (Zone 1)	Gweta (Zone 1)	Rakops (Zone 2)	Mmatshumo (Zone 2)
Number of firewood dealers	14.0	10.0	10.0	0.0
% of total households	2.1	1.3	1.4	0.0
Number of loads sold per month	3.5	4.0	3.0	0.0
Price of load (P)	250.0	275.0	175.0	0.0
Total cash income per month (P)	875.0	1100.0	525.0	0.0

Only a few households harvest timber to make various wooden products. Relatively few individuals within a village are able to produce these well-refined products. The main species used for making these items are listed in Table 18. Households manufacture furniture items, various items used in production, such as hoe, axe and chisel handles, as well as items such as instruments (Table 21).

Table 21: Different types of products made from timber and their approximate price

Type of product	Approximate Price
Kika (pounding pot)	small P35 - 50
	Large P50 - 150
Motshe (pounding stick)	P40 - 50
Kgotla chair	P150 - 350
Kgamelo (bucket)	P25 - 50
Dintsho	P7
Walking stick	-
Lehetlho	P7
Handles for axe and ho	P10 - 20
Handles for chisel	P30
Moropa (drum)	-
Leswana (wooden spoon)	P25

Mopane worms

The collection of mopane worms is an important activity. Because they are in high demand they are collected in vast quantities, and are sold locally and to areas outside the villages that do not have access to the mopane worms. The community of Rakops (Zone 2) do not collect mopane worms because they are not available in or around the village. In Mmatshumo (Zone 2), households sell Mopane worms to areas outside the village, such as Letlhakane and Rakops. In Gweta (Zone 1), collectors from outside the village travel long distances to reach the resource and stay in the area for up to month, harvesting the worms and then selling them to outside areas. According to the focus group discussions buyers from outside the villages are said to be selling the worms to South Africa at much higher rates. Overall, a relatively high proportion, some 80%, of the mopane worm harvest is sold.

Mopane worms are harvested in April and in December, with the largest quantities being harvested during April. The December season is often short and also coincides with the ploughing season, which limits harvesting. Based on descriptions provided by the focus groups, we estimated that about 200kg are harvested per user household in April, and an additional 60kg in December in an

average year. Respondents from Nata village (Zone 1) explained that Mopane worms have not been plentiful over the past two seasons and reasons for this trend are unknown.

Information was obtained from the focus group discussions on the proportion of households that engage in this activity. There are a higher percentage of households in the north engaged in collecting mopane worms than those in the south (Table 22). Based on the reported harvests, mopane worms were estimated to be worth in the order of P3000 to user households, with a total net private value of P 5.8 million and P4.0 million in Zone 1 and Zone 2, respectively. The activity contributes an estimated P 11 million in direct value added to the national income (Table 22).

Table 22: Estimated household harvests and value of mopane worms in the study area

Mopane Worms	% of households	Harvested (kg)	Sold (kg)	Price	Gross private value	Net private value	Gross value added
Zone 1 N							
Per producer households	48	260	208	12	3 120	2 688	3 060
Total		562 317	449 854		6 747 804	5 813 637	6 618 111
Zone 2 S							
Per producer households	20	260	195	12	3 120	2 940	3 186
Total		357 035	267 777		4 284 424	4 037 284	4 375 076
TOTAL		919 352	717 630		11 032 229	9 850 921	10 993 186

Other natural resources

Use of palms, salt harvesting, fishing, hunting of wild animals and birds, and honey collection were activities mentioned during the focus group discussions. However, unlike the areas of the Okavango Delta, these activities are only practised in very small amounts or very irregularly. Areas surrounding the Okavango rely largely on fishing and gain relatively high amounts of income from craft orientated activities, such as basket weaving (Turpie *et al.*, 2006). These activities are discussed below but are considered to make only a minor contribution in terms of income to households from natural resources. The proportion of households involved in these activities and the amounts harvested annually are not known and therefore their value could not be calculated.

Leaves of the *Mokola* palm *Hyphaena ventricosa* are harvested mainly for the manufacture of baskets, tying of thatching, and other crafts. The seeds of the tree are ornamental and can be used for decoration and to make bracelets and necklaces. Basket weaving in these villages is not prevalent as there is a lack of market, and because of this the baskets are not sold and only made on request. Natural dye collected from the veld is used to dye the baskets the desired colour. Although there are households within the study area that do collect mokola, this is mainly for household use only and very few women weave baskets and sell products.

The villagers of Nata and Mmatshumo harvest salt from the pans. This is done mainly from October – November, and harvested by locals as well as non-locals. The salt is sold at approximately P20/kg but is also used for decoration, supplementary feeds for livestock, in cooking and has medicinal value. The salt is dug out and left to dry in the sun. Respondents explained that the harvesting of salt leaves skin extremely dry and itchy and because of this not many people practise salt harvesting. The practice of salt harvesting was once common on the pans, and is described in detail by Matshetshe (1999).

The only village to say they practised fishing was Nata village in the east. Here, according to the focus group, approximately 5% of all households engage in fishing for subsistence. Fishing takes place in the Nata River, and is practiced all year round, but particularly after heavy rains. The fish are said to be extremely salty and the main fish species caught are bream, *mandevu*, and to a lesser extent sardine.

All groups from all four villages claimed they did not engage in the hunting of wild animals and that the only game meat they got was bought during the DWNP auction. Hunting licenses are expensive and respondents said they fear prosecution. Some groups did say they hunted wild birds for household consumption and that the birds were plentiful and increasing in number.

A very small proportion of households collect wild honey in the study area. A small number of residents of the Nata and Rakops villages collect honey or keep their own bees. Villagers stated that most people are afraid of being stung and that there is no real market for honey.

In all of the natural resources gathering activities described above, the economic contributions are higher than the corresponding net private values, or private net incomes. This is primarily due to the fact that they are labour intensive, and labour in the MFMP area has economic or social value which is higher than the private cost. This is due largely to unemployment in the less skilled labour sectors, which results in the real economic opportunity cost for labour being lower than the transaction or wage cost of labour. Another reason for the economic values being higher than private ones is the fact that these activities, unlike livestock and crop production do not benefit from a net subsidy in the MFMP area.

2.3.5. Livelihoods, direct and total economic impact

Table 23 shows the summarised livelihoods income from livestock, crops and natural resource use other than tourism. This is given in the net private values column. It amounts in aggregate to P 108 million and includes the value of own consumption, or subsistence use of resources as well as income generated from sales. Table 23 also shows the total estimated impacts, of agricultural activities and natural resources use in the MFMP area, on the broader Botswana gross national income, including both direct value added and indirect value added resulting from backward linkages. The direct value added to gross national income attributable to these activities within the MFMP area is shown in the second column, and amounts to P 109 million in total. The value added multiplier as determined by Turpie *et al.* (2006), using the social accounting matrix (SAM) model of the Botswana economy was measured at 1.95 for the agricultural activities, and 1.64 for the natural resources harvesting activities. Based on these multipliers, the total gross value added was estimated to be in the order of P 187 million per annum. This reflects an estimate of all the annual gross value added that is generated both directly and indirectly, in the Botswana economy, as a result of these activities. Without them the economy would be that much smaller.

Table 23: Summary of the net private values and economic values associated with household natural resource use and agricultural activities (in Pula millions per year)

Activity/use	Net Private Value	Direct gross Value added	Value added multiplier	Total gross Value added
Livestock	15.4	10.7	1.95	20.8
Crops	19.2	14.7	1.95	28.7
Grasses	32.0	33.6	1.64	55.0
Wild foods	29.1	35.7	1.64	58.5
Firewood	2.7	3.6	1.64	5.8
Mopane worms	9.9	11.0	1.64	18.0
TOTAL	108.2	109.1		186.9

2.3.6. Tourism

Typical wildlife viewing lodges/camps in the MFMP area can be expected to be financially attractive as investments, with a ten year internal rates of return of between 10% and 15%. They could be expected to contribute significantly in terms of land rentals and resource royalties to land holders in the area. A typical lodge might be in a position to contribute up to P400 000 per annum to community trusts or land or district authorities.

Typical safari hunting enterprises in the northern parts of the MFMP area, where there are elephant bulls in the quota, can be expected to generate ten year internal rates of return for investors of between 10 and 15%, and contribute rentals and royalties of up to P1 million to community trusts or other land holders. Without elephant on the hunting quota the venture would be unlikely to be attractive for the investor without considerable economies of scale.

Table 24 shows the key direct economic use values estimated for tourism in the study area. Tourism in the MFMP area directly contributes some P 55 million annually in gross value added to the national income. Some 65% of this is generated by game lodges/camps, and 42% of it is generated by the few up-market establishments. About 22% of the direct GNI contribution of P 55 million is from the few safari hunting enterprises in the area.

Table 24: Direct economic use values for tourism within the MFMP area (Pula, 2010)

Category	Capital investment	Gross Output*	Gross value added*
Serviced hotels/motels			
Upper to mid market	14 504 700	16 016 600	6 486 000
Mid market	1 345 500	1 485 800	601 700
Subtotal	15 850 200	17 502 400	7 087 700
Game lodges/camps			
Upper market	51 378 400	56 733 800	22 974 600
Upper to mid market	15 660 500	17 292 900	7 002 800
Mid market	14 279 900	15 768 400	6 385 500
Subtotal	81 318 800	89 795 100	36 362 900
Other tourism activities			
Campsites	185 200	204 500	82 800
Mobile operations	6 708 800	14 816 200	5 999 900
Safari hunting operations	6 793 100	14 131 600	5 807 700
Subtotal	13 687 100	29 152 300	11 890 400
TOTAL	110 856 100	136 449 800	55 341 000

*per annum

Table 25: Total direct and indirect economic values for tourism in the Botswana economy, attributable to the MFMP area (Pula, 2010)

Category	Capital investment	Gross Output*	Gross value added*
Serviced hotels/motels			
Upper to mid market	63 617 500	70 248 700	28 447 500
Mid market	5 901 500	6 516 700	2 639 000
Subtotal	69 519 000	76 765 400	31 086 500
Game lodges/camps			
Upper market	225 345 700	248 834 600	100 766 700
Upper to mid market	68 686 900	75 846 500	30 714 400
Mid market	62 631 600	69 160 000	28 006 700
Subtotal	356 664 200	393 841 100	159 487 800
Other tourism activities			
Campsites	324 900	358 700	145 300
Mobile operations	11 769 900	25 993 500	10 526 200
Safari hunting operations	29 794 400	61 981 000	25 472 600
Subtotal	41 889 200	88 333 200	36 144 100
Total	468 072 400	558 939 700	226 718 400

*per annum

Table 25 also shows use value attributable to tourism in the MFMP area, but in this case it shows the *total* impact on the Botswana economy from these activities. Thus it includes the effects of lateral linkages, such as when visitors to MFMP area accommodations spend elsewhere in getting to and from these facilities. It also includes the effects of backward linkages, such as when accommodations on the MFMP area purchase inputs such as fuel and food from other sectors, or when employees of these accommodations spend their salaries on goods for themselves such as food. The effects of lateral linkages were estimated using a factor of 1.7, derived from tourism surveys (Department of Tourism 2000, 2006), and the backward linkage effects were estimated using the tourism income multiplier of 2.58, derived from the work of Turpie *et al.* (2006).

It can be seen that the total impact of tourism in the MFMP area on the gross national income in 2010 is estimated to be P 226.7 million. This is significantly higher - four times higher - than the P 55 million directly generated by the accommodations within the MFMP area, and it shows the importance of linkages in the modern, demand driven tourism sector. By and large, the MFMP tourism activities represent accommodation for tourists attracted to or using the attributes in the area. Tourists who make use of these products also spend in Botswana on booking agents, transport, crafts, and other retail products during their trip. These expenditures are deemed to be laterally linked as they would not be made without the expenditures on the MFMP accommodation experience. Both the on-site and laterally linked expenditures result in direct value added, and they both result in backward linked value added due to the value added multiplier. This explains the significantly higher overall multiplier effect associated with tourism compared with that for agriculture and natural resources use.

Table 26 shows some further economic values associated with tourism, in the MFMP area. It is estimated that the tourism activities (primarily accommodations) within the MFMP area result in 350 jobs, and annual salaries and wages payments of some P 22 million. This reflects an average monthly wage of about P 1,100 for unskilled employees, about P 4,100 for skilled workers, and P 13,700 for managers, indicating that employment in the tourism sector tends to be better paid than that in agriculture. As a result of the lateral and backward linkages referred to above, the number of jobs in the Botswana economy as a whole, attributable to this tourism activity, is estimated to be 1,440, with remuneration amounting to P 90.2 million. Tourism activities making use of the natural resources lodges/camps, hunting operations, campsites, etc, generate resource rents of some P 6.9 million per annum in addition to those which government appropriates in taxes and fees. The contribution of MFMP tourism to local livelihoods was estimated to be some P 14.7 million.

Table 26: Further economic and financial values associated with tourism in the MFMP area (Pula/annum, 2010)

Jobs (number)	Wage bill (Pula)	Resource rent* (Pula)	Local livelihoods (Pula)
Direct values - FMP area only			
350	22 021 000	6 909 000	14 732 000
Direct and indirect impact - Botswana economy			
1,440	90 214 000	n/a	n/a

* Crude preliminary estimate

CBNRM

The valuation of tourism described above, covers all tourism but it is useful for the MFMP to explain how property rights fit into these values. Traditionally Communal Land is managed by the District Land Board and State Land is managed by the Department of Lands. The national Community-Based Natural Resources Management (CBNRM) programme aims to provide resident communities with

use rights over natural resources in particular wildlife resources. They can form CBOs and register them as trusts, to carry out common property management and use of these resources. This has been the case in those parts of the MFMP area where communities reside and some eight trusts have been registered. Table 27 shows details relating to the registered trusts that are currently operational, and Table 28 shows details for those that are registered but not operational, following data from Setlhogile (2010).

A typical CBO in the MFMP area might generate a ten year financial internal rate of return on overall investment of some 10%. For the community itself the return is higher if the subsidies flowing to them from donors and government are considered. The ten year internal rate of return for communities would be some 25%. Community net income in the form of livelihoods from a CBO might be some P 270,000 per annum, made up as net income from activities such as campsites, salaries and wages from CBO employment, and net income from the rentals and royalties received from joint venture partners, such as lodges or hunting enterprises.

The aggregate direct economic gross value added to national income by the CBNRM programme activities in the MFMP area amounts to some P 990 000. Inclusion of the backward linkages for these CBO activities results in an estimated value added multiplier of 1.81 as derived from the Namibian and Botswana SAMs (Lange *et al.*, 2004; Turpie *et al.*, 2006) the total direct plus induced economic impact of these CBO activities would amount to some P 1.8 million. This ignores lateral linkages associated with the joint venture partnerships. However, as explained, because of overlap, none of the values can be added to the tourism values already documented above.

CBO income is nearly all derived from tourism and is made up of rentals and royalties from lodge/camp, or hunting, joint venture partnerships, net income from community run campsites and guiding fees. As such it is included in the valuation of tourism above. The CBO investment models overlap with the tourism activity models described above and only add very small amounts of additional value to those presented above. Where they come in useful is in informing us on how much of the rents generated in tourism are captured by communities, and illustrating what the incentives for communities to conserve their resources sustainably through CBNRM are.

It is clear from the model developed for the MFMP area that CBOs are economically efficient. CBNRM has been shown in Namibia to be highly successful in diversifying incomes, and enhancing conservation of natural resources (NACSO, 2008), and the CBNRM programme as a whole there has been shown to be economically viable (Barnes, 2008). What is clear is that there is significant potential for further development of CBOs in the MFMP area - all those in Table 28 have potential to become operational, capture rents from tourism and other natural resource uses, and ensure more sustainable natural resources management.

Table 27: Registered and operational CBOs in the MFMP area in 2010

Name of CBO	Date registered	Villages Covered	CBNRM Activities	Remarks
Trusts registered and operational				
Nata Conservation Trust	05/05/1992	Nata, Sepako, Maposa, Manxotae	<p>Current activities</p> <ol style="list-style-type: none"> 1. Photographic tourism in Nata Sanctuary. 2. Craft production 3. Management of a Campsite <p>Planned Activities at Nata Sanctuary</p> <ol style="list-style-type: none"> 1. Development and Management of a lodge <p>Planned Activities at CT 5</p> <ol style="list-style-type: none"> 1. Photographic tourism 	<p>Financial/economic model developed. Revenues for 2009: P135,000, gate fees and Nata Lodge.</p> <p>Workshop held to try and align their constitution with the Model Deed of Trust. MoU signed with joint venture partner to build and operate the lodge.</p> <p>Application submitted to Ngwato Land Board for CT 5.</p> <p>Drafting Management Plan for CT 5.</p>
Gaing-O Community Trust	1997	Mmatshumo	<p>Current activities</p> <ol style="list-style-type: none"> 1. Photographic tourism on Lekhubu Island (a National Monument). 2. Management of a Campsite 3. Selling crafts and firewood <p>Possible future activities</p> <ol style="list-style-type: none"> 1. Lodge development 	<p>Financial/economic model developed. Revenues for 2009: P444,000.</p>
Xhauhwatubi Development Trust	11/12/2002	Phuduhudu Size of the CHA: 112,8 km ²	<p>Current activities</p> <ol style="list-style-type: none"> 1. Hunting and some photographic tourism. 2. Sponsorships, funeral contributions, accommodation, houses and toilets for elderly, employment – 14 (2 non-locals). <p>Planned activities</p> <ol style="list-style-type: none"> 1. Planning shift to photography in 2010. 	<p>Community have waiver to utilize resources in NG 49, Head Lease signing pending development of NG 49 Management Plan. Trust constitution amended to align it with the Model Deed of Trust.</p> <p>Retendering joint venture in 2010. Revenues in 2005: P1,271,750, Including: Land rental, Hunting quota, Game birds, Community development.</p>

Table 28: Registered CBOs, currently not operational in the MFMP area in 2010

Name of CBO	Date registered	Villages Covered	CBNRM Activities	Remarks
Trusts registered but not operational				
GWEZOTSHA Natural Resources Trust	08/03/1996	Gweta, Zoroga and Tsokatsha CT11&CT7 Grazing and photographic areas. 11,927 km ²	Former activities 1. Morula processing and marketing.	Trust operated for some time between 1996 and 2005, but has since stopped. Supported by DWNP, Conservation international and Gweta Lodge owner. MEWT has initiated a revival of Trust. Revenues between P30,000 and P140,000 per annum.
Ngande Trust	11/12/2002	Kumaga	Recent activities 1. Production and sale of Morula sweets. Planned Activities 1. Photographic activities at Gwaraga around Makgadikgadi Pans National Park. 2. Lodge. 3. Cultural Village and Campsite 4. Fish Farming	Trust in the process of amending its constitution (Deed of Trust) to encompass others who were not initially members of Ngande Trust, but affected by the Makgadikgadi Pans National Park fencing project. The Trust recommended a change of name.
Mokopi Conservation Trust	19/12/2005	Mopipi. Mokoboxane	Planned Activities 1. Mopipi Dam rehabilitation for fish farming. 2. Game farming. 3. Campsite. 4. Tree planting.	Not yet operational. Management plan developed in 2006/7. MP recommended Trust approach donors, including DEBSWANA, for financial and other assistance.
Lenao la Kwalabe Conservation Trust	19/12/2005	Kedia	Planned Activity 1. Game farm at Hima Ranches	Not yet operational.
Gumakotsha Conservation Trust	26/03/2006	Mosu	Planned Activities 1. Game farm at Gumakotsha farm. 2. Fish farming. 3. Cultural village. 4. Lodge or motel.	Not yet operational.

2.3.7. Mining

Table 29 and Table 30 show the direct economic value estimates derived from the 2009 and 2008 data available.

Table 29: Direct economic values for mining in the MFMP area (Pula million/annum, 2010)

Category	Capital investment	Gross output	Gross value added
Mining (soda ash & salt)	458,000,000	528,500,000	190,000,000

Table 30: Further direct economic and financial values estimated for soda ash and salt mining in the in the MFMP area (Pula /annum, 2010)

Jobs (number)	Wage bill (Pula)	Resource rent* (Pula)	Local livelihoods* (Pula)
440	99,000,000	121,300,000	74,250,000

* Crude estimates based on aggregate data

Without more detailed financial data it was difficult to rigorously compare the estimates in Table 29 and 30 with others made in this report. The estimated direct value added to the gross national income for 2010 amounts to some P 190 million, and some 440 people are employed, with a wage bill of some P 99 million. Employment in the mining industry is therefore relatively highly paid compared with that in tourism and even more so compared with that in agriculture. Data on production and values for earlier years suggest that 2010 output values might be some 10% higher than those in earlier years. Based on these estimates, mining is clearly the most economically significant natural resources use in the MFMP area. The diamond mining activities, at Orapa and Letlhakane, just outside the MFMP area were left out of the valuation, but together they are estimated to employ some six times more people than the soda ash operation here (Department of Mines 2007). Thus one might crudely deduce that direct economic value added to GNI for diamond mining just outside the MFMP area amounts to some P 1 billion.

The income or value added multiplier for the mining sector is estimated from the Namibian SAM (Lange et al. 2004) is estimated to be 2.46. If this is applied to the direct gross value added of P 190 million in Table 29, then the total gross value added to the national income, including the effects of all backward linkages, would be some P 467 million.

2.3.8. Aggregate direct use value

Table 31 shows a summary of the direct use values measured for the MFMP area. The net private value, which is measured as the annual local livelihoods contribution, amounts to P 197 million. It is highest for the agriculture and natural resource use activities, with 55% of the total, and lowest for the tourism activities, with 7% of the total. Mining contributes an estimated 38% of the total livelihoods contribution. Figure 2 shows the relative contribution of each direct use to the overall direct use value.

In terms of contributions to the national economy the relative contributions show a distinctly different picture. Direct gross value added (generated within the MFMP area) amounts to an estimated P 354 million, and total direct and indirect gross value added (also including value added

elsewhere in the country) is estimated to be in the order of P 881 million. Figures 3 and 4 show the relative contribution of each broad use value category to the totals. The contributions are dominated by mining and the contribution of tourism to the economy is much greater than it is for livelihoods. It is interesting that, whereas in terms of direct value added, agriculture and natural resources use contribute 31% and tourism activities contribute 16%, in the broader economy the pattern is reversed. In terms of total economic impact, agriculture and natural resources use contribute 21% and tourism activities contribute 26% of the MFMP area use value. This illustrates the impact of the tourism value added multiplier which is significantly larger than that for agriculture and natural resource use.

Generally, while agriculture and natural resource use in the MMP area contribute importantly to livelihoods, they are less important as contributors to the economy. Tourism on the other hand contributes only a small proportion of its income to local livelihoods, but has a much more significant economic contribution, particularly in the broader economy. It must be noted that the tourism value added multiplier used here is not as large as that used by WTTC for the economy-wide measure of tourism value in the tourism satellite accounts for Botswana (WTTC 2007). In that analysis further linkages were included. It must also be noted that the agriculture and natural resources use activities in the MFMP area could have higher multiplier effects if they were commercialised further than at present and developed more formal forward linkages in processing and marketing.

Table 31: Private (livelihood) and economic use values for the MFMP area (Pula/annum, 2010).

Category	Net private value*	Direct gross value added**	Total gross value added***
Agriculture and natural resources use			
Livestock	15 380 537	10 656 741	20 780 645
Crops	19 209 452	14 707 613	28 679 846
Grasses	31 953 922	33 565 717	55 047 776
Wild Fruits	29 075 714	35 659 475	58 481 539
Firewood	2 689 926	3 558 990	5 836 744
Mopane worms	9 851 101	10 993 389	18 029 159
Subtotal	108 160 653	109 141 926	186 855 708
Tourism			
Serviced hotels/motels	Not measured	7 087 700	31 086 500
Game lodges/camps	Not measured	36 362 900	159 487 800
Safari hunting	Not measured	5 807 700	25 472 600
Campsites	Not measured	82 800	145 300
Mobile operators	Not measured	5 999 900	10 526 200
Subtotal	14 732 000	55 341 000	226 718 400
Mining			
Soda ash and salt	74 250 000	190 000 000	467 000 000
TOTAL	197 142 653	354 482 926	880 574 108

* Net Income to households within the MFMP area, which is the local livelihood contribution.

** Gross value added directly to gross national income within MFMP area

*** Gross value added within MFMP area as well as in wider economy as a result of use activities in MFMP area

Figure 2: Contribution of different activities to local livelihoods in MFMP area (2010)

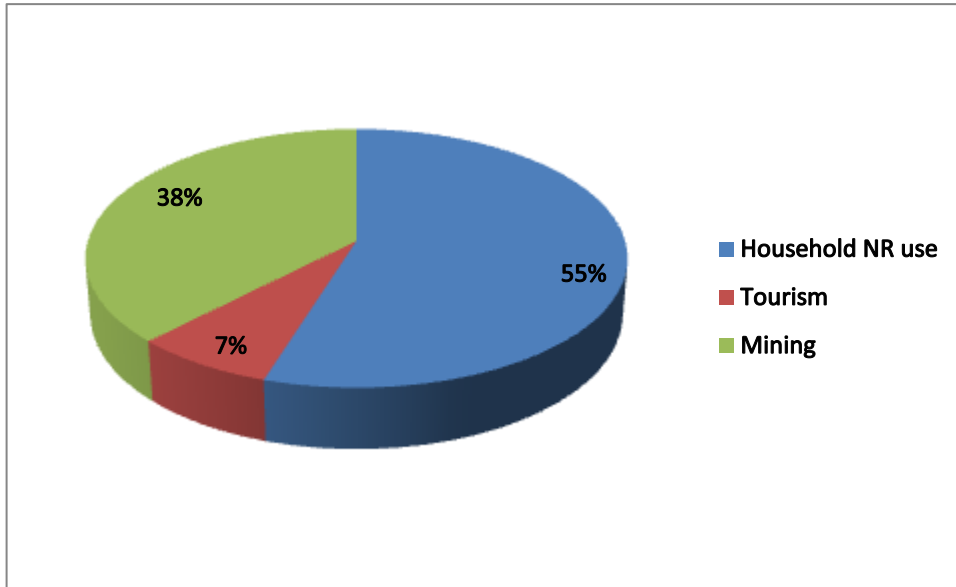


Figure 3: Contribution of different activities to direct value added in the MFMP area (2010)

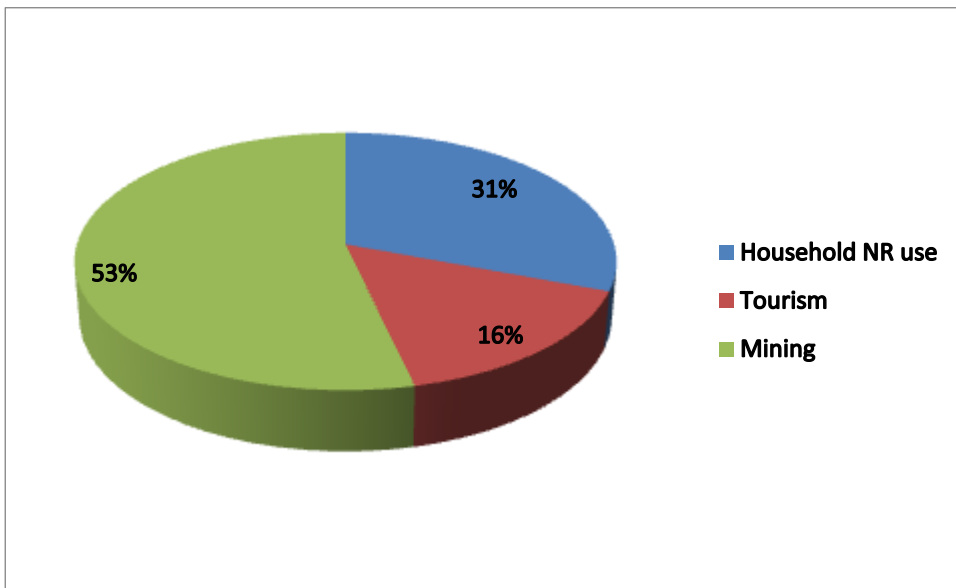
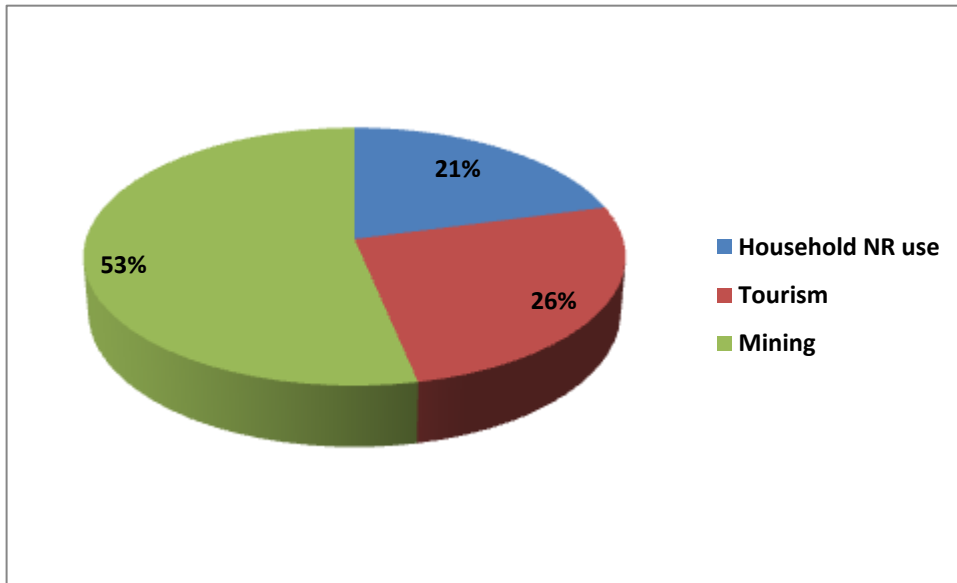


Figure 4: Contribution of different activities to direct value added in the MFMP area (2010)



3. The indirect use value of the MFMP area

3.1. Introduction

Use values are rooted in the ecological functions of the ecosystem concerned. The direct use values are associated with the production function of the ecosystem and its resources. The indirect use values are based on the regeneration function (breeding and biodiversity), absorption function (water purification, waste assimilation and CO₂ sequestration) and information function (ecosystem as an indicator of environmental change as well as its role for scientific research and education). Indirect use values further refer to off-site impacts of the production function, i.e. productive values generated outside the project area (e.g. through wildlife migration). The indirect use values are critical to future benefits generated by ecosystems and maintenance of their integrity. The estimation of indirect use values requires in-depth understanding of the ecosystem under review. As ecological knowledge is often inadequate, value estimates are uncertain; as result sensitivity analyses need to be conducted and the results need to be interpreted with caution.

The MFMP area is a seasonally flooded area but with great variability (spatially, seasonally and annually). It has ephemeral rivers such as the Nata, Moseitse and Boteti Rivers and salt pans, which receive water from rainfall, river inflows and are also recharged by shallow groundwater; see MFMP hydrology report, this volume). The amount and seasonality of water in the pans vary from year to year. The Boteti River has not held water since 1991 but water has reached well beyond Rakops in 2010; water is expected to reach Mopipi village and Lake Xau. The core wetland area is largely undisturbed. However, there is a soda ash mine that extracts brine from the pans. There are some twenty settlements all around the pans and in higher parts of the project area. Several tourism camps and lodges are found on the edges of the pans (see tourism & heritage development MFMP report vol 1 & 2 and section 2.4, this report). Livestock and crop production are the main subsistence activities of the local population.

3.2. Approach and methods

The study was largely a desk top study based on available statistics and reports, internet searches and information provided by experts. For example, information was sought from the RAMSAR Scientific and Advisory Committee and from some wetland experts contacted during the HOORC Wetland Flood Pulses Conference (February 2010 in Maun). Therefore, the estimates are based on the best available information and knowledge (imperfect as it proved to be). The methods used are similar to those used in the Okavango valuation study (Turpie *et al*, 2006), but where new information and insights were available, these has been used. For example, new figures have been used for carbon sequestration.

A variety of indirect use values is estimated in the literature (see references), including:

1. *Flood attenuation and control*, which reduced the risks of and damage caused by floods;
2. *Groundwater recharge*, where the wetland contributes to groundwater recharge, which becomes available for abstraction;
3. *Waste treatment and water purification*, where the wetland absorbs pollution and waste and purifies water;
4. *Sediment retention*, where the wetland retains fertile sediment for the benefit of arable production and the capacity and lifetime of any downstream dam;
5. *Wildlife refuge, habitat for species breeding and nursery*. This use is closely linked to biodiversity maintenance;

6. *Chemical cycling or carbon sequestration.* Most wetlands are carbon sinks and therefore contribute to lowering CO₂ concentrations;
7. *Scientific and education:* wetlands are important for our understanding of ecology. This use is related to the information function of a wetland;
8. *Biodiversity in general:* wetlands are usually rich in biodiversity;
9. *External support:* changes in wetlands often have serious off-site effects, indicating that the wetland support external ecosystems and their use. It is difficult to quantify this impact as in-depth knowledge is required about the wetland-external area interactions;
10. *Water transport,* which refers to the water distribution dynamics inside the wetland. Changing dynamics lead to changes in water distribution and use potential.

Flood attenuation and control, sediment retention and water transport are currently insignificant in the MFMP area. The external support role is combined with wildlife refuge and biodiversity values are captured in part through direct use and through the wildlife refuge functions, but BD in general is rarely considered as an indirect use. Biodiversity is already captured in various indirect uses, especially the wildlife refuge, breeding and nursing use, and separate estimation of BD value would lead to double counting (Spaninks and van Beukering, 1997).

Given the above, this assessment has focused on the following indirect uses:

- Carbon sequestration;
- Groundwater recharge and use;
- Wildlife refuge;
- Water purification;
- Scientific research and education.

The valuation methods used are summarised in Table 32.

Table 32: Valuation methods used

Function	Method
Carbon sequestration	<ul style="list-style-type: none"> • Identify the major vegetation zones in the project area and their size (from the MFMP land use component) • For each vegetation zone: identify the net carbon sink figures • Determine the value of 1 ton of carbon sequestered; • Estimate the value (amount of carbon sunk * unit value) • Carry out sensitivity analyses for key assumptions
Groundwater recharge & use	<ul style="list-style-type: none"> • Establish the main ground water users; • Estimate groundwater abstraction and the percentage that is recharged (i.e. sustainable); • Establish the value of a m³ of groundwater; • Estimate the value of groundwater recharge: amount recharged * unit value.
Wildlife refuge	<ul style="list-style-type: none"> • Identification of the valuable migratory wildlife and bird species; • Estimation of their migration pattern/destinations and use of wildlife & birds for tourism and hunting outside the project area; and • Valuation of related eco tourism and hunting (as % of tourism facilities and revenues).
Water purification	<ul style="list-style-type: none"> • Identify sources of water pollution; • Estimate the amount of pollution generated; • Estimate the value of the natural purification.
Scientific research & education	<ul style="list-style-type: none"> • Make an inventory of research & filming activities; • Estimate the research budgets and costs • Determine the aggregate value of scientific research & education

3.3. Results

The most important indirect use values are groundwater recharge, wildlife refuge, carbon sequestration, water purification and scientific research and education. Below, the estimates of these indirect uses are discussed prior to the integral discussion of the indirect use value of the delta.

3.3.1. Groundwater recharge¹

This value reflects the replenishment of ground water, which can be used for abstraction. Groundwater is used by the following sectors: livestock, settlements (domestic and some commerce), mining and to a small extent wildlife (boreholes inside the National Parks). Brine is not recharged and therefore treated as a mineral (MFMP report Ecology and Hydrogeology, this volume) and therefore its abstraction of around 18 MCM is not considered here. Prior to the assessment two issues need some elaboration.

The first issue is groundwater mining, which is common in well fields around mines and well fields serving a large population (CSO, 2009). For example, abstraction in the Dukwi well field (near the MFMP area) exceeds the sustainable yield by a factor of 11 and the well field could be exhausted soon after 2020 (CSO, 2009). Abstraction from the Letlhakane well field (for diamond mining and the village) exceeds the sustainable yield by almost sixty percent. As the indirect use value refers to the recharge that is used, it is necessary to estimate the rate of recharge as a percentage of abstraction. Groundwater mining for the diamonds mines is well known (Debswana, 2008) and the recharge rate has been assumed to be 25% of the abstraction. For livestock boreholes, abstraction is assumed to not exceed the recharge as most settlements are small. For settlements, recharge is assumed to be 65% of abstraction.

The second issue refers to water flows between the MFMP area and its surroundings. For example, the potable water supply for BOTASH (around 0.3 MCM/ annum) comes from Dukwi wellfield, which is outside the MFMP area). BOTASH accounts for 11.2% of the abstraction of the Dukwi wellfield and therefore the mine contributes to its depletion (outside the project area). In contrast, the Debswana well fields 2 (abstraction of around 0.8 MCM/annum) and 4 (abstraction of around 0.5 MCM/ annum) are located inside the MFMP area and provide water to the diamond mines outside the MFMP area. Obviously, the impacts of water abstraction occur inside the MFMP area.

Livestock

The water consumption has been estimated as the number of livestock (by type) multiplied by the daily water consumption. For the Makgadikgadi region, two sets of livestock numbers are available (agricultural statistics and the Department of Veterinary Services). According to the Agricultural Statistics, the total livestock numbers were 272,718 in the area while cattle crush data for 2009 indicate that the total number of livestock stands at 179,566. The Agricultural Statistics are assumed to be most reliable, but both figures have been used in the estimation of water consumption by livestock. The estimated livestock water consumption is summarised therefore summarised in Table 33.

¹ This section has been developed with Setlhogile (2010, forthcoming).

Table 33: Ground water consumption by livestock in the MFMP area (MCM)

	Cattle crush (2009)	Agric statistics (2006)
Cattle	2.08	2.76
Goats	0.03	0.18
Sheep	0.06	0.01
Donkeys	0.04	0.11
Horses	0.07	0.03
Total water consumption of livestock	2.28	3.08
Total ground water abstraction for livestock	1.71	2.31

Note: livestock uses surface water (river, pans, haffirs etc.) during three months in the wet season.

Mining

Botash (soda ash and salt) and Orapa- Lethakane mines (diamonds) rely heavily on groundwater for the production and processing of minerals. BOTASH uses process water from its own well field within the project area (with three boreholes) and obtains potable water from the Dukwi well field through the Water Utilities corporation. The abstraction from its own well field is on average around 600 000 m³ per annum with an estimated recharge of 385 000 m³ (65%). From the supply of potable water, the abstraction is estimated to be around 302 000 m³ per annum (outside the project area).

The diamond mines use their own well fields. The estimated abstraction rate from these well fields is 1.36 MCM/ annum with an estimated recharge of 340,000m³ (a quarter of the abstraction). This lead to a total ground water recharge related to mining of 1 MCM/ annum.

Settlements

Groundwater is the main source of potable water supply to villages in Botswana: about 80% of the rural population relies entirely on these resources. The study area is no exception. Sowa Township was excluded largely because it does not derive potable water supply from a groundwater source inside the project area. The population projections for 2009 (based on the 2001 Census figures) are indicated in Table 34.

Table 34: Population data for the settlements in the MFMP area (excl. associated localities)

	2001	2006	2007	2008	2009
Sowa	2,879	3029	3,093	3,158	3,224
Mosu	1,100	1150	1,174	1,199	1,224
Mmatshumo	865	904	923	942	962
Mopipi	3,066	3206	3,273	3,342	3,412
Xhumo	1,591	1663	1,698	1,734	1,770
Rakops	4,555	4763	4,863	4,965	5,069
Toromoja	649	679	693	708	723
Moreomaoto	526	550	562	573	585
Kedia	793	829	846	864	882
Xhumaga	925	967	987	1,008	1,029
Motopi	1,130	1181	1,206	1,231	1,257
Mmadikola	828	866	884	903	922
Mokoboxane	1,290	1349	1,377	1,406	1,436
Nata	4,150	4213	4,301	4,392	4,484

Gweta	4,055	4117	4,203	4,292	4,382
Zoroga	202	962	982	1,003	1,024
Total	25,725	27,399	27,974	28,562	29,162

Source: CSO, 2001 and own calculations.

Given the per capita water demand figures stipulated by the Ministry of Local Government, the total annual groundwater abstraction for the settlements is estimated at 762 820 m³ for 2009. This excludes water consumption in the Sowa Township. At an assumed recharge rate of 65% of the groundwater abstraction, the groundwater recharge associated with settlements is estimated to be 495 833 m³ per annum.

Wildlife

Wildlife traditionally depends on surface water. The Boteti River was traditionally the main source of water for wildlife within the Park, especially during dry periods. However, since 1991, the river had gone dry. Furthermore, the western boundary fence of the park has also affected access to surface water. As a mitigation measure, for reduced river access, nine boreholes and five watering holes were developed inside the Park. The hourly water abstraction from the boreholes is 53.88 m³ (Water Surveys, 2007). Assuming that the boreholes pump water at least four hours per day, the total annual water abstractions is estimated at 78 645 m³. These boreholes have been installed with solar pumps and therefore when the solar power is insufficient, pumping is very limited hence the low number of pumping hours. Since this estimate is low, the recharge level has therefore been assumed to be equivalent to the recharge.

Overall groundwater recharge value

The aggregate of the sectoral groundwater recharge estimates need to be multiplied by the unit water value to estimate the indirect use value of groundwater recharge. No reliable representative local cost and price data for water could be obtained. Therefore, the same unit value as used in the nearby Okavango valuation was used here (P2,75/m³). The estimates are presented in Table 35.

Table 35: Groundwater recharge value of the MFMP area (Pula million)

	Unit	Amount
Domestic	000 m ³	495.8
Livestock	000 m ³	2313.5
MNP	000 m ³	78.7
Mining	000 m ³	1027.3
Total consumption	MCM	3.92
Total groundwater recharge value	Pula million	10.77

The groundwater recharge is estimated to be P 10.8 million. If cattle crash data are used, the value is lower at P 9.1 million. The livestock sector is the largest water user followed by the mining sector. Together these sectors account for over eighty percent of groundwater consumption.

3.3.2. Carbon sequestration

Biomass, soils and wetlands contribute to capturing of carbon dioxide, and carbon sequestration is therefore an important indirect use value. Land use changes, management practices and fires alter carbon sequestration.

Where carbon sequestration is included in valuation studies, its value is significant in comparison with other indirect use values (e.g. Zambezi and Okavango; Turpie *et al*, 1999 and Turpie *et al*, 2006). Most valuation studies apply a very simple estimation method. The estimated carbon sink function of land (in tons/ha) is multiplied by the estimated value of a ton of carbon. The estimation of both figures is fraught with uncertainty, as no reliable estimates are available for the different land categories.

A literature review (see section 6) led to the following conclusions:

- Undisturbed wetlands tend to be a natural sink of carbon;
- Disturbed wetlands (e.g. agriculture) sequester less carbon than undisturbed wetlands;
- Tropical wetlands sequester more carbon than wetlands in temperate zones due to the high primary production;
- For Australian grassland:
 - Estimates of carbon pools (above and below ground) differ significantly by as much as a factor 2. The soil C pool is more than double that of the live C plant biomass pool;
 - Average carbon stocks could be around 78 T C/ha; improved rangeland management could lead to an increase in carbon sequestration of 0.5T/ha/annum (based on three empirical studies);
 - Carbon sequestration is likely to be determined by grazing intensity (higher leads to less carbon), fire (negative) and rangeland management (better management higher carbon sequestration). However, there are no empirical figures for the impact of grazing pressure on C sequestration; it probably takes many years to be detected;
 - The study deduces that deteriorated rangelands are able to sequester around 140 kg C/ha/yr or 513 kg CO₂/ha/yr. They advise to use an uncertainty factor of 5.
- Regarding fires:
 - The impacts of fires depend on the time and the conditions at the time of the fire (e.g. fuel load etc.);
 - There is particular uncertainty about the impact of fires on soil C pool. Depending on the fire conditions, a large part of the living biomass is lost; this can lead to accelerated sequestration in later years (catching up);
 - Moreover, veld fires increase CO₂ emissions in a particular year but have no overall impact on the carbon balance in African savannas as it also tends to lead to an increase in shrubs and woody biomass (leading to higher sequestration every year). Burning means a transfer from up to 90% of the above ground carbon pool into the air.
- Salt pans: No empirical figures were found for carbon sequestration of salt pans. Research is needed to fill this gap. However, after discussion with experts, it was agreed that it is currently best to assume that the salt pans themselves are carbon neutral.

Vegetation zones and estimation of carbon sequestration

Based on the literature, the following 'picture' for the project area has been constructed. *(Based on Australian data) rangelands store between 50 to 100 T of C/ha. It takes forty years to accumulate C in the soil. Two thirds of carbon is in the soil; one third in above soil biomass. The primary production on open grassland (saline) is low and therefore the carbon sink is estimated at not more than 1 T/ha. The average carbon sink of shrubbed grassland (sweet rangelands with grass and shrubs) is 2 T/ha/annum; Woodlands would be 3 T/ha/yr. The salt pans and open water are assumed to be carbon neutral, i.e. they are neither a sink nor a source (in the absence of empirical data on sources and sinks).* This leads to the following vegetation zones (from the land use component) and sink figures (Table 36).

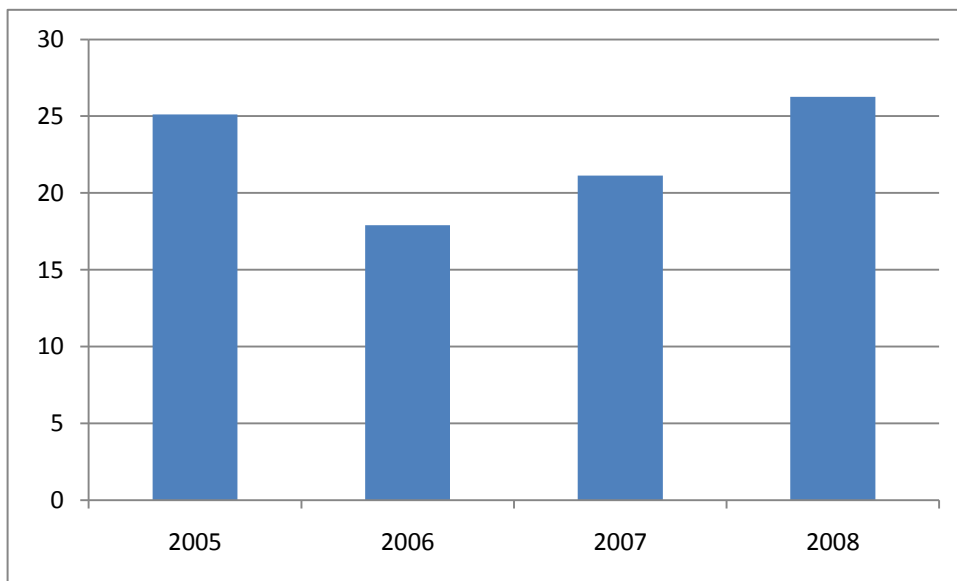
Table 366: Assumed carbon sequestration rates by ecosystem

vegetation zones	size in ha	Net sink 1 (T/ha/annum)	Alternative 1: low net sink 2 (T/ha/yr)	Alternative 2: high net sink 3
Open water	78 528	0	0	0
Open grassland (saline)	436 365	1	0.5	1.5
Open pan (salt)	711 946	0	0	0
Shrubbed grassland	860 861	2	1.75	2.25
woodland	1 554 681	3	2.75	3.25
Industrial use	1 701	0.25	0	0.5
total	3 644 082			

Note: areas for vegetation zones are derived from the vegetation mapping exercise.

The value of carbon

Global carbon markets have operated for over five years now and they have shown an upward trend in market price of carbon (interrupted by the global recession). The market price of 1 ton of carbon has been on average US\$ 21 for the period 2005- 2009 (see also Figure 5).

Figure 5: Average annual price of carbon traded (US\$/ton of carbon)

Sources: Annual carbon trading reports.

Other prices/ costs of carbon handling have been reviewed for comparison sake. The results are presented in Table 37. It appears that reforestation and carbon trading are cheaper than technological mitigation measures with costs well below US\$10/ ton C. Moreover, the costs of carbon capturing are less than those of carbon removal.

Table 37: Cost estimates of one ton of carbon (in US\$).

Type of costs	Cost estimate
Damage costs	US\$13-20/ton C US\$1-30/ton C
Mitigation costs	Reforestation: US\$1.20-2.83/ton C
Carbon capturing Carbon removal	US\$12-44/ton C; mean of US\$26 US\$15-53 ton C mean of US\$ 33
Carbon trading prices	US\$0.5-9/ ton C for compliant projects compliant with the Kyoto Protocol (KP) US\$0.5-2/ ton C for KP non-compliant projects. US\$3-30/ton C

Sources: Turpie *et al*, 2006

For this assessment, we use US\$ 20/T of carbon as the standard value with a low of US\$ 10 and a high of US\$ 30. The standard figure is much higher than the figure used for the Okavango valuation (US\$ 5 with sensitivity analyses for US\$ 10 and US\$ 27).

Overall value of carbon sequestration

Based on the above, the value of carbon sequestration was computed and sensitivity analyses were carried out (Table 38). The estimated IUV for carbon sequestration is US\$ 115 million for the project area and US\$ 31.94/ha (Pula = US\$ 0.1382 in December 2009). Sensitivity analyses show that the results are highly sensitive. The sensitivity for the sequestration figures is higher than that for unit sequestration values.

Table 38: Estimates of carbon sequestration value and results of sensitivity analyses

IUV in US\$	US\$20	US\$10	US\$30	Range (Pula million)
Sink 1 (standard)	136 451 127	68 225 564	204 676 691	68 – 205
Sink 2 (low)	120 001 257	60 000 629	180 001 886	60 – 180
Sink 3 (high)	152 883 985	76 450 499	229 351 496	76 - 229
	120 - 153 million	60 - 76 million	180 - 229 million	
IUV/ha	US\$20	US\$10	US\$30	
Sink 1 (standard)	37.44	18.72	56.17	15.97 - 47.92
Sink 2 (low)	32.93	16.47	49.40	6.25 - 18.75
Sink 3 (high)	41.95	20.98	62.94	27.08 - 81.23

The value of carbon sequestration is higher than in the Okavango and this is largely due to use of more recent information (a higher carbon value and slightly higher carbon sink figures).

3.3.3. Wildlife refuge

The project area holds significant wildlife and bird resources, albeit at much lower levels than in the past². Currently, zebra and wildebeest are most common in the area followed by ostrich springbok and gemsbok. Elephants, ostrich and gemsbok are increasing in numbers while other species show a

² This loss of wildlife resources represents a significant decline in natural capital, and raises the question whether historical wildlife resources levels can (and should) be restored under the FMP.

downward trend in the period 1996-2006. A small number of buffaloes are now found in the area (92 in 2006). More details are found in the wildlife component report.

Wildlife and bird resources of the Makgadikgadi migrate to other parts of Botswana and outside the country and generate value at those destinations. It is important to note that the Makgadikgadi wetlands are part of the KAZA transfrontier conservation area (TFCA).

Valuable migratory wildlife species

The main species that generate value *outside* the project were identified from the literature and through discussions with experts. The following species were identified as most important:

- Mammals: elephant, buffalo, wildebeest and zebra. While wild dogs are also considered important, their number is very small, and they do not feature in aerial surveys. Wildebeest migration is mostly confined to the project area. Zebra migration is within the project area (east-west) and to the north outside the project area (Okavango and Chobe);
- Bird species: flamingo, pelican, the wattle crane and slated egret.

Migration patterns and external uses

Experts were interrogated to determine the migration patterns of wildlife from the Makgadikgadi. The destination areas are summarised in Table 39 by three main species and by type of use (hunting, ecotourism or both). The project area is linked with 25 CHAs through wildlife migration.

Table 39: Wildlife use status and wildlife occurrence by CHA

	status of area	CBO	Hunting	Use	Zebra	Elephant	Buffalo
NG28					x		
NG32	COMWMA	CBO & priv op	Y	Ecotourism & hunting	x		
NG33					x		
NG34	COMWMA	CBO & priv op	Y	Ecotourism & hunt	x		
NG42	CONC	Priv op	Y	Hunt		x	x
NG43					x		
NG44	CONC		Y	Hunt	x		
CT1	CONC		Y	Hunt		x	x
CT2	CONC	Priv op	Y	hunt only		x	x
CT3	CONC		Y	Hunt		x	x
CT4				Ecotourism		x	x
CT5	COMWMA (Nata sanctuary applied)			Ecotourism		x	x
CT6						x	x
CH1	COMWMA	CBO & priv op	Y	Hunting		x	x
CH2	COMWMA	CBO & priv op		Ecotourism			
CH3						x	x
CH4						x	x
CH5						x	x
CH6						x	x

CH7						x	x
CH8	COMWMA	CBO & priv op	Y	Ecotourism& hunt			
CH9						x	x
CH11						x	x
CH12	CONC		y	hunt only			
CH13						x	x

Hunting quotas in the areas where wildlife migrates into, are modest, but the elephant quota has increased in recent years (6 for private concessions and 12 in community areas). This largely explains the growth in the country's hunting industry (from US 10 million in 2000 to US\$ 40 million in 2008³; from 5 500 hunting days in 2000 to 8 000 days in 2008; Martin, 2008). While the total number of hunting quotas decreased, the quotas for valuable species such as elephant increased. The number of quota is relatively small, but their value is significant as elephant and buffalo are high value species. These species account for the bulk of the income of the hunting industry (ULG, 2000; Martin, 2008).

Ecotourism is an important industry in northern Botswana and generates significant job and income opportunities (Suich *et al*, 2005; WTO, 2005).

Valuation

Hunting

The species values have been derived from the 'model hunts' used in the 2000 review of the hunting industry (ULG, 2000 and hunting offers on the internet). For example, a model hunt of five elephants was assumed to take twenty one days for an estimated price of US\$ 40 000/ elephant. The hunt of a buffalo is a 12 days package at two thirds of the costs of elephants. The operating costs of hunting are estimated at US\$ 1 000/day (ULG, 2001 and Martin, 2008). The value of zebra and wildebeest is derived from the trophy and license fees. The following assumptions were made:

- For zebra: 20% of the hunting quota can be attributed to the project area;
- For elephants and buffalo, this percentage is 10%.

Given the uncertainties of these percentages, sensitivity analysis was done for a lower and higher percentage.

The resulting hunting value is estimated to have increased from P 0.6 million in 1997 to P 3.1 million in 2010 (Table 40). The increase in value is almost entirely due to the fivefold increase in hunting quota of elephants in this period.

Table 40: Estimated wildlife refuge value for hunting (1997-2010)

	1997	2006	2008	2009	2010
zebra	9 768	22 793	22 793	21 708	26 049
elephant	577 424	1 154 848	1 154 848	2 378 437	2 983 357
buffalo	40 521	41 486	41 486	35 697	60 781
Total	627 713	1 219 127	1 219 127	2 435 842	3 070 188

Note: wildebeest and zebra only license and trophy value.

Source: DWNP hunting quota and ULG, 2001.

³ Martin estimates the full potential of the hunting industry in Botswana at US\$ 94 million.

Tourism

The CHAs with migrating wildlife only have a few ecotourism lodges and facilities and the ecotourism information was incomplete. Values were derived from the tourism accommodation inventory carried out for KAZA (Suich *et al*, 2005). The following assumptions were made:

- Ten ecotourism facilities derive some value from the Makgadikgadi wildlife resources;
- The facilities have financial returns similar to the average found in the KAZA inventory;
- Ten percent of the returns and costs can be attributed to the Makgadikgadi.

The estimated value of ecotourism is P 2.8 million per annum (Table 41). Sensitivity analyses were done for more and fewer facilities and for a higher and lower percentage of the returns associated with the Makgadikgadi. The estimated value ranges from P 0.7 to P 4.3 million per annum.

Table 41: Indirect use value of wildlife refuge for ecotourism (in P000)

		No of lodges		
		10	15	5
% turn over associated with the Makgadikgadi	10	<i>2 849</i>	4 273.5	1 424.5
	5	1 424.5	2 136.8	712.3
	15	4 273.5	6 410.3	2 136.8

Note: figure in bold and italics is the 'regular' figure. Other figures reflect different assumptions regarding the number of lodges and the percentage of the revenues associated with the Makgadikgadi.

3.3.4. Purification of water

Settlements, tourism camps and the Botash mine are the main potential sources of pollution. The type of sanitary facilities in villages are summarised in Table 42. Most villages have a dump site for solid waste. Sowa township has a wastewater treatment plant (1991; cement lined pond system with capacity of 370 m³/day). It is used at full capacity and plans exist to expand the plant. Since de-sludging, the water quality has improved. No village has a wastewater treatment plant; Nata and Gweta are scheduled to have treatment facilities by the year 2025 (SMEC, 2003). More than a third of the rural households (37%) had no sanitary facilities in 2001. Thirty percent was connected to a septic tank and 28% had a (ventilated improved) pit latrine. Obviously, this situation poses sanitary risks and pollution risks to groundwater and water in rivers. Significant differences exist between villages.

Table 42: Sanitary facilities in the MFMP area

Settlement	Toilets	Ventilated improved pit latrines	No sanitary facility
Sowa	100%	0%	0%
Mosu	17%	28%	41%
Mmatshumo	10%	35%	51%
Mopipi	13%	23%	60%
Xhumo	27%	36%	30%
Kedia	7%	21%	66%
Tsienyane/Rakops	22%	40%	34%
Toromoja	13%	27%	59%
Moreomaoto	20%	12%	41%

Makalamabedi	25%	32%	41%
Xhumaga	18%	27%	48%
Motopi	25%	19%	38%
Mmadikola	16%	34%	47%
Mokoboxane	17%	21%	60%
Nata	18%	36%	34%
Gweta	23%	36%	37%
Zoroga	2%	12%	84%
Makobo	11%	60%	27%
Total	30%	28%	37%

Source: 2001 Population Census

The status of solid waste disposal and collection is presented in Table 43. Most of the solid waste is disposed in rubbish pits and less than a third is collected (almost 100% in Sowa township).

Table 43: Solid waste collection and disposal in MFMP area (2001)

Settlement	Regularly collected	Irregularly Collected	Incineration	Roadside Dumping	Disposal in rubbish pit
Sowa	99.0%	0.3%	0.0%	0.0%	0.2%
Mosuo	7.7%	18.6%	12.4%	15.3%	44.9%
Mmatshumo	0.5%	2.1%	55.8%	5.3%	35.8%
Mopipi	3.0%	19.4%	27.7%	14.6%	32.3%
Xhumo	3.4%	19.5%	21.7%	10.8%	39.0%
Kedia	24.1%	2.8%	14.2%	23.4%	32.6%
Tsienyane/Rakops	4.4%	24.5%	2.6%	9.4%	54.6%
Toromoja	15.0%	9.5%	7.5%	15.6%	52.4%
Moreomaoto	0.0%	6.6%	2.5%	8.3%	82.6%
Makalamabedi	2.7%	4.4%	3.1%	1.0%	87.8%
Xhumaga	9.7%	7.5%	10.8%	7.5%	64.0%
Motopi	1.6%	4.9%	6.1%	7.8%	77.9%
Mmadikola	4.7%	7.0%	9.9%	7.6%	67.8%
Mokoboxane	22.4%	12.1%	15.4%	7.0%	37.9%
Nata	3.0%	4.2%	17.9%	5.0%	67.1%
Gweta	8.3%	2.5%	1.1%	3.4%	83.3%
Zoroga	0.5%	3.0%	0.0%	22.3%	73.8%
Makobo	40.0%	0.6%	1.7%	4.4%	50.6%
total	19.3%	9.2%	10.2%	7.5%	51.6%

Source: 2001 Population Census.

There are a few lodges on the edge of the salt pans and along the Boteti and Nata Rivers. They mostly have septic tanks and their waste is either re-used and recycled (e.g. paper & cans),

composted (kitchen and garden waste) or transported to a dump site in nearby villages. No major source of pollution was found during fieldwork.

The mine has a water treatment facility with a capacity of 220m³/day. In the 2003 NMPWWS, the operation was criticised for lack of maintenance and unlined and overloaded ponds. According to BOTASH, the situation has improved. There is no overflow of the ponds and all treated water evaporates. The ponds are now regularly de-sludged (2008 and planned for 2010). According to Botash, the fence of the plant is ineffective and needs to be repaired in 2010; vegetation will also be cleared this year. The current land fill is expected to be full by mid 2011 and a new one is being planned. The scoping report for that has been sent to the DEA and a full EIA will probably be necessary. The old one will also be include on the update EIA for Botash for closure monitoring. No coal residues are disposed at the landfill. The coal residue is disposed off as ash slurry to the Ash Slurry dam.

In the absence of major sources of water pollution and because of the dry nature of most of the project area, the water purification value of the area is estimated to be negligible.

3.3.5. Scientific and educational value (S & E)

The S & E value is estimated by valuing scientific research, filming and educational activities associated with the Makgadikgadi wetland. Applied research has been excluded as this is seen as part of resource management and does not directly contribute towards increasing the knowledge and understanding of wetlands, which can be used elsewhere or will benefit use in future.

A list with research and film permits was obtained from government and up-dated with recent research projects. The main recent scientific projects in the area include the following:

- Species research on zebra and wildebeest migration and on brown hyenas;
- Research on birdlife (e.g. flamingo, Kori bustard and crane) and monitoring of bird species;
- Research on ephemeral rivers in Botswana (Boteti), Namibia and South Africa;
- Desertification mitigation and remediation of land degradation (DESIRE project) in Boteti sub-district.

A total of twenty research projects were identified and approached. A brief questionnaire (budget and operation costs) was circulated to estimate the annual value added of research and filming. Ten responses were received (50% response rate). No response was received for film and documentary projects.

Research budgets in foreign currencies were converted in Pula using the exchange rate half way the project. In kind contributions were valued at P 250 day for research assistance and volunteers and P 15 000 for individual researchers.

The average annual budget for the ten research projects was P 1 128 462 (period 2005-2009). Assuming that the expenditures of the other projects are similar, the scientific research value would be double at P 2.3 million. The intermediate costs (e.g. purchase and use of cars, computers, stationery etc.) are roughly forty percent. The estimated value is low in comparison to the Okavango Delta and reflects the absence of a research institution such as HOORC and lack of international 'fame' as a research destination. The MFMP and MIMP should aim to increase scientific research in the area to improve the understanding and management of the area.

3.4. Aggregate estimate of indirect use value

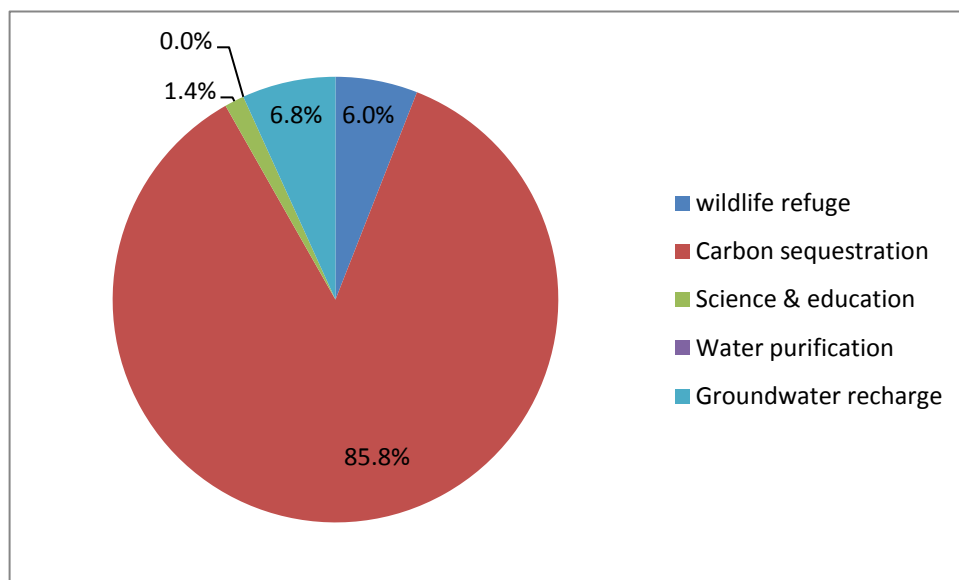
Given the large number of assumptions that had to be made, the estimated figures are indicative and should be reflected as a range in possible values. The results are summarised in Table 44. The annual indirect use value is estimated to be P 155.4 million with a mix-max range from P 73.6 to P 253.4 million.

Table 44: Estimated indirect use value of the MFMP area (Pula)

	Category	Best estimate	Low estimate	High estimate
1	Wildlife refuge			
	1.a hunting	3 070 200	1 541 600	4 598 800
	1.b ecotourism	2 849 000	712 300	6 410 300
2	Carbon sequestration	136 451 100	60 000 600	229 351 500
3	Science & education	2 256 900	2 256 900	2 256 900
4	Water purification	0	0	0
5	Groundwater recharge	10 800 000	9 100 000	10 800 000
	Total indirect use value	155 427 200	73 611 400	253 417 441

Carbon sequestration contributes around 85% of the indirect use value. Wildlife refuge and groundwater recharge are distant next valuable component (around 6%). The relative values of individual ecoservices is shown in Figure 6.

Figure 6: Relative value of indirect uses - ecoservices



The range of values is large (Table 44), showing the sensitivity of the results for the assumptions that have been made.

The comparison with IUV estimates of other wetlands shows that the results are lower than those of the Okavango Delta and the Zambezi River basin. This is despite the increase in the value of carbon sequestration. The reasons include:

1. Unlike in most wetlands, flood attenuation and sediment retention is of low importance in the delta. Flood attenuation and sediment retention represent significant values in other studies;
2. The value of water purification and groundwater recharge is relatively small because of the low population density and human influence on most of the delta: waste generation is small and so is groundwater abstraction.

4. Option value

The option value is difficult to quantify and yet may be significant. The option value is linked to the use value in that it represents the willingness to pay for preservation of the resource with the option of using it later. There are no data on the extent of non-use values in the MFMP area, but it seems clear that the option value is significant for several reasons.

Firstly, investments made by DWNP in the MNPNP were made with the aim of preserving the natural resources and biodiversity in these parks. Given the objectives and policies associated with these protected area developments it would seem that the willingness of the public sector to make these investments is the result of several values, some of which are described elsewhere in this report. On the one hand there is the aim of preserving the biodiversity and natural system simply so that it is not lost (existence value). Then, given the utilitarian policy environment some of the investments in the protected areas are aimed at enhancing the value of current use of these areas for tourism (direct use values). Further to that, investments in preservation of the wildlife stocks in these parks is also aimed at strengthening the indirect use value or refuge function of the parks, where use of wildlife migrating or dispersing outside them is enhanced. Lastly some of the investment in protecting the national parks is likely to be so that they could be utilised some time in the future, when, for example, market conditions allow. This last value is option value.

Secondly, the use value of the hunting sector can be doubled with relatively simple management measures. In other words, the option value is the same as the current hunting value (while the government is currently restricting hunting in the country).

Thirdly, mineral exploration is widespread in the area indicating a large option value for minerals. The size of the option value can, however, not be determined unless exploration is concluded. A small diamond mine inside the project has suspended production pending recovery of the diamond market. This constitutes part of the option value.

Fourthly, government and donors have been able to mobilize local communities through the community-based natural resources management (CBNRM) programme to form CBOs (Trusts) aimed at preserving the wildlife and natural attributes in their areas. The investments here, by government, donors and communities, are also aimed at securing manifestation of several values. While investment for direct use values is dominant, some is aimed at preservation of natural assets for non-use values, and particularly option value

Fifthly, global climate change is likely to increase extreme events such as floods. The pans are suitable to attenuate floods as they cover a huge area.

Finally, groundwater is being mined and consequently the future use value of groundwater resources is restricted. However, this loss has to be compared with the huge direct use value currently created by the mines.

5. Concluding remarks

Mining and carbon sequestration account for most of the use value of the MFMP area. Generally, while agriculture and natural resource use in the MFMP area contribute importantly to livelihoods, they are less important as contributors to the economy. Tourism on the other hand contributes only a small proportion of its income to local livelihoods, but has a much more significant economic contribution, particularly in the broader economy.

Table 31 shows that livestock generates private use or livelihood value (P 15.4 million). This is more than the direct gross value added generated by livestock (P 10.7 million), partly because of subsidies, and in spite of the small herd sizes and generally poor herd productivity resulting from open access to grazing and peoples' desire to increase herd size. The livelihoods' contribution of crop production is (P 19.2 million), and higher than the direct economic contribution (P 14.7 million), and again this reflects the effect of subsidies in an environment with relatively poor crop production potential.

Remarkably, the livelihood contribution associated with the collection of grass (P 32.0 million) and wild fruits (P 29.1 million) are more important, despite the fact that no subsidies are received. Tourism has a small contribution to livelihoods (P 14.7 million). Mining contributes a steady P 74.3 million to local livelihoods.

Economically, mining is the biggest contributor to the national economy, with P 190 million and P 476 million in gross value added directly and in total respectively. Tourism contributes fairly significantly in direct value added (P 55.3 million) but not as much as agriculture and natural resources use (P 109 million). Due to the very significant linkages that tourism has with the wider economy, it contributes more (P 226.7 million) than agriculture and natural resource use (P 186.9 million) in terms of its total direct and indirect economic impact.

The base line livelihood and economic direct use values associated with tourism in the MFMP area reflect only partial development of the ultimate potential for the area. There appears to be considerable potential for expansion, intensification, and diversification of tourism in and around the protected areas. Investments made in protecting and enhancing the tourism asset base will have the effect of enhancing future use values.

The significant potential for expanding tourism in the MFMP area within a sound framework of property rights could significantly increase the contribution of tourism to local livelihoods through employment, CBNRM rentals and community tourism ventures. Associated with this, and resulting from the large tourism value added multiplier, would be a significant increase in the contribution of tourism to the economy. Agriculture and natural resources use are very significant for local livelihoods, as expected. This could be enhanced with more efficient use of resources with property rights, and with more commercialisation of these activities the contributions made by these activities to the economy could also be increased substantially.

These findings lead to the following conclusions:

- The livelihood and economic benefits from agriculture (crops and in particular livestock) could be increased with improved property rights and commercialization ;
- Natural resource use requires greater recognition in policy making and planning given its livelihood importance;
- While tourism creates significant value, it needs to drastically increase its livelihood contribution. This can be achieved by CBNRM, private – community partnership, employment creation and strengthening downstream and upstream linkages in the tourism product cycle.

Carbon sequestration is by far the most important indirect use value (P 136.5 million) followed by groundwater recharge (P 10.8 million) and wildlife refuge (P 5.9 million). The value of science & education is small, reflecting the lack of research and education activities in the area (e.g. as compared to the Okavango Delta). The value of groundwater recharge is critical given the high level of groundwater abstraction and indeed groundwater mining. The latter is a critical concern for the option value, which otherwise is believed to be significant (e.g. future tourism expansion, future mineral extraction, more productive agriculture, and flood attenuation).

6. Recommendations for the MFMP and MIMP

The MFMP area is only partially developed and this gives an opportunity to make sure that developments are environmentally sound and sustainable, and that they contribute optimally to Botswana's development in terms of livelihoods and national income.

Tourism offers the option to significantly increase and diversify livelihoods and incomes in the area. The protected areas are the cores underpinning this potential. It is important that expansion of protected areas and tourism outside the existing protected areas take place under a regime of common property rights involving local communities. The CBNRM programme, and policy surrounding concessions, will have important roles to play here. Future tourism development must contribute much more to livelihood improvements than hitherto.

Mining creates significant national value added and financial benefits to the mining company. The local benefits are small and less clear. Given the capital intensive nature of mining, job creation is limited. Local downstream and upstream linkages within the mining cycle need to be pursued to generate more local, livelihood benefits.

The natural resource use sector needs to be recognised in the MFMP as a key livelihood sector with commercial potential (e.g. thatching grass, mopane worm and morula products). Such natural resources need to be adequately managed to ensure their sustainability.

During the MFMP implementation, funding sources derived from the region's carbon sequestration capacity need to be explored and viable ones identified. For example, such funding could be used to improve community based grazing or natural resource management schemes. The MFMP should stimulate more research and educational activities to improve our understanding of and appreciation for the Makgadikgadi wetland system. For example, a research fund could be established under the MFMP and MIMP to promote research among local and regional students. The MFMP provides research topics such as:

- Research on carbon sequestration of salt pans;
- More research on groundwater recharge and salinity;
- The MFMP and MIMP should aim to increase scientific research in the area to improve the understanding and management of the area.

Finally, the valuation exercises should be expanded to the MIMP areas that are not part of the MFMP area. Agriculture and tourism are expected to be important direct uses in these areas.

7. References

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8. APPENDICES

8.1. The wildlife viewing lodge model

MAKGADIKAGDI PANS FMP FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA TOURISM - MAKGADIKAGDI 2010 - BASE CASE									
ASSUMPTIONS*									
Production System:	18	bed, up-market lodge offering all inclusive, guided, wildlife viewing.							
Site:	High quality, unfenced area with river/floodplain frontage and mixed population of northeastern woodland species.								
Game Density:	100%	2.87	LSU Equivalents/Sq. Km. or,		35	Hectares per LSU Equivalent			
Carrying Capacity:	100%	0.125	Tourist Beds/Sq. Km. or,		800	Ha. per Tourist Bed			
Concession Size:	48200	Hectares or,		482	Square Kilometres				
Tourist Category:	Overseas	80%	Regional	10%	Resident	5%	Citizen	5%	
	Adults	90%	Children	10%					
Occupancy Rate:	100%	47.5%	Average Length of Stay:		4 Days				
Daily Tariffs (P):	100%	Overseas	2933	Regional	2933	Resident	2933	Citizen	2933
		Children	100%	of Adult Price					
Capital Item Prices:	100%	(Variation from Normal for Sensitivity Analysis)							
Capital Sources:	100%	Loan =	25%	Equity =	75%	and:	100%	Foreign	25%
								Domestic	75%
Interest Rates:	100%	Rate for Capital Loans:		10%	Rate for Working Capital Loans:		13%		
Working Capital as Proportion of Annual Operating Costs:	20%								
Park Entry Fees:	100%	Fee per Tourist Night/Day:		P 91.00					
Land Rental and Resource Royalty (P):	100%	Rental:	0.82	per Ha.	100%	Royalty:	4%	of Turnover	
Manpower Needs:	100%	Managers	6	Skilled Labour	7	Unskilled Labour	15		
	100%	Management:		Foreign	25%	Citizen	75%		
Shadow Wage Adjustment:	100%	Managers	1.00	Skilled Labour	1.00	100%	Unskilled Labour	0.50	
Foreign Exchange Premium:	100%	6%		Adjustment Factor =		1.06			
Tax Adjustments:	100%	General Sales Tax:		10%	Import Taxes: from SACU:		0%	to SACU: n/a	
Discount Rates:	100%	Financial Discount Rate:		8%	Economic Discount Rate:		8%		
Opportunity Cost of Capital:	100%	8%							
<p>Static models depict enterprise at full production. Static financial model includes interest, amortisation government fees, royalties and land rentals. Static economic model takes foreign inflows and outflows into account, excludes other interest and transfers and values enterprise in economic prices before land and government costs</p> <p>Dynamic models presented over 5 and 10 years, to measure IRR and NPV. Financial dynamic model, at constant prices, excludes interest and depreciation, and includes asset residual values. Economic model includes foreign inflows and outflows, and measures value of enterprise in economic prices before inclusion of land costs and public expenditures.</p>									
* Shaded cells indicate degree of conformity with base case values. Underlined shaded cells can be changed									

FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA TOURISM - MAKGADIKGADI 2010 - BASE CASE											
TABLE 1: CAPITAL REQUIREMENTS											
ITEM	QUANT.	PRICE PULA	FINAN. COST	LIFE Years	AMORT. + INT.	DEPREC- IATION	ECON. DEPR.	FOREX ADJ.	TAX ADJ.	ECON. COST	
FIXED CAPITAL											
DOMESTIC ITEMS											
Houses Manager	6	57412	344471	40	40461	8612	7751	1.00	0.90	310024	
Houses Labour	22	8633	189934	40	22310	4748	4274	1.00	0.90	189934	
Storerooms	1	863335	863335	40	101407	21583	19425	1.00	0.90	777002	
Tourist Lodges	1	2065529	2065529	40	242616	51638	46474	1.00	0.90	1858977	
Borehole	0	179862	0	40	0	0	0	1.00	0.90	0	
Reservoir (Whole Water System)	1	467640	467640	40	54929	11691	10522	1.00	0.90	420876	
Reticulation/Pans	0	6443	0	40	0	0	0	1.00	0.90	0	
Firebreaks	0.00	8805	0	40	0	0	0	1.00	0.90	0	
Hiking Trails	0.00	1289	0	40	0	0	0	1.00	0.90	0	
Power/Road to Site	1	71945	71945	40	8451	1799	1619	1.00	0.90	64750	
CONTINGENCIES @ 5%			200143	40	23509	5004	4503	1.00	0.90	180128	
SUBTOTAL DOMESTIC ITEMS			4202996							3801690	
TRADABLE ITEMS											
Boma	0	75381	0	20	0	0	0	1.06	0.90	0	
Hiker Camps	0	0	0	15	0	0	0	1.06	0.90	0	
Pump/Windmill	1	139594	139594	15	18353	9306	8878	1.06	0.90	133173	
Fencing Perimeter	0.00	125914	0	15	0	0	0	1.06	0.90	0	
Fencing Internal	0.00	114467	0	15	0	0	0	1.06	0.90	0	
CONTINGENCIES @ 5%			6980	15	918	465	444	1.06	0.90	6659	
SUBTOTAL TRADABLES			146574							139831	
SUBTOTAL- FIXED CAPITAL			4349570							3941521	
MOVABLE CAPITAL											
TRADABLE ITEMS											
Land Cruisers/Trucks/Vans	4	578306	2313223	4	729754	578306	551704	1.06	0.90	2206815	
Tools/Office Equipment	1	63784	63784	6	14645	10631	10142	1.06	0.90	60850	
Lodge Equipment	1	83982	83982	6	19283	13997	13353	1.06	0.90	80119	
Boats/Quad bikes	3	14174	42522	6	9763	7087	6761	1.06	0.90	40566	
CONTINGENCIES @ 10%			250351	6	57482	41725	39806	1.06	0.90	238835	
SUBTOTAL TRADABLES			2753862							2627184	
DOMESTIC ITEMS											
Capture: Small Antelope	0	0	0	40	0			1.00	0.90	0	
: Large Antelope	0	0	0	40	0			1.00	0.90	0	
: Ostrich	0	0	0	40	0			1.00	0.90	0	
: Other Animals	0	0	0	40	0			1.00	0.90	0	
Horses and Donkeys	0	0	0	40	0			1.00	0.90	0	
CONTINGENCIES @ 10%			0	40	0			1.00	0.90	0	
SUBTOTAL- DOMESTIC ITEMS			0							0	
SUBTOTAL- MOVABLE CAPITAL			2753862							2627184	
WORKING CAPITAL											
			LOAN	INTEREST							
VARIABLE			771938	100352							
OVERHEAD			457103	59423					1.06	1.00	818254
SUBTOTAL- WORKING CAPITAL			1229041	159775							1302784
TOTALS			8332473	159775	1343881	766592	725655			7871490	

FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA TOURISM - MAKGADIKGADI 2010 - BASE CASE							
TABLE 2: STOCK COMPOSITION BY SPECIES AT FULL PRODUCTION							
ITEM	HEAD	LSU FACTOR			LSU		
Baboon	217	0.00			0		
Black Rhinoceros	0	1.50			0		
Buffalo	25	1.00			25		
Burchells Zebra	924	0.63			582		
Bushbuck	4	0.14			1		
Bushpig	0	0.20			0		
Cheetah	8	0.00			0		
Crocodile	0	0.00			0		
Duiker	588	0.07			41		
Eland	29	1.00			29		
Elephant	69	3.33			231		
Gemsbok	105	0.40			42		
Giraffe	58	1.50			88		
Hartebeest	14	0.26			4		
Impala	105	0.14			15		
Klipspringer	0	0.07			0		
Kudu	277	0.40			111		
Lechwe	0	0.16			0		
Leopard	21	0.00			0		
Lion	14	0.00			0		
Monkey vervet	42	0.00			0		
Ostrich	210	0.26			55		
Reedbuck	0	0.14			0		
Roan	0	0.65			0		
Small predators	140	0.00			0		
Spotted Hyaena	21	0.00			0		
Springbok	504	0.08			40		
Steenbok	578	0.06			35		
Tsessebe	0	0.26			0		
Warthog	126	0.20			25		
Waterbuck	0	0.37			0		
Wildebeest	147	0.40			59		
TOTAL	4227				1381		
GAME DENSITY:	2.87	LSU PER SQ.KM.;		CONCESSION SIZE:	48200	HECTARES	
TABLE 3: SALES AT FULL PRODUCTION							
ITEM	VISITOR DAYS	@	RATE P/Day	FINANCIAL VALUE	FOREX ADJ.	TAX ADJ.	ECON. VALUE
Overseas Adults	2247	@	2933	6591024	1.06	1.00	6986485
Regional Adults	281	@	2933	823878	1.06	1.00	873311
Resident Adults	140	@	2933	411939	1.06	1.00	436655
Citizen Adults	140	@	2933	411939	1.00	1.00	411939
Overseas Children	250	@	2933	732336	1.06	1.00	776276
Regional Children	31	@	2933	91542	1.06	1.00	97035
Resident Children	16	@	2933	45771	1.06	1.00	48517
Citizen Children	16	@	2933	45771	1.00	1.00	45771
Optional Excursions				0	1.06	1.00	0
Bar				0	1.06	1.00	0
Crafts/Curios				46811	1.06	1.00	49620
TOTALS	3121		GROSS INCOME	9201011			9725609

FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA TOURISM - MAKGADIKGADI 2010 - BASE CASE									
TABLE 4: VARIABLE EXPENDITURE AT FULL PRODUCTION									
ITEM	FINANCIAL VALUES			FOREX ADJ.	TAX ADJ.	ECONOMIC VALUES			
	P/LSU	P/HA.	VALUE			P/LSU	P/HA.	VALUE	
TRADABLE ITEMS				0.25					
				2300253					
Marketing Costs: Advertising	666.19	19.09	920101		1.06	0.90	635.55	18.21	877776
: Agents Fees	999.29	28.63	1380152		1.06	0.90	1059.25	30.35	1462961
Lodge Running Costs : Accomodation	97.05	2.78	134042		1.06	0.90	92.59	2.65	127877
: Transport	26.79	0.77	36996		1.06	0.90	25.55	0.73	35294
: Optional Activ.	0.00	0.00	0		1.06	0.90	0.00	0.00	0
: Bar	67.94	1.95	93830		1.06	0.90	64.81	1.86	89514
: Crafts/Curios	40.28	1.15	55628		1.06	0.90	38.42	1.10	53069
Fodder and Supplements	0.00	0.00	0		1.06	0.90	0.00	0.00	0
Offtake Costs: Ammunition	0.00	0.00	0		1.06	0.90	0.00	0.00	0
: Supplies and Packaging	0.00	0.00	0		1.06	0.90	0.00	0.00	0
: Transport	0.00	0.00	0		1.06	0.90	0.00	0.00	0
: Live Game Distribution	0.00	0.00	0		1.06	0.90	0.00	0.00	0
: Biltong Distribution	0.00	0.00	0		1.06	0.90	0.00	0.00	0
Fuels, Oils and Miscellaneous Costs	25.23	0.72	34851		1.06	0.90	24.07	0.69	33248
SUBTOTAL TRADABLES	1922.77	55.10	2655599				1940.25	55.60	2679738
DOMESTIC ITEMS									
Veterinary and Medicine Costs	0.00	0.00	0		1.00	0.90	0.00	0.00	0
Licence Fees: Park Entrance Fees	205.62	5.89	283988		1.00	1.00	0.00	0.00	0
: Hunting Licences	0.00	0.00	0		1.00	1.00	0.00	0.00	0
Sales Tax	666.19	19.09	920101		1.00	1.00	0.00	0.00	0
SUBTOTAL DOMESTIC ITEMS	871.81	24.98	1204089				0.00	0.00	0
TOTAL VARIABLE EXPENDITURE	2794.59	80.08	3859689				1940.25	55.60	2679738
TABLE 5: OPERATING OVERHEAD EXPENDITURE AT FULL PRODUCTION									
ITEM	FINANCIAL VALUES			FOREX ADJ.	TAX ADJ.	ECONOMIC VALUES			
	P/LSU	P/HA.	VALUE			P/LSU	P/HA.	VALUE	
DOMESTIC ITEMS				0.17					
				1536360					
Salaries and Wages: Unskilled Labour	143.53	4.11	198240	0.20	1.00	1.00	143.53	4.11	99120
: Skilled Labour	251.19	7.20	346920		1.00	1.00	251.19	7.20	312228
: Managers	717.67	20.56	991200		1.00	1.00	717.67	20.56	991200
Administration	60.64	1.74	83756		1.00	0.90	60.64	1.74	75381
Maintenance and Repairs	178.33	5.11	246298		1.00	0.90	178.33	5.11	221669
Insurance	303.45	8.70	419102		1.00	0.90	303.45	8.70	377192
Travelling	0.00	0.00	0		1.00	0.90	0.00	0.00	0
TOTAL OPERATING OVERHEAD EXPEND.	1654.82	47.42	2285517				1654.82	47.42	2076790

FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA TOURISM - MAKGADIKGADI 2010 - BASE CASE			
TABLE 6: STATIC FINANCIAL MODEL (AT FULL PRODUCTION)			
ITEM	UNITS		TOTAL
Concession Extent	Hectares		48200
Concession Stock	Large Stock Units (LSU)		1381
Total Capital Requirement	PULA		8332473
	P/LSU	P/HECTARE	PULA
GROSS INCOME	6661.95	190.89	9201011
VARIABLE COSTS	2794.59	80.08	3859689
GROSS MARGIN	3867.36	110.82	5341323
OVERHEAD COSTS			
Overhead Operating Costs	1654.82	47.42	2285517
Loan Amortisation and Interest	243.26	6.97	335970
Provisions for Capital Replacement	416.29	11.93	574944
Interest on Variable Working Capital	72.66	2.08	100352
Interest on Overhead Working Capital	43.03	1.23	59423
Land Rental	28.62	0.82	39524
Resource Royalty	266.48	7.64	368040
TOTAL OVERHEAD COSTS	2725.14	78.09	3763771
NET CASH INCOME	1142.22	32.73	1577551
NET CASH INCOME/P100 TOTAL CAPITAL INVESTMENT	18.93		
"TOTAL BENEFITS"*/P100 TOTAL CAPITAL INVESTMENT	56.71		
"TOTAL BENEFITS"*/HECTARE	98.04		
* "Total Benefits" = all of Net Cash Income, Salaries and Wages, Licences and Duties, Rental and Royalties.			

FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA TOURISM - MAKGADIKGADI 2010 - BASE CASE			
TABLE 7: STATIC ECONOMIC MODEL (AT FULL PRODUCTION)			
ITEM	UNITS		TOTAL
Concession Extent	Hectares		48200
Concession Stock	Large Stock Units (LSU)		1381
Total Capital Requirement	PULA		7871490
Economic Depreciation Cost	PULA		725655
Foreign Financing (Prorated)	PULA		203147
Foreign Amortisation	PULA		50787
Foreign Capital Replacement Provision	PULA		152360
Foreign Interest Cost	PULA		195322
Domestic Interest Cost	PULA		585966
ECONOMIC BENEFITS	P/LSU	P/HECTARE	PULA
Gross Income	7041.78	201.78	9725609
ECONOMIC COSTS			
DOMESTIC COMPONENT			
Shadow Unskilled Citizen Wages	71.77	2.06	99120
Other Citizen Wages	764.32	21.90	1055628
Opportunity Cost of Capital	455.95	13.06	629719
Other Domestic Economic Costs	488.18	13.99	674242
SUBTOTAL DOMESTIC COMPONENT	1780.22	51.01	2458709
TRADABLE COMPONENT			
Foreign Remuneration	179.42	5.14	247800
Foreign Services	1355.84	38.85	1872590
Foreign Interest	141.42	4.05	195322
Foreign Lease Payments	0.00	0.00	0
Foreign Rentals	0.00	0.00	0
Foreign Net Income	302.69	8.67	418051
Other Tradable Economic Costs	584.41	16.75	807148
SUBTOTAL TRADABLE COMPONENT	2563.78	73.46	3540911
TOTAL ECONOMIC COSTS	4343.99	124.47	5999620
GROSS VALUE ADDED TO NATIONAL INCOME	2697.78	77.30	3725990
NET VALUE ADDED (Excluding Depreciation)	2172.38	62.25	3000335
STATISTICAL GROSS VALUE ADDED	3533.87	101.26	4880738
DOMESTIC RESOURCE COST RATIO =	0.49		
NET VALUE ADDED/P100 TOTAL CAPITAL COST =	38.12		
CAPITAL COST/EMPLOYMENT OPPORTUNITY CREATED =	281125		
NUMBER OF EMPLOYMENT OPPORTUNITIES/1000 HA.	0.58		

FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA TOURISM - MAKGADIKGADI 2010 - BASE CASE												
TABLE 8: CAPITAL PHASING, DEPRECIATION SCHEDULE AND CALCULATION OF RESIDUAL VALUE (PULA)												
ITEM	LIFE (Yrs)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
DEPRECIABLE ASSETS												
"Forty Year" Items	40											
Total Expenditure		4202996										
Phased Expenditure		2521798	1681199	0	0	0	0	0	0	0	0	0
Depreciation		63045	105075	105075	105075	105075	105075	105075	105075	105075	105075	105075
Residual value		2521798	4139951	4034876	3929802	3824727	3719652	3614577	3509502	3404427	3299352	3194277
"Twenty Year" Items	20											
Total Expenditure		0										
Phased Expenditure		0	0	0	0	0	0	0	0	0	0	0
Depreciation		0	0	0	0	0	0	0	0	0	0	0
Residual value		0	0	0	0	0	0	0	0	0	0	0
"Fifteen Year" Items	15											
Total Expenditure		146574										
Phased Expenditure		87944	58629	0	0	0	0	0	0	0	0	0
Depreciation		5863	9772	9772	9772	9772	9772	9772	9772	9772	9772	9772
Residual value		87944	140711	130939	121168	111396	101624	91853	82081	72310	62538	52767
"Six Year" Items	6						6					
Total Expenditure		440639						440639				
Phased Expenditure		308447	132192	0	0	0	0	308447	132192	0	0	0
Depreciation		51408	73440	73440	73440	73440	73440	73440	73440	73440	73440	73440
Residual value		308447	389231	315791	242352	168912	95472	330479	389231	315791	242352	168912
"Four Year" Items	4											
Total Expenditure		2313223				2313223				2313223		
Phased Expenditure		2313223	0	0	0	2313223	0	0	0	2313223	0	0
Depreciation		578306	578306	578306	578306	578306	578306	578306	578306	578306	578306	578306
Residual value		2313223	1734917	1156611	578306	2313223	1734917	1156611	578306	2313223	1734917	1156611
NON DEPRECIABLE ASSETS												
Stock	-											
Phased Expenditure		0	0	0	0	0	0	0	0	0	0	0
Residual value		0	0	0	0	0	0	0	0	0	0	0
Working Capital	-											
Phased Expenditure		1229041	0	0	0	0	0	0	0	0	0	0
TOTAL PHASED CAPITAL EXPENDITURE												
Domestic Component		2521798	1681199	0	0	0	0	0	0	0	0	0
Tradable Component		2709615	190821	0	0	2313223	0	308447	132192	2313223	0	0
Total Financial Value		5231412	1872020	0	0	2313223	0	308447	132192	2313223	0	0
Total Economic Value		4854590	1695122	0	0	2206815	0	294259	126111	2206815	0	0
TOTAL ASSET RESIDUAL VALUE												
Domestic Component		2521798	4139951	4034876	3929802	3824727	3719652	3614577	3509502	3404427	3299352	3194277
Tradable Component		2709615	2264859	1603342	941825	2593531	1932013	1578944	1049618	2701324	2039807	1378290
Financial Value		5231412	6404811	5638219	4871626	6418257	5651665	5193521	4559120	6105751	5339159	4572567
Economic Value		4854590	5886632	5160977	4435322	5916482	5190827	4759431	4159888	5641047	4915393	4189738

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TABLE 9: LOAN FINANCING SCHEDULE (PULA)												
ITEM	PERIOD (Yrs)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
LONG TERM LOANS												
TWENTY YEAR LOAN 20												
Total Expenditure		1050749										
Loan Disbursements		630449	420300	0	0	0	0	0	0	0	0	0
Loan Payments		74052	123421	123421	123421	123421	123421	123421	123421	123421	123421	123421
Amortisation		31522	52537	52537	52537	52537	52537	52537	52537	52537	52537	52537
Interest Payments		42530	70883	70883	70883	70883	70883	70883	70883	70883	70883	70883
Loans Outstanding		630449	1019227	966689	914152	861614	809077	756539	704002	651464	598927	546390
FIFTEEN YEAR LOAN 15												
Total Expenditure		36643										
Loan Disbursements		27483	9161	0	0	0	0	0	0	0	0	0
Loan Payments		3613	4818	4818	4818	4818	4818	4818	4818	4818	4818	4818
Amortisation		1832	2443	2443	2443	2443	2443	2443	2443	2443	2443	2443
Interest Payments		1781	2375	2375	2375	2375	2375	2375	2375	2375	2375	2375
Loans Outstanding		27483	34811	32368	29925	27483	25040	22597	20154	17711	15268	12825
SIX YEAR LOAN 6												
Total Expenditure		110160						6				
Loan Disbursements		77112	33048	0	0	0	0	77112	33048	0	0	0
Loan Payments		17705	25294	25294	25294	25294	25294	25294	25294	25294	25294	25294
Amortisation		12852	18360	18360	18360	18360	18360	18360	18360	18360	18360	18360
Interest Payments		4853	6934	6934	6934	6934	6934	6934	6934	6934	6934	6934
Loans Outstanding		77112	97308	78948	60588	42228	23868	82620	97308	78948	60588	42228
FOUR YEAR LOAN 4												
Total Expenditure		578306				578306				578306		
Loan Disbursements		578306	0	0	0	578306	0	0	0	578306	0	0
Loan Payments		182439	182439	182439	182439	182439	182439	182439	182439	182439	182439	182439
Amortisation		144576	144576	144576	144576	144576	144576	144576	144576	144576	144576	144576
Interest Payments		37862	37862	37862	37862	37862	37862	37862	37862	37862	37862	37862
Loans Outstanding		578306	433729	289153	144576	578306	433729	289153	144576	578306	433729	289153
SHORT TERM LOANS												
Working Capital 1												
Overdraft		1229041	1229041	1229041	1229041	1229041	1229041	1229041	1229041	1229041	1229041	1229041
Interest Payments		159775	159775	159775	159775	159775	159775	159775	159775	159775	159775	159775
TOTAL LONG TERM LOAN DISBURSMENTS												
Domestic Component		985012	346881	0	0	433729	0	57834	24786	433729	0	0
Foreign Component *		348038	122565	0	0	153251	0	20435	8758	153251	0	0
TOTAL LONG TERM LOAN AMORTISATION												
Domestic Component		143087	163438	163438	163438	163438	163438	163438	163438	163438	163438	163438
Foreign Component *		50558	57748	57748	57748	57748	57748	57748	57748	57748	57748	57748
TOTAL INTEREST PAYMENTS												
Domestic Component		185101	208372	208372	208372	208372	208372	208372	208372	208372	208372	208372
Foreign Component *		65403	73625	73625	73625	73625	73625	73625	73625	73625	73625	73625
TOTAL LOANS OUTSTANDING												
Domestic Component		985012	1188806	1025369	861931	1132223	968785	863182	724530	994822	831384	667947
Foreign Component *		348038	420045	362297	304549	400052	342304	304991	256001	351504	293756	236008
* Economic Values												

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TABLE 10: FINANCIAL ANALYSIS - 5 YEARS (PULA)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
EXPENDITURE						
Capital Expenditure	5231412	1872020	0	0	2313223	0
Variable Expenditure	385969	2315813	3859689	3859689	3859689	3859689
Overhead Expenditure	2693082	2693082	2693082	2693082	2693082	2693082
TOTAL EXPENDITURE	8310463	6880915	6552770	6552770	8865993	6552770
INCOME						
Gross Income	0	4600506	8280910	9201011	9201011	9201011
Asset Residual Value	0	0	0	0	0	5651665
TOTAL INCOME	0	4600506	8280910	9201011	9201011	14852676
NET BENEFIT/COST	-8310463	-2280409	1728140	2648241	335018	8299906
FINANCIAL RATE OF RETURN (FRR) OVER 5 YEARS				=	5.39%	
NET PRESENT VALUE (NPV) @		8.00%		=	-873211	

TABLE 11: FINANCIAL ANALYSIS - 7 YEARS (PULA)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
EXPENDITURE								
Capital Expenditure	5231412	1872020	0	0	2313223	0	308447	132192
Variable Expenditure	385969	2315813	3859689	3859689	3859689	3859689	3859689	3859689
Overhead Expenditure	2693082	2693082	2693082	2693082	2693082	2693082	2693082	2693082
TOTAL EXPENDITURE	8310463	6880915	6552770	6552770	8865993	6552770	6861218	6684962
INCOME								
Gross Income	0	4600506	8280910	9201011	9201011	9201011	9201011	9201011
Asset Residual Value	0	0	0	0	0	0	0	4559120
TOTAL INCOME	0	4600506	8280910	9201011	9201011	9201011	9201011	13760131
NET BENEFIT/COST	-8310463	-2280409	1728140	2648241	335018	2648241	2339793	7075169
FINANCIAL RATE OF RETURN (FRR) OVER 7 YEARS				=	9.69%			
NET PRESENT VALUE (NPV) @		8.00%		=	753022			

TABLE 12: FINANCIAL ANALYSIS - 10 YEARS (PULA)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
EXPENDITURE											
Capital Expenditure	5231412	1872020	0	0	2313223	0	308447	132192	2313223	0	0
Variable Expenditure	385969	2315813	3859689	3859689	3859689	3859689	3859689	3859689	3859689	3859689	3859689
Overhead Expenditure	2693082	2693082	2693082	2693082	2693082	2693082	2693082	2693082	2693082	2693082	2693082
TOTAL EXPENDITURE	8310463	6880915	6552770	6552770	8865993	6552770	6861218	6684962	8865993	6552770	6552770
INCOME											
Gross Income	0	4600506	8280910	9201011	9201011	9201011	9201011	9201011	9201011	9201011	9201011
Asset Residual Value	0	0	0	0	0	0	0	0	0	0	4572567
TOTAL INCOME	0	4600506	8280910	9201011	9201011	9201011	9201011	9201011	9201011	9201011	13773578
NET BENEFIT/COST	-8310463	-2280409	1728140	2648241	335018	2648241	2339793	2516049	335018	2648241	7220808
FINANCIAL RATE OF RETURN (FRR) OVER 10 YEARS				=	12.68%						
NET PRESENT VALUE (NPV) @		8.00%		=	2780992						

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TABLE 13: ECONOMIC ANALYSIS - 5 YEARS (PULA)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
ECONOMIC COSTS						
Capital Expenditure	4854590	1695122	0	0	2206815	0
Unskilled Wages	99120	99120	99120	99120	99120	99120
Other Domestic Costs	1383896	1729870	1729870	1729870	1729870	1729870
Tradable Costs	287675	1726051	2876751	2876751	2876751	2876751
Foreign Amortisation	50558	57748	57748	57748	57748	57748
Foreign Profits	0	29264	334441	418051	418051	418051
Foreign Loans Outst.	0	0	0	0	0	342304
TOTAL COSTS	6675839	5337174	5097929	5181540	7388354	5523844
ECONOMIC BENEFITS						
Gross Income	0	4862805	8753048	9725609	9725609	9725609
Asset Residual Value	0	0	0	0	0	5190827
Foreign Financing	348038	122565	0	0	153251	0
TOTAL BENEFITS	348038	4985369	8753048	9725609	9878860	14916437
NET BENEFIT/COST	-6327801	-351804	3655119	4544070	2490506	9392593
ECONOMIC RATE OF RETURN (ERR) OVER 5 YEARS				=	35.65%	
NET PRESENT VALUE (NPV) @		8.00%		=	7694811	

TABLE 14: ECONOMIC ANALYSIS - 10 YEARS (PULA)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
ECONOMIC COSTS											
Capital Expenditure	4854590	1695122	0	0	2206815	0	294259	126111	2206815	0	0
Unskilled Wages	99120	99120	99120	99120	99120	99120	99120	99120	99120	99120	99120
Other Domestic Costs	1383896	1729870	1729870	1729870	1729870	1729870	1729870	1729870	1729870	1729870	1729870
Tradable Costs	287675	1726051	2876751	2876751	2876751	2876751	2876751	2876751	2876751	2876751	2876751
Foreign Amortisation	50558	57748	57748	57748	57748	57748	57748	57748	57748	57748	57748
Foreign Profits	0	29264	334441	418051	418051	418051	418051	418051	418051	418051	418051
Foreign Loans Outst.	0	0	0	0	0	0	0	0	0	0	236008
TOTAL COSTS	6675839	5337174	5097929	5181540	7388354	5181540	5475799	5307651	7388354	5181540	5417547
ECONOMIC BENEFITS											
Gross Income	0	4862805	8753048	9725609	9725609	9725609	9725609	9725609	9725609	9725609	9725609
Asset Residual Value	0	0	0	0	0	0	0	0	0	0	4189738
Foreign Financing	348038	122565	0	0	153251	0	20435	8758	153251	0	0
TOTAL BENEFITS	348038	4985369	8753048	9725609	9878860	9725609	9746044	9734367	9878860	9725609	13915347
NET BENEFIT/COST	-6327801	-351804	3655119	4544070	2490506	4544070	4270245	4426716	2490506	4544070	8497800
ECONOMIC RATE OF RETURN (ERR) OVER 10 YEARS				=	40.53%						
NET PRESENT VALUE (NPV) @		8.00%		=	16517900						

FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA TOURISM - MAKGADIKGADI 2010 - BASE CASE					
TABLE 15: SUMMARY OF RESULTS					
ITEM	UNITS				TOTAL
Concession Extent	Hectares				48200
Concession Stock	Large Stock Units (LSU)				1381
Annual Visitor Days (VD)	Number				3121
ITEM	% of TCI	P/VISITOR DAY	P/LSU	P/HECTARE	PULA
Total Financial Capital (TCI)	-	2670.02	6033.09	172.87	8332473
Jobs					28
Financial Gross Income	110.42%	2948.33	6661.95	190.89	9201011
Variable Financial Costs	-	1236.78	2794.59	80.08	3859689
Fixed Financial Costs	-	1206.05	2725.14	78.09	3763771
Net Cash Income	18.93%	505.50	1142.22	32.73	1577551
Local Community Cash Income	11.43%	305.29	689.82	19.77	952724
Land Rental	-	12.66	28.62	0.82	39524
Resource Royalty	-	117.93	266.48	7.64	368040
FRR (@ 10 Years)	-	-	-	-	12.68%
FNPV (@ 8%, @ 10 Years)	-	-	-	57.70	2780992
Total Economic Capital	-	2522.31	5699.31	163.31	7871490
Economic Gross Income	123.55%	3116.43	7041.78	201.78	9725609
Economic Costs	76.22%	1922.49	4343.99	124.47	5999620
Incremental Gross Value Added	47.34%	1193.94	2697.78	77.30	3725990
Incremental Net Value Added	38.12%	961.41	2172.38	62.25	3000335
Statistical Gross Value Added	62.01%	1563.96	3533.87	101.26	4880738
ERR (@ 10 Years)	-	-	-	-	40.53%
ENPV (@ 8%, @ 10 Years)	-	-	-	342.70	16517900
Economic Capital Cost/Job	-	-	-	-	281125
Domestic Resource Cost Ratio	-	-	-	-	0.49
Policy Analysis Matrix	: Effects of Policy / Market Imperfections		: on Output		-524598
			: on Tradable Inputs		885312
			: on Domestic Factors		-1783497
	: Net Effects of Policy / Market Imperfections		: on Annual Net Income		-1422784
			: on Net Present Value (10 Years)		-13736908

8.2. The safari hunting enterprise model

MAKGADIKGADI PANS FMP FINANCIAL/ECONOMIC MODEL - MEDIUM QUALITY AREA SAFARI HUNTING - MAKGADIKGADI 2010 - BASE CASE ASSUMPTIONS*											
Production System:	8	bed, up-market lodge offering all inclusive, guided, wildlife hunts.									
Site:	High quality, unfenced area with riparian, wetland and woodland setting and mixed population of Okavango delta species on quota.										
Game Density:	<u>100%</u>	2.92	LSU Equivalents/Sq. Km. or,		34	Hectares per LSU Equivalent					
Carrying Capacity:	<u>100%</u>	0.007	Tourist Beds/Sq. Km. or,		14100	Ha. per Tourist Bed					
Concession Size:	112800	Hectares or,		1128	Square Kilometres		(Share of larger area)				
Tourist Category:	Overseas	95%	Regional	5%	Resident	0%	Citizen	0%			
Average Group Size:	1.5		Hunters		1	Observers		0.5			
Occupancy Rate:	Overall	16%	No. of	10	Day Hunts =	22	Total =	220	Hunter Days		
Daily Tariffs (Pula):	<u>100%</u>	Overseas	10308	Regional	10308	Resident	10308	Citizen	10308		
		Observer's Tariff as Percent of Full Price: 50%									
Capital Item Prices:	<u>100%</u>	(Variation from Normal for Sensitivity Analysis)									
Capital Sources:	<u>100%</u>	Loan =	25%	Equity =	75%	and:	<u>100%</u>	Foreign	25%	Domestic	75%
Interest Rates:	Rate for Capital Loans:			10%	Rate for Working Capital Loans:			13%			
Working Capital as Proportion of Annual Operating Costs:	20%										
Park Entry Fees:	<u>100%</u>	Fee per Tourist Night/Day: Pula			0.00						
Land Rental and Resource Royalty (Pula):	<u>100%</u>	Rental:	2.00	per Ha.	<u>100%</u>	Royalty:	12%	of Turnover			
Personpower Needs:	<u>100%</u>	Managers	3	Skilled Labour	4	Unskilled Labour	5				
	<u>100%</u>	Management:	Foreign		25%	Citizen	75%				
Shadow Wage Adjustment:	<u>100%</u>	Managers	1.00	Skilled Labour	1.00	<u>100%</u>	Unskilled Labour	0.50			
Foreign Exchange Premium:	<u>100%</u>	6%		Adjustment Factor =		1.06					
Tax Adjustments:	<u>100%</u>	General Sales Tax:		10%	Import Taxes: from SACU:	0%	to SACU:	n/a			
Discount Rates:	<u>100%</u>	Financial Discount Rate:			8%	Economic Discount Rate:			8%		
Static models depict enterprise at full production. Static financial model includes interest, amortisation government fees, royalties and land rentals. Static economic model takes foreign inflows and outflows into account, excludes other interest and transfers and values enterprise in economic prices before land and government costs											
Dynamic models presented over 5 and 10 years, to measure IRR and NPV. Financial dynamic model, at constant prices, excludes interest and depreciation, and includes asset residual values. Economic model includes foreign inflows and outflows, and measures value of enterprise in economic prices before inclusion of land costs and public expenditures.											
* Shaded cells indicate degree of conformity with base case values. Underlined shaded cells can be changed											

FINANCIAL/ECONOMIC MODEL - MEDIUM QUALITY AREA SAFARI HUNTING - MAKGADIKGADI 2010 - BASE CASE										
TABLE 1: CAPITAL REQUIREMENTS										
ITEM	QUANT.	PRICE Pula	FINAN. COST	LIFE Years	AMORT. + INT.	DEPREC- IATION	ECON. DEPR.	FOREX ADJ.	TAX ADJ.	ECON. COST
FIXED CAPITAL										
DOMESTIC ITEMS										
Houses Manager	3	0	0	40	0	0	0	1.00	0.90	0
Houses Labour	9	0	0	40	0	0	0	1.00	0.90	0
Storerooms/buildings	0	236000	0	40	0	0	0	1.00	0.90	0
Tourist Lodges	1	398250	398250	40	46778	9956	8961	1.00	0.90	358425
Boreholes/Wells	1	147500	147500	40	17325	3688	3319	1.00	0.90	132750
Reservoir (Whole Water System)	1	32686	32686	40	3839	817	735	1.00	0.90	29417
Reticulation/Pans	0	8850	0	40	0	0	0	1.00	0.90	0
Firebreaks	0.00	12095	0	40	0	0	0	1.00	0.90	0
Hiking Trails	0.00	1770	0	40	0	0	0	1.00	0.90	0
Power/Road to Site	1	23600	23600	40	2772	590	531	1.00	0.90	21240
CONTINGENCIES @ 5%			30102	40	3536	753	677	1.00	0.90	27092
SUBTOTAL DOMESTIC ITEMS			632138							568924
TRADABLE ITEMS										
Boma	0	79650	0	20	0	0	0	1.06	0.90	0
Hiker Camps	0	0	0	15	0	0	0	1.06	0.90	0
Pump/Windmill	1	92040	92040	15	12101	6136	5854	1.06	0.90	87806
Fencing Perimeter	0.00	133045	0	15	0	0	0	1.06	0.90	0
Fencing Internal	0.00	120950	0	15	0	0	0	1.06	0.90	0
CONTINGENCIES @ 5%			4602	15	605	307	293	1.06	0.90	4390
SUBTOTAL TRADABLES			96642							92196
SUBTOTAL- FIXED CAPITAL			728780							661120
MOVABLE CAPITAL										
TRADABLE ITEMS										
Land Cruisers/Trucks/Vans	3	313880	941640	4	297060	235410	224581	1.06	0.90	898325
Tents	10	35400	354000	6	81281	59000	56286	1.06	0.90	337716
Tools/Equipment	1	385954	385954	6	88618	64326	61367	1.06	0.90	368200
Boats	0	129800	0	6	0	0	0	1.06	0.90	0
CONTINGENCIES @ 10%			168159	6	38611	28027	26737	1.06	0.90	160424
SUBTOTAL TRADABLES			1849754							1764665
DOMESTIC ITEMS										
Capture: Small Antelope	0	0	0	40	0			1.00	0.90	0
: Large Antelope	0	0	0	40	0			1.00	0.90	0
: Ostrich	0	0	0	40	0			1.00	0.90	0
: Other Animals	0	0	0	40	0			1.00	0.90	0
Horses and Donkeys	0	0	0	40	0			1.00	0.90	0
CONTINGENCIES @ 10%			0	40	0			1.00	0.90	0
SUBTOTAL- DOMESTIC ITEMS			0							0
SUBTOTAL- MOVABLE CAPITAL			1849754							1764665
WORKING CAPITAL										
			LOAN	INTEREST						
VARIABLE			358075	46550				1.06	1.00	379559
OVERHEAD			459926	59790				1.06	1.00	487522
SUBTOTAL- WORKING CAPITAL			818001	106340						867081
TOTALS			3396535	106340	592526	409009	389341			3292867

FINANCIAL/ECONOMIC MODEL - MEDIUM QUALITY AREA SAFARI HUNTING - MAKGADIKGADI 2010 - BASE CASE								
TABLE 2: STOCK COMPOSITION BY SPECIES AT FULL PRODUCTION								
ITEM	HEAD	OFFTAKE %	NO.	PRICE	FIN. VALUE	LSU FACTOR	LSU	
Baboon	517	1.06%	6	2148	11812	0.00	0	
Black Rhinoceros	0	0.00%	0	198240	0	1.50	0	
Buffalo	60	11.67%	7	21476	150332	1.00	60	
Burchells Zebra	2200	0.16%	4	8590	30066	0.63	1386	
Bushbuck	10	0.00%	0	2146	0	0.14	1	
Bushpig	0	0.00%	0	1431	0	0.20	0	
Cheetah	20	0.00%	0	28613	0	0.00	0	
Crocodile	0	0.00%	0	7731	0	0.00	0	
Duiker	1400	0.29%	4	859	3436	0.07	98	
Eland	69	0.72%	1	16322	8161	1.00	69	
Elephant	165	13.33%	22	163218	3590787	3.33	549	
Gemsbok	250	0.60%	2	10308	15463	0.40	100	
Giraffe	139	0.00%	0	14306	0	1.50	208	
Hartebeest	32	0.00%	0	7731	0	0.26	8	
Impala	250	0.00%	0	3436	0	0.14	35	
Klipspringer	0	0.00%	0	1788	0	0.07	0	
Kudu	660	0.61%	4	11168	44670	0.40	264	
Lechwe	0	0.00%	0	7731	0	0.16	0	
Leopard	50	0.00%	0	35221	0	0.00	0	
Lion	33	0.00%	0	47247	0	0.00	0	
Monkey vervet	100	0.00%	0	590	0	0.00	0	
Ostrich	500	0.50%	3	182	455	0.26	130	
Reedbuck	0	0.00%	0	5584	0	0.14	0	
Roan	0	0.00%	0	35766	0	0.65	0	
Small predators	333	0.45%	2	767	1151	0.00	0	
Spotted Hyaena	50	2.00%	1	4295	4295	0.00	0	
Springbok	1200	0.17%	2	2577	5154	0.08	96	
Steenbok	1375	1.09%	15	859	12886	0.06	83	
Tsessebe	0	0.00%	0	6872	0	0.26	0	
Warthog	300	0.67%	2	2577	5154	0.20	60	
Waterbuck	0	0.00%	0	11168	0	0.37	0	
Wildebeest	350	0.43%	2	8161	12241	0.40	140	
TOTAL	10064		74		3896063		3288	
GAME DENSITY ON LAN	2.92	LSU PER SQ.KM.;	CONCESSION SIZE:	112800	HECTARES			
TABLE 3: SALES AT FULL PRODUCTION								
ITEM	VISITOR DAYS	@ RATE	(Pula/Day)	FINANCIAL VALUE	FOREX ADJ.	TAX ADJ.	ECONOMIC VALUE	
Overseas Hunters	209	@	10308 Pula/Day =	2154472	6498809	1.06	0.90	2055367
Regional Hunters	11	@	10308 Pula/Day =	113393		1.06	0.90	108177
Resident Hunters	0	@	10308 Pula/Day =	0		1.06	0.90	0
Citizen Hunters	0	@	10308 Pula/Day =	0		1.00	0.90	0
Overseas Observers	105	@	5154 Pula/Day =	538618	566966	1.06	0.90	513842
Regional Observers	6	@	5154 Pula/Day =	28348		1.06	0.90	27044
Resident Observers	0	@	5154 Pula/Day =	0		1.06	0.90	0
Citizen Observers	0	@	5154 Pula/Day =	0		1.00	0.90	0
Trophy Fees				3896063		1.06	0.90	3716844
Dip and Pack				145600		1.06	0.90	138902
Other (Gun Hire, Tips, etc.)				189280		1.06	0.90	180573
TOTALS	330		GROSS INCOME	7065775				6740750

FINANCIAL/ECONOMIC MODEL - MEDIUM QUALITY AREA SAFARI HUNTING - MAKGADIKGADI 2010 - BASE CASE									
TABLE 4: VARIABLE EXPENDITURE AT FULL PRODUCTION									
ITEM	FINANCIAL VALUES			FOREX ADJ.	TAX ADJ.	ECONOMIC VALUES			VALUE
	Pula/LSU	Pula/HA.	VALUE			Pula/LSU	Pula/HA.	VALUE	
TRADABLE ITEMS				0.15					
				1083890					
Marketing Costs: Advertising	76.06	2.22	250128	3.54%	1.06	0.90	72.56	2.12	238623
: Agents Fees	253.55	7.39	833761	11.80%	1.06	0.90	241.88	7.05	795408
Lodge Running Costs : Accomodation	19.56	0.57	64329	0.91%	1.06	0.90	18.66	0.54	61370
: Transport	31.50	0.92	103580	1.47%	1.06	0.90	30.05	0.88	98816
: Optional Activ.	0.00	0.00	0		1.06	0.90	0.00	0.00	0
: Bar	0.00	0.00	0	0.00%	1.06	0.90	0.00	0.00	0
: Crafts/Curios	0.33	0.01	1090	0.02%	1.06	0.90	0.32	0.01	1040
Fodder and Supplements	0.00	0.00	0		1.06	0.90	0.00	0.00	0
Offtake Costs: Ammunition	0.00	0.00	0		1.06	0.90	0.00	0.00	0
: Supplies and Packaging	8.12	0.24	26713	0.38%	1.06	0.90	7.75	0.23	25484
: Transport	0.00	0.00	0		1.06	0.90	0.00	0.00	0
: Live Game Distribution	0.00	0.00	0		1.06	0.90	0.00	0.00	0
: Biltong Distribution	0.00	0.00	0		1.06	0.90	0.00	0.00	0
Fuels, Oils and Miscellaneous Costs	13.26	0.39	43613	0.62%	1.06	0.90	12.65	0.37	41607
SUBTOTAL TRADABLES	402.39	11.73	1323215	18.73%			383.88	11.19	1262347
DOMESTIC ITEMS									
Veterinary and Medicine Costs	0.00	0.00	0		1.00	0.90	0.00	0.00	0
Licence Fees: Park Entrance Fees	0.00	0.00	0		1.00	1.00	0.00	0.00	0
: Hunting Licences	0.00	0.00	0		1.00	1.00	0.00	0.00	0
Sales Tax	142.06	4.14	467159		1.00	1.00	142.06	4.14	467159
SUBTOTAL DOMESTIC ITEMS	142.06	4.14	467159				142.06	4.14	467159
TOTAL VARIABLE EXPENDITURE	544.45	15.87	1790374				525.94	15.33	1729506
TABLE 5: OPERATING OVERHEAD EXPENDITURE AT FULL PRODUCTION									
ITEM	FINANCIAL VALUES			FOREX ADJ.	TAX ADJ.	ECONOMIC VALUES			VALUE
	Pula/LSU	Pula/HA.	VALUE			Pula/LSU	Pula/HA.	VALUE	
DOMESTIC ITEMS				0.36					
				2035264					
Salaries and Wages: Unskilled Labour	44.21	1.29	145376		1.00	1.00	44.21	1.29	72688
: Skilled Labour	176.83	5.16	581504		1.00	1.00	176.83	5.16	523354
: Managers	397.88	11.60	1308384		1.00	1.00	397.88	11.60	1308384
Administration	12.92	0.38	42480	0.60%	1.00	0.90	12.92	0.38	38232
Maintenance and Repairs	35.97	1.05	118273		1.00	0.90	35.97	1.05	106446
Insurance	16.94	0.49	55706		1.00	0.90	16.94	0.49	50135
Travelling	14.57	0.42	47908		1.00	0.90	14.57	0.42	43117
TOTAL OPERATING OVERHEAD EXPENDIT	699.32	20.39	2299631				699.32	20.39	2142356

FINANCIAL/ECONOMIC MODEL - MEDIUM QUALITY AREA SAFARI HUNTING - MAKGADIKGADI 2010 - BASE CASE			
TABLE 6: STATIC FINANCIAL MODEL (AT FULL PRODUCTION)			
ITEM	UNITS		TOTAL
Concession Extent	Hectares		112800
Concession Stock	Large Stock Units (LSU)		3288
Total Capital Requirement	Pula		3396535
	Pula/LSU	Pula/HECTARE	Pula
GROSS INCOME	2148.69	62.64	7065775
VARIABLE COSTS	544.45	15.87	1790374
GROSS MARGIN	1604.24	46.77	5275401
OVERHEAD COSTS			
Overhead Operating Costs	699.32	20.39	2299631
Loan Amortisation and Interest	45.05	1.31	148132
Provisions for Capital Replacement	93.28	2.72	306756
Interest on Variable Working Capital	14.16	0.41	46550
Interest on Overhead Working Capital	18.18	0.53	59790
Land Rental	68.60	2.00	225600
Resource Royalty	257.84	7.52	847893
TOTAL OVERHEAD COSTS	1196.43	34.88	3934352
NET CASH INCOME	407.81	11.89	1341049
NET CASH INCOME/Pula100 TOTAL CAPITAL INVESTMENT	39.48		
"TOTAL BENEFITS"*/Pula100 TOTAL CAPITAL INVESTMENT	144.76		
"TOTAL BENEFITS"*/HECTARE	43.59		
* "Total Benefits" = all of Net Cash Income, Salaries and Wages, Licences and Duties, Rental and Royalties.			

FINANCIAL/ECONOMIC MODEL - MEDIUM QUALITY AREA SAFARI HUNTING - MAKGADIKGADI 2010 - BASE CASE			
TABLE 7: STATIC ECONOMIC MODEL (AT FULL PRODUCTION)			
ITEM	UNITS		TOTAL
Concession Extent	Hectares		112800
Concession Stock	Large Stock Units (LSU)		3288
Total Capital Requirement	Pula		3292867
Economic Depreciation Cost	Pula		389341
Foreign Financing (Prorated)	Pula		108387
Foreign Amortisation	Pula		27097
Foreign Capital Replacement Provision	Pula		81290
Foreign Interest Cost	Pula		76812
Domestic Interest Cost	Pula		230437
ECONOMIC BENEFITS	Pula/LSU	Pula/HECTARE	Pula
Gross Income	2049.85	59.76	6740750
ECONOMIC COSTS			
DOMESTIC COMPONENT			
Shadow Unskilled Citizen Wages	22.10	0.64	72688
Other Citizen Wages	457.56	13.34	1504642
Other Domestic Economic Costs	72.35	2.11	237930
SUBTOTAL DOMESTIC COMPONENT	552.02	16.09	1815260
TRADABLE COMPONENT			
Foreign Remuneration	99.47	2.90	327096
Foreign Services	298.73	8.71	982329
Foreign Interest	23.36	0.68	76812
Foreign Lease Payments	0.00	0.00	0
Foreign Rentals	0.00	0.00	0
Foreign Net Income	108.07	3.15	355378
Other Tradable Economic Costs	85.15	2.48	280018
SUBTOTAL TRADABLE COMPONENT	614.78	17.92	2021634
TOTAL ECONOMIC COSTS	1166.80	34.02	3836894
GROSS VALUE ADDED TO NATIONAL INCOME	883.06	25.74	2903856
NET VALUE ADDED (Excluding Depreciation)	764.66	22.29	2514515
STATISTICAL GROSS VALUE ADDED	1362.72	39.73	4481186
DOMESTIC RESOURCE COST RATIO	0.43		
NET VALUE ADDED/Pula100 TOTAL CAPITAL COST	76.36		
CAPITAL COST/EMPLOYMENT OPPORTUNITY CREATED	274406		
NUMBER OF EMPLOYMENT OPPORTUNITIES/1000 HA.	0.11		

FINANCIAL/ECONOMIC MODEL - MEDIUM QUALITY AREA SAFARI HUNTING - MAKGADIKGADI 2010 - BASE CASE												
TABLE 8: CAPITAL PHASING, DEPRECIATION SCHEDULE AND CALCULATION OF RESIDUAL VALUE												
ITEM	LIFE (Yrs)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
DEPRECIABLE ASSETS												
"Forty Year" Items	40											
Total Expenditure		632138										
Phased Expenditure		379283	252855	0	0	0	0	0	0	0	0	0
Depreciation		9482	15803	15803	15803	15803	15803	15803	15803	15803	15803	15803
Residual value		379283	622656	606852	591049	575245	559442	543639	527835	512032	496228	480425
"Twenty Year" Items	20											
Total Expenditure		0										
Phased Expenditure		0	0	0	0	0	0	0	0	0	0	0
Depreciation		0	0	0	0	0	0	0	0	0	0	0
Residual value		0	0	0	0	0	0	0	0	0	0	0
"Fifteen Year" Items	15											
Total Expenditure		96642										
Phased Expenditure		57985	38657	0	0	0	0	0	0	0	0	0
Depreciation		3866	6443	6443	6443	6443	6443	6443	6443	6443	6443	6443
Residual value		57985	92776	86334	79891	73448	67005	60562	54120	47677	41234	34791
"Six Year" Items	6						6					
Total Expenditure		908114						908114				
Phased Expenditure		635680	272434	0	0	0	0	635680	272434	0	0	0
Depreciation		105947	151352	151352	151352	151352	151352	151352	151352	151352	151352	151352
Residual value		635680	802167	650815	499463	348110	196758	681085	802167	650815	499463	348110
"Four Year" Items	4											
Total Expenditure		941640				941640				941640		
Phased Expenditure		941640	0	0	0	941640	0	0	0	941640	0	0
Depreciation		235410	235410	235410	235410	235410	235410	235410	235410	235410	235410	235410
Residual value		941640	706230	470820	235410	941640	706230	470820	235410	941640	706230	470820
NON DEPRECIABLE ASSETS												
Stock	-											
Phased Expenditure		0	0	0	0	0	0	0	0	0	0	0
Residual value		0	0	0	0	0	0	0	0	0	0	0
Working Capital	-											
Phased Expenditure		0	0	0	0	0	0	0	0	0	0	0
TOTAL PHASED CAPITAL EXPENDITURE												
Domestic Component		379283	252855	0	0	0	0	0	0	0	0	0
Tradable Component		1635305	311091	0	0	941640	0	635680	272434	941640	0	0
Total Financial Value		2014588	563946	0	0	941640	0	635680	272434	941640	0	0
Total Economic Value		1901435	524350	0	0	898325	0	606438	259902	898325	0	0
TOTAL ASSET RESIDUAL VALUE												
Domestic Component		379283	622656	606852	591049	575245	559442	543639	527835	512032	496228	480425
Tradable Component		1635305	1601174	1207968	814763	1363198	969993	1212468	1091697	1640132	1246927	853721
Financial Value		2014588	2223829	1814821	1405812	1938444	1529435	1756106	1619532	2152163	1743155	1334146
Economic Value		1901435	2087910	1698569	1309228	1818212	1428871	1645969	1516530	2025514	1636173	1246832

FINANCIAL/ECONOMIC MODEL - MEDIUM QUALITY AREA SAFARI HUNTING - MAKGADIKGADI 2010 - BASE CASE													
TABLE 9: LOAN FINANCING SCHEDULE													
ITEM	PERIOD	Year (Yrs)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
LONG TERM LOANS													
TWENTY YEAR LOAN 20													
Total Expenditure			158034										
Loan Disbursements			94821	63214	0	0	0	0	0	0	0	0	0
Loan Payments			11138	18563	18563	18563	18563	18563	18563	18563	18563	18563	18563
Amortisation			4741	7902	7902	7902	7902	7902	7902	7902	7902	7902	7902
Interest Payments			6397	10661	10661	10661	10661	10661	10661	10661	10661	10661	10661
Loans Outstanding			94821	153293	145392	137490	129588	121687	113785	105883	97981	90080	82178
FIFTEEN YEAR LOAN 15													
Total Expenditure			24161										
Loan Disbursements			18120	6040	0	0	0	0	0	0	0	0	0
Loan Payments			2382	3176	3176	3176	3176	3176	3176	3176	3176	3176	3176
Amortisation			1208	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611
Interest Payments			1174	1566	1566	1566	1566	1566	1566	1566	1566	1566	1566
Loans Outstanding			18120	22952	21342	19731	18120	16510	14899	13288	11678	10067	8456
SIX YEAR LOAN 6													
Total Expenditure			227028					6	227028				
Loan Disbursements			158920	68109	0	0	0	0	158920	68109	0	0	0
Loan Payments			36489	52127	52127	52127	52127	52127	52127	52127	52127	52127	52127
Amortisation			26487	37838	37838	37838	37838	37838	37838	37838	37838	37838	37838
Interest Payments			10003	14289	14289	14289	14289	14289	14289	14289	14289	14289	14289
Loans Outstanding			158920	200542	162704	124866	87028	49189	170271	200542	162704	124866	87028
FOUR YEAR LOAN 4													
Total Expenditure			235410				235410				235410		
Loan Disbursements			235410	0	0	0	235410	0	0	0	235410	0	0
Loan Payments			74265	74265	74265	74265	74265	74265	74265	74265	74265	74265	74265
Amortisation			58853	58853	58853	58853	58853	58853	58853	58853	58853	58853	58853
Interest Payments			15412	15412	15412	15412	15412	15412	15412	15412	15412	15412	15412
Loans Outstanding			235410	176558	117705	58853	235410	176558	117705	58853	235410	176558	117705
SHORT TERM LOANS													
Working Capital 1													
Overdraft			818001	818001	818001	818001	818001	818001	818001	818001	818001	818001	818001
Interest Payments			106340	106340	106340	106340	106340	106340	106340	106340	106340	106340	106340
TOTAL LONG TERM LOAN DISBURSMENTS													
Domestic Component			380453	103022	0	0	176558	0	119190	51081	176558	0	0
Foreign Component *			134427	36401	0	0	62384	0	42114	18049	62384	0	0
TOTAL LONG TERM LOAN AMORTISATION													
Domestic Component			68466	79652	79652	79652	79652	79652	79652	79652	79652	79652	79652
Foreign Component *			24191	28144	28144	28144	28144	28144	28144	28144	28144	28144	28144
TOTAL INTEREST PAYMENTS													
Domestic Component			104495	111201	111201	111201	111201	111201	111201	111201	111201	111201	111201
Foreign Component *			36921	39291	39291	39291	39291	39291	39291	39291	39291	39291	39291
TOTAL LOANS OUTSTANDING													
Domestic Component			380453	415009	335357	255704	352610	272957	312495	283924	380829	301177	221525
Foreign Component *			134427	146636	118493	90349	124589	96445	110415	100320	134560	106416	78272
* Economic Values													

FINANCIAL/ECONOMIC MODEL - MEDIUM QUALITY AREA SAFARI HUNTING - MAKGADIKGADI 2010 - BASE CASE

TABLE 10: FINANCIAL ANALYSIS - 5 YEARS (Pula, 2010)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
EXPENDITURE						
Capital Expenditure	2014588	563946	0	0	941640	0
Variable Expenditure	179037	1074224	1790374	1790374	1790374	1790374
Overhead Expenditure	3373124	3373124	3373124	3373124	3373124	3373124
TOTAL EXPENDITURE	5566749	5011294	5163498	5163498	6105138	5163498
INCOME						
Gross Income	0	3532888	6359198	7065775	7065775	7065775
Asset Residual Value	0	0	0	0	0	1529435
TOTAL INCOME	0	3532888	6359198	7065775	7065775	8595210
NET BENEFIT/COST	-5566749	-1478407	1195700	1902277	960637	3431712
FINANCIAL RATE OF RETURN (FRR) OVER 5 YEARS				=	1.69%	
NET PRESENT VALUE (NPV) @		8.00%		=	-1258122	

TABLE 11: FINANCIAL ANALYSIS - 7 YEARS (Pula, 2010)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
EXPENDITURE								
Capital Expenditure	2014588	563946	0	0	941640	0	635680	272434
Variable Expenditure	179037	1074224	1790374	1790374	1790374	1790374	1790374	1790374
Overhead Expenditure	3373124	3373124	3373124	3373124	3373124	3373124	3373124	3373124
TOTAL EXPENDITURE	5566749	5011294	5163498	5163498	6105138	5163498	5799178	5435932
INCOME								
Gross Income	0	3532888	6359198	7065775	7065775	7065775	7065775	7065775
Asset Residual Value	0	0	0	0	0	0	0	1619532
TOTAL INCOME	0	3532888	6359198	7065775	7065775	7065775	7065775	8685307
NET BENEFIT/COST	-5566749	-1478407	1195700	1902277	960637	1902277	1266598	3249375
FINANCIAL RATE OF RETURN (FRR) OVER 7 YEARS				=	9.01%			
NET PRESENT VALUE (NPV) @		8.00%		=	272658			

TABLE 12: FINANCIAL ANALYSIS - 10 YEARS (Pula, 2010)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
EXPENDITURE											
Capital Expenditure	2014588	563946	0	0	941640	0	635680	272434	941640	0	0
Variable Expenditure	179037	1074224	1790374	1790374	1790374	1790374	1790374	1790374	1790374	1790374	1790374
Overhead Expenditure	3373124	3373124	3373124	3373124	3373124	3373124	3373124	3373124	3373124	3373124	3373124
TOTAL EXPENDITURE	5566749	5011294	5163498	5163498	6105138	5163498	5799178	5435932	6105138	5163498	5163498
INCOME											
Gross Income	0	3532888	6359198	7065775	7065775	7065775	7065775	7065775	7065775	7065775	7065775
Asset Residual Value	0	0	0	0	0	0	0	0	0	0	1334146
TOTAL INCOME	0	3532888	6359198	7065775	7065775	7065775	7065775	7065775	7065775	7065775	8399921
NET BENEFIT/COST	-5566749	-1478407	1195700	1902277	960637	1902277	1266598	1629843	960637	1902277	3236424
FINANCIAL RATE OF RETURN (FRR) OVER 10 YEARS				=	13.75%						
NET PRESENT VALUE (NPV) @		8.00%		=	2147402						

FINANCIAL/ECONOMIC MODEL - MEDIUM QUALITY AREA SAFARI HUNTING - MAKGADIKGADI 2010 - BASE CASE

TABLE 13: ECONOMIC ANALYSIS - 5 YEARS (Pula,2010)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
ECONOMIC COSTS						
Capital Expenditure	1901435	524350	0	0	898325	0
Unskilled Wages	72688	72688	72688	72688	72688	72688
Other Domestic Costs	1394058	1742572	1742572	1742572	1742572	1742572
Tradable Costs	156235	937408	1562346	1562346	1562346	1562346
Foreign Amortisation	24191	28144	28144	28144	28144	28144
Foreign Profits	0	24876	284302	355378	355378	355378
Foreign Loans Outst.	0	0	0	0	0	96445
TOTAL COSTS	3548607	3330038	3690053	3761128	4659453	3857573
ECONOMIC BENEFITS						
Gross Income	0	3370375	6066675	6740750	6740750	6740750
Asset Residual Value	0	0	0	0	0	1428871
Foreign Financing	134427	36401	0	0	62384	0
TOTAL BENEFITS	134427	3406776	6066675	6740750	6803133	8169621
NET BENEFIT/COST	-3414180	76737	2376622	2979621	2143681	4312048
ECONOMIC RATE OF RETURN (ERR) OVER 5 YEARS				=	43.71%	
NET PRESENT VALUE (NPV) @		8.00%	=	5157536		

TABLE 14: ECONOMIC ANALYSIS - 10 YEARS (Pula, 2010)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
ECONOMIC COSTS											
Capital Expenditure	1901435	524350	0	0	898325	0	606438	259902	898325	0	0
Unskilled Wages	72688	72688	72688	72688	72688	72688	72688	72688	72688	72688	72688
Other Domestic Costs	1394058	1742572	1742572	1742572	1742572	1742572	1742572	1742572	1742572	1742572	1742572
Tradable Costs	156235	937408	1562346	1562346	1562346	1562346	1562346	1562346	1562346	1562346	1562346
Foreign Amortisation	24191	28144	28144	28144	28144	28144	28144	28144	28144	28144	28144
Foreign Profits	0	24876	284302	355378	355378	355378	355378	355378	355378	355378	355378
Foreign Loans Outst.	0	0	0	0	0	0	0	0	0	0	78272
TOTAL COSTS	3548607	3330038	3690053	3761128	4659453	3761128	4367567	4021030	4659453	3761128	3839400
ECONOMIC BENEFITS											
Gross Income	0	3370375	6066675	6740750	6740750	6740750	6740750	6740750	6740750	6740750	6740750
Asset Residual Value	0	0	0	0	0	0	0	0	0	0	1246832
Foreign Financing	134427	36401	0	0	62384	0	42114	18049	62384	0	0
TOTAL BENEFITS	134427	3406776	6066675	6740750	6803133	6740750	6782863	6758798	6803133	6740750	7987582
NET BENEFIT/COST	-3414180	76737	2376622	2979621	2143681	2979621	2415297	2737768	2143681	2979621	4148182
ECONOMIC RATE OF RETURN (ERR) OVER 10 YEARS				=	49.97%						
NET PRESENT VALUE (NPV) @		8.00%	=	11437915							

FINANCIAL/ECONOMIC MODEL - MEDIUM QUALITY AREA SAFARI HUNTING - MAKGADIKGADI 2010 - BASE CASE					
TABLE 15: SUMMARY OF RESULTS					
ITEM		UNITS			TOTAL
Concession Extent		Hectares			112800
Concession Stock		Large Stock Units (LSU)			3288
Annual Visitor Days (VD)		Number			330
ITEM	% of TCI	Pula/VD	Pula/LSU	Pula/HECTARE	Pula
Total Financial Capital (TCI)	-	10292.53	1032.88	30.11	3396535
Financial Gross Income	208.03%	21411.44	2148.69	62.64	7065775
Variable Financial Costs	-	5425.38	544.45	15.87	1790374
Fixed Financial Costs	-	11922.28	1196.43	34.88	3934352
Salaries & wages					2035264
Net Cash Income	0.39482869	4063.79	407.81	11.89	1341049
Local Community Cash Income					1800373
Land Rental	-	683.64	68.60	2.00	225600
Resource Royalty	-	2569.37	257.84	7.52	847893
FRR (@ 10 Years)	-	-	-	-	13.75%
FNPV (@ 8%, @ 10 Years)	-	-	-	19.04	2147402
Total Economic Capital	-	9978.38	1001.36	29.19	3292867
Economic Gross Income	204.71%	20426.51	2049.85	59.76	6740750
Economic Costs	116.52%	11626.95	1166.80	34.02	3836894
Incremental Gross Value Added	88.19%	8799.56	883.06	25.74	2903856
Incremental Net Value Added	76.36%	7619.74	764.66	22.29	2514515
Statistical Gross Value Added	136.09%	13579.35	1362.72	39.73	4481186
ERR (@ 10 Years)	-	-	-	-	49.97%
ENPV (@ 8%, @ 10 Years)	-	-	-	101.40	11437915
Economic Capital Cost/Job	-	-	-	-	274406
Domestic Resource Cost Ratio	-	-	-	-	0.43
Policy Analysis Matrix	: Effects of Policy / Market Imperfections		: on Output		325026
			: on Tradable Inputs		698418
			: on Domestic Factors		-2196910
	: Net Effects of Policy / Market Imperfections		: on Annual Net Income		-1173466
			: on Net Present Value (10 Years)		-9290512

8.3. The CBO Trust investment model

MAKGADIKGADI PANS FMP FINANCIAL/ECONOMIC MODEL - CBO TRUST INVESTMENT - MAKGADIKGADI 2010- BASE CASE ASSUMPTIONS*											
Production System:	32	beds. A community-based trust involved in the management of a CHA with 2 lodge/camp JVPs and campsite									
Site:	Pans environment with some savanna rangelands moderate wildlife populations, birds and access to water points										
Game Density:	100%	5.80	LSU Equivalents/Sq. Km. or,			17	Hectares per LSU Equivalent				
Carrying Capacity:	<u>100%</u>	0.113	Tourist Beds/Sq. Km. or,			888	Ha. per Tourist Bed				
Conservacy Size:	28400	Hectares or,		284	Square Kilometres		Core Wildlife Area Size:	13300			
Tourist Category:	Overseas	50%	Regional	35%	Resident	5%	Citizen	10%			
	Adults	100%	Children	0%							
Occupancy Rate:	<u>100%</u>	50.0%	Average Length of Stay:			10 Days					
Daily Tariffs (Pula):	<u>100%</u>	Overseas	350	Regional	350	Resident	350	Citizen	350		
		Children	75%	of Adult Price							
Capital Item Prices:	<u>100%</u>	(Variation from Normal for Sensitivity Analysis)									
Capital Sources:	<u>100%</u>	Loan =	0%	Equity =	100%	and:	<u>100%</u>	Foreign	0%	Domestic	100%
Interest Rates:	Rate for Capital Loans:			9%	Rate for Working Capital Loans:			12%			
Working Capital as Proportion of Annual Operating Costs:	0%										
Park Entry Fees:	<u>100%</u>	Fee per Tourist Night/Day: Pula				30.00					
Household Dividends:	450	Households @ Pula 0									
Land Rental and Resource Royalty (Pula):	<u>100%</u>	Rental:	0.00	per Ha.	<u>100%</u>	Royalty:	0%				
Manpower Needs:	<u>100%</u>	Managers	1	Skilled Labour	4	Unskilled Labour	4				
	<u>100%</u>	Management:		Foreign	0%	Citizen	100%				
Shadow Wage Adjustment:	<u>100%</u>	Managers	1.00	Skilled Labour	1.00	<u>100%</u>	Unskilled Labour	0.50			
Foreign Exchange Premium:	<u>100%</u>	6%			Adjustment Factor =	1.06					
Tax Adjustments:	<u>100%</u>	General Sales Tax:		10%	Import Taxes: from SACU:	0%	to SACU:	n/a			
Discount Rates:	<u>100%</u>	Financial Discount Rate:			8%	Economic Discount Rate:			8%		
Opportunity Cost of Capital	<u>100%</u>	8%									
Static models depict enterprise at full production. Static financial model includes interest, amortisation government fees, royalties and land rentals. Static economic model takes foreign inflows and outflows into account, excludes other interest and transfers and values enterprise in economic prices before land and government costs											
Dynamic models presented over 5 and 10 years, to measure IRR and NPV. Financial dynamic model, at constant prices, excludes interest and depreciation, and includes asset residual values. Economic model includes foreign inflows and outflows, and measures value of enterprise in economic prices before inclusion of land costs and public expenditures.											
* Underlined cells indicate degree of conformity with base case values, and can be changed											

FINANCIAL/ECONOMIC MODEL - CBO TRUST INVESTMENT - MAKGADIKGADI 2010- BASE CASE											
TABLE 1: CAPITAL REQUIREMENTS											
ITEM	QUANT.	PRICE Pula	FINAN. COST	LIFE Years	AMORT. + INT.	DEPREC- IATION	ECON. DEPR.	FOREX ADJ.	TAX ADJ.	ECON. COST	
FIXED CAPITAL											
DOMESTIC ITEMS											
Houses Manager	0	34000	0	40	0	0	0	1.00	0.90	0	
Ablution blocks	1	50,000	50000	40	5477	1250	1125	1.00	0.90	45000	
Buildings	1	185,802	185802	40	20354	4645	4181	1.00	0.90	167222	
Cultural village/campsite/lodge	1	575,000	575000	40	62989	14375	12938	1.00	0.90	517500	
Boreholes	1	25000	25000	40	2739	625	563	1.00	0.90	22500	
Reservoirs	0	0	0	40	0	0	0	1.00	0.90	0	
Reticulation/Pans	0	0	0	40	0	0	0	1.00	0.90	0	
Road Maintenance (km)	0	0	0	40	0	0	0	1.00	0.90	0	
Hiking Trails (km)	0	0	0	40	0	0	0	1.00	0.90	0	
Transaction Costs	0	0	0	40	0	0	0	1.00	0.90	0	
CONTINGENCIES @ 5%			41790	40	4578	1045	940	1.00	0.90	37611	
SUBTOTAL DOMESTIC ITEMS			877592							789833	
TRADABLE ITEMS											
Boma/Pens	0	15000	0	20	0	0	0	1.06	0.90	0	
Campsite	0	100000	0	15	0	0	0	1.06	0.90	0	
Pump/Windmill	1	140,800	140800	15	17467	9387	8955	1.06	0.90	134323	
Fencing Perimeter (km)	0	4510	0	15	0	0	0	1.06	0.90	0	
Other Items	0	2050	0	15	0	0	0	1.06	0.90	0	
CONTINGENCIES @ 5%			7040	15	873	469	448	1.06	0.90	6716	
SUBTOTAL TRADABLES			147840							141039	
SUBTOTAL- FIXED CAPITAL			1025432							930872	
MOVABLE CAPITAL											
TRADABLE ITEMS											
LDVs/Trucks	1	330750	330750	4	102092	82688	78884	1.06	0.90	315536	
Tools/Office Equipment	1	61,115	61115	6	13624	10186	9717	1.06	0.90	58304	
Other equipment	1	26,000	26000	6	5796	4333	4134	1.06	0.90	24804	
Training	1	100000	100000	6	22292	16667	15900	1.06	0.90	95400	
CONTINGENCIES @ 10%			51787	6	11544	8631	8234	1.06	0.90	49404	
SUBTOTAL TRADABLES			569652							543448	
DOMESTIC ITEMS											
Stock : Small Game	Batch	0	0	40	0			1.00	0.90	0	
: Large Game	Batch	0	0	40	0			1.00	0.90	0	
: Big Five		0	0	40	0			1.00	0.90	0	
: Cattle		0	0	40	0			1.00	0.90	0	
Horses and Donkeys		0	0	40	0			1.00	0.90	0	
CONTINGENCIES @ 10%			0	40	0			1.00	0.90	0	
SUBTOTAL- DOMESTIC ITEMS			0							0	
SUBTOTAL- MOVABLE CAPITAL			569652							543448	
WORKING CAPITAL											
			LOAN	INTEREST							
VARIABLE			0	0							
OVERHEAD			0	0					1.06	1.00	0
SUBTOTAL- WORKING CAPITAL			0	0							
TOTALS			1595084	0	269826	154300	146018			1474320	

FINANCIAL/ECONOMIC MODEL - CBO TRUST INVESTMENT - MAKGADIKGADI 2010- BASE CASE							
TABLE 2: STOCK COMPOSITION BY SPECIES AT FULL PRODUCTION							
ITEM	HEAD	POT. OFF-TAKE (%)	OFF-TAKE (NO.)	OFF-TAKE (%)	PROP. LIVE	LSU FACTOR	LSU
Buffalo	0	6.60%	0	3.30%	0	0	1.00
Crocodile	0	23.50%	0	11.75%	0	0	0.07
Eland	15	6.70%	1	3.35%	1	0	1.00
Elephant	0	3.10%	0	1.55%	0	0	3.33
Hartebeest	10	10.20%	1	5.10%	1	0	0.26
Impala	112	14.65%	16	7.33%	8	3	0.14
Kudu	193	9.90%	19	4.95%	10	6	0.45
Leopard	23	15.00%	3	7.50%	2	1	0.00
Lion	0	12.00%	0	6.00%	0	0	0.00
Oryx	70	9.40%	7	4.70%	3	3	0.40
Ostrich	147	10.00%	15	5.00%	7	4	0.26
Springbok	602	16.00%	96	8.00%	48	18	0.08
Steenbok	1805	27.70%	500	13.85%	250	5	0.06
Warthog	131	14.40%	19	7.20%	9	4	0.18
Wild dog	0	15.00%	0	7.50%	0	0	0.00
Wildebeest	100	9.60%	10	4.80%	5	3	0.40
Zebra	560	8.40%	47	4.20%	24	24	0.63
Cattle	0	15.00%	0	7.50%	0	0	1.00
Goats	0	45.00%	0	22.50%	0	0	0.11
Donkeys/horses	19	10.00%	2	5.00%	1	0	0.63
TOTAL	3787		736		368	73	771
STOCK DENSITY ON LAND: 5.80 LSU PER SQ.KM.; CONSERVANCY SIZE:				13300	HECTARES		
TABLE 3: SALES AT FULL PRODUCTION							
ITEM	QUANTITY	@	VALUE (Pula)	FINANCIAL VALUE	FOREX ADJ.	TAX ADJ.	ECON. VALUE
Trophy Hunting Rental	0 camp	@	21500	0	1.06	1.00	0
Trophy Hunting: Royalty	0 quota	@	67500	0	1.06	1.00	0
Trophy Hunting: Meat	0 animals	@	327	0	1.06	1.00	0
Tourism Rentals: Lodge	1 site	@	621373	621373	1.06	1.00	658655
Campsite Net Income	0 site	@	269675	0	1.06	1.00	0
Tourism Rentals: Other	0 site	@	210420	0	1.06	1.00	0
Live Game Sales	0 animals	@	0	0	1.06	1.00	0
Venison: Biltong	0 animals	@	327	0	1.06	1.00	0
Livestock sales	0 animals	@	0	0	1.06	1.00	0
Crafts	0 units	@	33396	0	1.06	1.00	0
Poles	0 h'holds	@	525	0	1.00	1.00	0
Other	1	@	7608	7608	1.00	1.00	7608
TOTALS			GROSS INCOME	628980			666263

FINANCIAL/ECONOMIC MODEL - CBO TRUST INVESTMENT - MAKGADIKGADI 2010- BASE CASE								
TABLE 4: VARIABLE EXPENDITURE AT FULL PRODUCTION								
ITEM	FINANCIAL VALUES			FOREX ADJ.	TAX ADJ.	ECONOMIC VALUES		
	Pula/LSU	Pula/HA.	VALUE			Pula/LSU	Pula/HA.	VALUE
TRADABLE ITEMS								
Marketing Costs: Advertising	7.97	0.46	6150	1.06	0.90	7.61	0.44	5867
: Agents Fees	0.00	0.00	0	1.06	0.90	0.00	0.00	0
Campsite Running Costs : Accomodation	24.33	1.41	18773	1.06	0.90	23.22	1.35	17909
: Utilities	14.45	0.84	11,144.40	1.06	0.90	13.78	0.80	10632
Temporary employment	21.72	1.26	16,756.00	1.06	0.90	20.72	1.20	15985
: Bar	0.00	0.00	0	1.06	0.90	0.00	0.00	0
: Crafts	0.00	0.00	0	1.06	0.90	0.00	0.00	0
Fodder and Supplements	0.00	0.00	0	1.06	0.90	0.00	0.00	0
Other Costs : Office Supplies	32.07	1.86	24,737.25	1.06	0.90	30.59	1.77	23599
: Capture Team	0.00	0.00	0	1.06	0.90	0.00	0.00	0
: Biltong Distribution	0.00	0.00	0	1.06	0.90	0.00	0.00	0
: Live Game Distribution	0.00	0.00	0	1.06	0.90	0.00	0.00	0
Consultancies, Travel and Training	5.51	0.32	4,249.95	1.06	0.90	5.26	0.30	4054
General Vehicle Running Costs	22.96	1.33	17,712.65	1.06	0.90	21.90	1.27	16898
SUBTOTAL TRADABLES	129.01	7.48	99523			123.07	7.14	94945
DOMESTIC ITEMS								
Veterinary and Medicine Costs	0.00	0.00	0	1.00	0.90	0.00	0.00	0
Meat Board Levy	0.00	0.00	0	1.00	1.00	0.00	0.00	0
Bank Fees	8.12	0.47	6,267.95	1.00	1.00	0.00	0.00	0
Sales Tax	32.04	1.86	24,718.70	1.00	1.00	0.00	0.00	0
SUBTOTAL DOMESTIC ITEMS	40.17	2.33	30987			0.00	0.00	0
TOTAL VARIABLE EXPENDITURE	169.18	9.81	130510			123.07	7.14	94945
TABLE 5: OPERATING OVERHEAD EXPENDITURE AT FULL PRODUCTION								
ITEM	FINANCIAL VALUES			FOREX ADJ.	TAX ADJ.	ECONOMIC VALUES		
	Pula/LSU	Pula/HA.	VALUE			Pula/LSU	Pula/HA.	VALUE
DOMESTIC ITEMS								
Salaries and Wages:	150.39	8.72	116,018.70	1.00	1.00	150.39	8.72	58009
: Skilled Labour	0.00	0.00		1.00	1.00	0.00	0.00	0
: Managers	0.00	0.00		1.00	1.00	0.00	0.00	0
Administration	2.42	0.14	1,869.90	1.00	0.90	2.42	0.14	1683
Maintenance and Repairs	37.67	2.19	29,063.75	1.00	0.90	37.67	2.19	26157
Insurance	36.92	2.14	28483	1.00	0.90	36.92	2.14	25634
Miscellaneous Fixed Costs	18.61	1.08	14,357.20	1.00	0.90	18.61	1.08	12921
TOTAL OPERATING OVERHEAD EXPENDITUR	246.02	14.27	189792			246.02	14.27	124405

FINANCIAL/ECONOMIC MODEL - CBO TRUST INVESTMENT - MAKGADIKGADI 2010- BASE CASE			
TABLE 6: STATIC FINANCIAL MODEL (AT FULL PRODUCTION)			
ITEM	UNITS		TOTAL
Conservancy Extent	Hectares		28400
Conservancy Stock	Large Stock Units (LSU)		771
Total Capital Requirement	Pula		1595084
	Pula/LSU	Pula/HA.	Pula
GROSS INCOME	815.33	22.15	628980
VARIABLE COSTS	169.18	4.60	130510
GROSS MARGIN	646.16	17.55	498471
OVERHEAD COSTS			
Overhead Operating Costs	246.02	6.68	189792
Loan Amortisation and Interest	0.00	0.00	0
Provisions for Capital Replacement	200.02	5.43	154300
Interest on Variable Working Capital	0.00	0.00	0
Interest on Overhead Working Capital	0.00	0.00	0
Land Rental	0.00	0.00	0
Resource Royalty	0.00	0.00	0
TOTAL OVERHEAD COSTS	446.04	12.12	344092
NET CASH INCOME	200.12	5.44	154378
NET CASH INCOME/Pula100 TOTAL CAPITAL INVESTMENT	9.68		
"TOTAL BENEFITS"*/Pula100 TOTAL CAPITAL INVESTMENT	18.89		
"TOTAL BENEFITS"*/HECTARE	10.61		
* "Total Benefits" = all of Net Cash Income, Salaries and Wages, Licences and Duties, Rental and Royalties.			

FINANCIAL/ECONOMIC MODEL - CBO TRUST INVESTMENT - MAKGADIKGADI 2010- BASE CASE			
TABLE 7: STATIC ECONOMIC MODEL (AT FULL PRODUCTION)			
ITEM	UNITS		TOTAL
Conservancy Extent	Hectares		28400
Conservancy Stock	Large Stock Units (LSU)		771
Total Initial Capital Requirement	Pula		1474320
Economic Depreciation Cost	Pula		146018
Foreign Financing (Prorated)	Pula		0
Foreign Amortisation	Pula		0
Foreign Capital Replacement Provision	Pula		0
Foreign Interest Cost	Pula		0
Domestic Interest Cost	Pula		122457
ECONOMIC BENEFITS	Pula/LSU	Pula/HECTARE	Pula
Gross Income	863.66	23.46	666263
ECONOMIC COSTS			
DOMESTIC COMPONENT			
Shadow Unskilled Citizen Wages	75.20	2.04	58009
Other Citizen Wages	0.00	0.00	0
Opportunity Cost of Capital	152.89	4.15	117946
Other Domestic Economic Costs	86.07	2.34	66396
SUBTOTAL DOMESTIC COMPONENT	314.15	8.53	242351
TRADABLE COMPONENT			
Foreign Remuneration	0.00	0.00	0
Foreign Services	3.80	0.10	2934
Foreign Interest	0.00	0.00	0
Foreign Lease Payments	0.00	0.00	0
Foreign Rentals	0.00	0.00	0
Foreign Net Income	0.00	0.00	0
Other Tradable Economic Costs	119.27	3.24	92012
SUBTOTAL TRADABLE COMPONENT	123.07	3.34	94945
TOTAL ECONOMIC COSTS	437.23	11.88	337296
GROSS VALUE ADDED TO NATIONAL INCOME	426.43	11.58	328967
NET VALUE ADDED (Excluding Depreciation)	237.15	6.44	182949
DOMESTIC RESOURCE COST RATIO =	0.64		
NET VALUE ADDED/Pula100 TOTAL CAPITAL COST =	12.41		
CAPITAL COST/EMPLOYMENT OPPORTUNITY CREATED =	163813		
NUMBER OF EMPLOYMENT OPPORTUNITIES/1000 HA.	0.32		

FINANCIAL/ECONOMIC MODEL - CBO TRUST INVESTMENT - MAKGADIKGADI 2010- BASE CASE													
TABLE 8: CAPITAL PHASING, DEPRECIATION SCHEDULE AND CALCULATION OF RESIDUAL VALUE													
ITEM	LIFE (Yrs)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
DEPRECIABLE ASSETS													
"Forty Year" Items	40												
Total Expenditure		877592											
Phased Expenditure		526555	351037	0	0	0	0	0	0	0	0	0	0
Depreciation		13164	21940	21940	21940	21940	21940	21940	21940	21940	21940	21940	21940
Residual value		526555	864428	842488	820549	798609	776669	754729	732789	710850	688910	666970	
"Twenty Year" Items	20												
Total Expenditure		0											
Phased Expenditure		0	0	0	0	0	0	0	0	0	0	0	0
Depreciation		0	0	0	0	0	0	0	0	0	0	0	0
Residual value		0	0	0	0	0	0	0	0	0	0	0	0
"Fifteen Year" Items	15												
Total Expenditure		147840											
Phased Expenditure		88704	59136	0	0	0	0	0	0	0	0	0	0
Depreciation		5914	9856	9856	9856	9856	9856	9856	9856	9856	9856	9856	9856
Residual value		88704	141926	132070	122214	112358	102502	92646	82790	72934	63078	53222	
"Six Year" Items	6						6						
Total Expenditure		238902						238902					
Phased Expenditure		167231	71670	0	0	0	0	167231	71670	0	0	0	0
Depreciation		27872	39817	39817	39817	39817	39817	39817	39817	39817	39817	39817	39817
Residual value		167231	211030	171213	131396	91579	51762	179176	211030	171213	131396	91579	
"Four Year" Items	4												
Total Expenditure		330750				330750				330750			
Phased Expenditure		330750	0	0	0	330750	0	0	0	330750	0	0	0
Depreciation		82688	82688	82688	82688	82688	82688	82688	82688	82688	82688	82688	82688
Residual value		330750	248063	165375	82688	330750	248063	165375	82688	330750	248063	165375	
NON DEPRECIABLE ASSETS													
Stock	-												
Phased Fin. Expenditure		0	0	0	0	0	0	0	0	0	0	0	0
Phased Econ. Expenditure		0	0	0	0	0	0	0	0	0	0	0	0
Residual value		1085864	1241377	1420447	1626803	1864793	2139483	2456790	2823625	3248073	3739601	4309310	
Working Capital	-												
Phased Expenditure		0	0	0	0	0	0	0	0	0	0	0	0
TOTAL PHASED CAPITAL EXPENDITURE													
Domestic Component		526555	351037	0	0	0	0	0	0	0	0	0	0
Tradable Component		586685	130806	0	0	330750	0	167231	71670	330750	0	0	0
Total Financial Value		1113240	481843	0	0	330750	0	167231	71670	330750	0	0	0
Total Economic Value		1033597	440723	0	0	315536	0	159538	68374	315536	0	0	0
TOTAL ASSET RESIDUAL VALUE													
Domestic Component		1612419	2105805	2262935	2447352	2663402	2916152	3211519	3556414	3958922	4428510	4976280	
Tradable Component		586685	601019	468658	336298	534687	402327	437198	376508	574897	442537	310176	
Financial Value		2199104	2706824	2731593	2783650	3198089	3318479	3648717	3932922	4533819	4871047	5286457	
Economic Value		2010875	2468596	2483741	2523445	2907153	3008357	3307454	3559961	4111482	4407839	4774561	

FINANCIAL/ECONOMIC MODEL - CBO TRUST INVESTMENT - MAKGADIKGADI 2010- BASE CASE													
TABLE 9: STOCK PROJECTION													
STOCK ON HAND (NO.)	Growth	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Buffalo	6.60%	0	0	0	0	0	0	0	0	0	0	0	0
Crocodile	23.50%	0	0	0	0	0	0	0	0	0	0	0	0
Eland	6.70%	8	8	9	10	10	11	12	12	13	14	15	
Elephant	3.10%	0	0	0	0	0	0	0	0	0	0	0	
Hartebeest	10.20%	4	4	5	5	6	6	7	7	8	9	10	
Impala	14.65%	28	33	37	43	49	56	65	74	85	97	112	
Kudu	9.90%	75	82	91	100	109	120	132	145	160	175	193	
Leopard	15.00%	6	7	8	9	10	11	13	15	17	20	23	
Lion	12.00%	0	0	0	0	0	0	0	0	0	0	0	
Oryx	9.40%	28	31	34	37	41	45	49	53	58	64	70	
Ostrich	10.00%	57	63	69	76	83	92	101	111	122	134	147	
Springbok	16.00%	136	158	184	213	247	287	332	386	447	519	602	
Steenbok	27.70%	156	200	255	326	416	531	679	867	1107	1413	1805	
Warthog	14.40%	34	39	45	51	58	67	76	87	100	114	131	
Wild dog	15.00%	0	0	0	0	0	0	0	0	0	0	0	
Wildebeest	9.60%	40	44	48	52	57	63	69	76	83	91	100	
Zebra	8.40%	250	271	294	319	345	374	406	440	477	517	560	
Cattle	15.00%	0	0	0	0	0	0	0	0	0	0	0	
Goats	45.00%	0	0	0	0	0	0	0	0	0	0	0	
Donkeys/horses	10.00%	8	8	9	10	11	12	13	15	16	18	19	
TOTALS		831	948	1086	1250	1444	1676	1954	2288	2694	3186	3787	
LSU ON HAND (NO.)	LSU FACTOR	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Buffalo	1.00	0	0	0	0	0	0	0	0	0	0	0	
Crocodile	0.07	0	0	0	0	0	0	0	0	0	0	0	
Eland	1.00	8	8	9	10	10	11	12	12	13	14	15	
Elephant	3.33	0	0	0	0	0	0	0	0	0	0	0	
Hartebeest	0.26	1	1	1	1	1	2	2	2	2	2	3	
Impala	0.14	4	5	5	6	7	8	9	10	12	14	16	
Kudu	0.45	34	37	41	45	49	54	59	65	72	79	87	
Leopard	0.00	0	0	0	0	0	0	0	0	0	0	0	
Lion	0.00	0	0	0	0	0	0	0	0	0	0	0	
Oryx	0.40	11	12	14	15	16	18	19	21	23	26	28	
Ostrich	0.26	15	16	18	20	22	24	26	29	32	35	38	
Springbok	0.08	11	13	15	17	20	23	27	31	36	42	48	
Steenbok	0.06	9	12	15	20	25	32	41	52	66	85	108	
Warthog	0.18	6	7	8	9	11	12	14	16	18	21	24	
Wild dog	0.00	0	0	0	0	0	0	0	0	0	0	0	
Wildebeest	0.40	16	17	19	21	23	25	28	30	33	36	40	
Zebra	0.63	158	171	185	201	218	236	256	277	300	326	353	
Cattle	1.00	0	0	0	0	0	0	0	0	0	0	0	
Goats	0.11	0	0	0	0	0	0	0	0	0	0	0	
Donkeys/horses	0.63	5	5	6	6	7	8	8	9	10	11	12	
TOTALS		277	305	336	370	408	452	500	555	618	689	771	
Stocking rate		38.8	35.3	32.1	29.1	26.4	23.8	21.5	19.4	17.4	15.6	14.0	

FINANCIAL/ECONOMIC MODEL - CBO TRUST INVESTMENT - MAKGADIKGADI 2010- BASE CASE													
TABLE 9: STOCK PROJECTION (Continued)													
STOCK SALES (NO.)	Off-Take	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Buffalo	3.30%	0	0	0	0	0	0	0	0	0	0	0	0
Crocodile	11.75%	0	0	0	0	0	0	0	0	0	0	0	0
Eland	3.35%	0	0	0	0	0	0	0	0	0	0	0	0
Elephant	1.55%	0	0	0	0	0	0	0	0	0	0	0	0
Hartebeest	5.10%	0	0	0	0	0	0	0	0	0	0	0	0
Impala	7.33%	0	0	0	0	0	0	0	0	0	0	0	0
Kudu	4.95%	0	0	0	0	0	0	0	0	0	0	0	0
Leopard	7.50%	0	0	0	0	0	0	0	0	0	0	0	0
Lion	6.00%	0	0	0	0	0	0	0	0	0	0	0	0
Oryx	4.70%	0	0	0	0	0	0	0	0	0	0	0	0
Ostrich	5.00%	0	0	0	0	0	0	0	0	0	0	0	0
Springbok	8.00%	0	0	0	0	0	0	0	0	0	0	0	0
Steenbok	13.85%	0	0	0	0	0	0	0	0	0	0	0	0
Warthog	7.20%	0	0	0	0	0	0	0	0	0	0	0	0
Wild dog	7.50%	0	0	0	0	0	0	0	0	0	0	0	0
Wildebeest	4.80%	0	0	0	0	0	0	0	0	0	0	0	0
Zebra	4.20%	0	0	0	0	0	0	0	0	0	0	0	0
Cattle	7.50%	0	0	0	0	0	0	0	0	0	0	0	0
Goats	22.50%	0	0	0	0	0	0	0	0	0	0	0	0
Donkeys/horses	5.00%	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS		0	0	0	0	0	0	0	0	0	0	0	0
STOCK PURCHASES (NO.)		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Buffalo		0	0	0	0	0	0	0	0	0	0	0	0
Crocodile		0	0	0	0	0	0	0	0	0	0	0	0
Eland		0	0	0	0	0	0	0	0	0	0	0	0
Elephant		0	0	0	0	0	0	0	0	0	0	0	0
Hartebeest		0	0	0	0	0	0	0	0	0	0	0	0
Impala		0	0	0	0	0	0	0	0	0	0	0	0
Kudu		0	0	0	0	0	0	0	0	0	0	0	0
Leopard		0	0	0	0	0	0	0	0	0	0	0	0
Lion		0	0	0	0	0	0	0	0	0	0	0	0
Oryx		0	0	0	0	0	0	0	0	0	0	0	0
Ostrich		0	0	0	0	0	0	0	0	0	0	0	0
Springbok		0	0	0	0	0	0	0	0	0	0	0	0
Steenbok		0	0	0	0	0	0	0	0	0	0	0	0
Warthog		0	0	0	0	0	0	0	0	0	0	0	0
Wild dog		0	0	0	0	0	0	0	0	0	0	0	0
Wildebeest		0	0	0	0	0	0	0	0	0	0	0	0
Zebra		0	0	0	0	0	0	0	0	0	0	0	0
Cattle		0	0	0	0	0	0	0	0	0	0	0	0
Goats		0	0	0	0	0	0	0	0	0	0	0	0
Donkeys/horses		0	0	0	0	0	0	0	0	0	0	0	0
TOTALS		0	0	0	0	0	0	0	0	0	0	0	0

FINANCIAL/ECONOMIC MODEL - CBO TRUST INVESTMENT - MAKGADIKGADI 2010- BASE CASE												
TABLE 9: STOCK PROJECTION (Continued)												
NET IMMIGRATION (NO.)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Buffalo	0	0	0	0	0	0	0	0	0	0	0	0
Crocodile	0	0	0	0	0	0	0	0	0	0	0	0
Eland	0	0	0	0	0	0	0	0	0	0	0	0
Elephant	0	0	0	0	0	0	0	0	0	0	0	0
Hartebeest	0	0	0	0	0	0	0	0	0	0	0	0
Impala	0	0	0	0	0	0	0	0	0	0	0	0
Kudu	0	0	0	0	0	0	0	0	0	0	0	0
Leopard	0	0	0	0	0	0	0	0	0	0	0	0
Lion	0	0	0	0	0	0	0	0	0	0	0	0
Oryx	0	0	0	0	0	0	0	0	0	0	0	0
Ostrich	0	0	0	0	0	0	0	0	0	0	0	0
Springbok	0	0	0	0	0	0	0	0	0	0	0	0
Steenbok	0	0	0	0	0	0	0	0	0	0	0	0
Warthog	0	0	0	0	0	0	0	0	0	0	0	0
Wild dog	0	0	0	0	0	0	0	0	0	0	0	0
Wildebeest	0	0	0	0	0	0	0	0	0	0	0	0
Zebra	0	0	0	0	0	0	0	0	0	0	0	0
Cattle	0	0	0	0	0	0	0	0	0	0	0	0
Goats	0	0	0	0	0	0	0	0	0	0	0	0
Donkeys/horses	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	0	0	0	0	0	0	0	0	0	0	0
VALUE OF STOCK (Pula)	VAL. /UNIT	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Buffalo	1154	0	0	0	0	0	0	0	0	0	0	0
Crocodile	2500	0	0	0	0	0	0	0	0	0	0	0
Eland	928	7283	7771	8291	8847	9440	10072	10747	11467	12235	13055	13930
Elephant	4115	0	0	0	0	0	0	0	0	0	0	0
Hartebeest	1375	5212	5744	6330	6975	7687	8471	9335	10287	11336	12492	13767
Impala	160	4543	5209	5972	6847	7850	8999	10318	11829	13563	15549	17827
Kudu	496	37196	40878	44925	49372	54260	59632	65536	72024	79154	86990	95602
Leopard	425	2418	2781	3198	3677	4229	4863	5593	6432	7397	8506	9782
Lion	582	0	0	0	0	0	0	0	0	0	0	0
Oryx	1504	42770	46790	51188	56000	61264	67023	73323	80215	87756	96005	105029
Ostrich	225	12819	14101	15511	17062	18768	20645	22709	24980	27478	30226	33249
Springbok	5750	784657	910202	1055835	1224768	1420731	1648048	1911736	2217613	2572431	2984020	3461464
Steenbok	85	13231	16896	21576	27553	35185	44931	57377	73270	93566	119484	152581
Warthog	133	4527	5179	5925	6778	7754	8870	10148	11609	13281	15193	17381
Wild dog	100	0	0	0	0	0	0	0	0	0	0	0
Wildebeest	491	19556	21433	23490	25745	28217	30926	33895	37149	40715	44624	48907
Zebra	606	151503	164230	178025	192979	209189	226761	245809	266457	288839	313102	339403
Cattle	800	0	0	0	0	0	0	0	0	0	0	0
Goats	50	0	0	0	0	0	0	0	0	0	0	0
Donkeys/horses	20	150	165	182	200	220	242	266	292	322	354	389
TOTAL VALUE OF STOCK		1085864	1241377	1420447	1626803	1864793	2139483	2456790	2823625	3248073	3739601	4309310
% OF FINAL RESID. VAL.		25.20%	28.81%	32.96%	37.75%	43.27%	49.65%	57.01%	65.52%	75.37%	86.78%	100.00%

FINANCIAL/ECONOMIC MODEL - CBO TRUST INVESTMENT - MAKGADIKGADI 2010- BASE CASE													
TABLE 9: STOCK PROJECTION (Continued)													
VALUE OF SALES (Pula)	VAL. /UNIT	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Buffalo	2308	0	0	0	0	0	0	0	0	0	0	0	0
Crocodile	5000	0	0	0	0	0	0	0	0	0	0	0	0
Eland	1855	0	0	0	0	0	0	0	0	0	0	0	0
Elephant	8231	0	0	0	0	0	0	0	0	0	0	0	0
Hartebeest	2750	0	0	0	0	0	0	0	0	0	0	0	0
Impala	320	0	0	0	0	0	0	0	0	0	0	0	0
Kudu	992	0	0	0	0	0	0	0	0	0	0	0	0
Leopard	851	0	0	0	0	0	0	0	0	0	0	0	0
Lion	1165	0	0	0	0	0	0	0	0	0	0	0	0
Oryx	3009	0	0	0	0	0	0	0	0	0	0	0	0
Ostrich	451	0	0	0	0	0	0	0	0	0	0	0	0
Springbok	11500	0	0	0	0	0	0	0	0	0	0	0	0
Steenbok	169	0	0	0	0	0	0	0	0	0	0	0	0
Warthog	265	0	0	0	0	0	0	0	0	0	0	0	0
Wild dog	200	0	0	0	0	0	0	0	0	0	0	0	0
Wildebeest	983	0	0	0	0	0	0	0	0	0	0	0	0
Zebra	1211	0	0	0	0	0	0	0	0	0	0	0	0
Cattle	800	0	0	0	0	0	0	0	0	0	0	0	0
Goats	50	0	0	0	0	0	0	0	0	0	0	0	0
Donkeys/horses	20	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL SALES VALUE		0	0	0	0	0	0	0	0	0	0	0	0
% OF FULL PROD. SALES		0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
PURCHASES (FINANCIAL)	VAL. /UNIT	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Buffalo	500	0	0	0	0	0	0	0	0	0	0	0	0
Crocodile	500	0	0	0	0	0	0	0	0	0	0	0	0
Eland	500	0	0	0	0	0	0	0	0	0	0	0	0
Elephant	500	0	0	0	0	0	0	0	0	0	0	0	0
Hartebeest	500	0	0	0	0	0	0	0	0	0	0	0	0
Impala	500	0	0	0	0	0	0	0	0	0	0	0	0
Kudu	500	0	0	0	0	0	0	0	0	0	0	0	0
Leopard	500	0	0	0	0	0	0	0	0	0	0	0	0
Lion	500	0	0	0	0	0	0	0	0	0	0	0	0
Oryx	500	0	0	0	0	0	0	0	0	0	0	0	0
Ostrich	500	0	0	0	0	0	0	0	0	0	0	0	0
Springbok	500	0	0	0	0	0	0	0	0	0	0	0	0
Steenbok	500	0	0	0	0	0	0	0	0	0	0	0	0
Warthog	500	0	0	0	0	0	0	0	0	0	0	0	0
Wild dog	500	0	0	0	0	0	0	0	0	0	0	0	0
Wildebeest	500	0	0	0	0	0	0	0	0	0	0	0	0
Zebra	500	0	0	0	0	0	0	0	0	0	0	0	0
Cattle	500	0	0	0	0	0	0	0	0	0	0	0	0
Goats	500	0	0	0	0	0	0	0	0	0	0	0	0
Donkeys/horses	500	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS		0	0	0	0	0	0	0	0	0	0	0	0

FINANCIAL/ECONOMIC MODEL - CBO TRUST INVESTMENT - MAKGADIKGADI 2010- BASE CASE													
TABLE 9: STOCK PROJECTION (Continued)													
PURCHASES (ECONOMIC)	VAL. /UNIT	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Buffalo	1154	0	0	0	0	0	0	0	0	0	0	0	
Crocodile	2500	0	0	0	0	0	0	0	0	0	0	0	
Eland	928	0	0	0	0	0	0	0	0	0	0	0	
Elephant	4115	0	0	0	0	0	0	0	0	0	0	0	
Hartebeest	1375	0	0	0	0	0	0	0	0	0	0	0	
Impala	160	0	0	0	0	0	0	0	0	0	0	0	
Kudu	496	0	0	0	0	0	0	0	0	0	0	0	
Leopard	425	0	0	0	0	0	0	0	0	0	0	0	
Lion	582	0	0	0	0	0	0	0	0	0	0	0	
Oryx	1504	0	0	0	0	0	0	0	0	0	0	0	
Ostrich	225	0	0	0	0	0	0	0	0	0	0	0	
Springbok	5750	0	0	0	0	0	0	0	0	0	0	0	
Steenbok	85	0	0	0	0	0	0	0	0	0	0	0	
Warthog	133	0	0	0	0	0	0	0	0	0	0	0	
Wild dog	100	0	0	0	0	0	0	0	0	0	0	0	
Wildebeest	491	0	0	0	0	0	0	0	0	0	0	0	
Zebra	606	0	0	0	0	0	0	0	0	0	0	0	
Cattle	800	0	0	0	0	0	0	0	0	0	0	0	
Goats	50	0	0	0	0	0	0	0	0	0	0	0	
Donkeys/horses	20	0	0	0	0	0	0	0	0	0	0	0	
TOTALS		0	0	0	0	0	0	0	0	0	0	0	

FINANCIAL/ECONOMIC MODEL - CBO TRUST INVESTMENT - MAKGADIKGADI 2010- BASE CASE

TABLE 10: LOAN FINANCING SCHEDULE

ITEM	PERIOD	Year (Yrs)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
LONG TERM LOANS													
TWENTY YEAR LOAN 20													
Total Expenditure			0										
Loan Disbursements			0	0	0	0	0	0	0	0	0	0	0
Loan Payments			0	0	0	0	0	0	0	0	0	0	0
Amortisation			0	0	0	0	0	0	0	0	0	0	0
Interest Payments			0	0	0	0	0	0	0	0	0	0	0
Loans Outstanding			0	0	0	0	0	0	0	0	0	0	0
FIFTEEN YEAR LOAN 15													
Total Expenditure			0										
Loan Disbursements			0	0	0	0	0	0	0	0	0	0	0
Loan Payments			0	0	0	0	0	0	0	0	0	0	0
Amortisation			0	0	0	0	0	0	0	0	0	0	0
Interest Payments			0	0	0	0	0	0	0	0	0	0	0
Loans Outstanding			0	0	0	0	0	0	0	0	0	0	0
SIX YEAR LOAN 6 6													
Total Expenditure			0						0				
Loan Disbursements			0	0	0	0	0	0	0	0	0	0	0
Loan Payments			0	0	0	0	0	0	0	0	0	0	0
Amortisation			0	0	0	0	0	0	0	0	0	0	0
Interest Payments			0	0	0	0	0	0	0	0	0	0	0
Loans Outstanding			0	0	0	0	0	0	0	0	0	0	0
FOUR YEAR LOAN 4													
Total Expenditure			0				0				0		
Loan Disbursements			0	0	0	0	0	0	0	0	0	0	0
Loan Payments			0	0	0	0	0	0	0	0	0	0	0
Amortisation			0	0	0	0	0	0	0	0	0	0	0
Interest Payments			0	0	0	0	0	0	0	0	0	0	0
Loans Outstanding			0	0	0	0	0	0	0	0	0	0	0
SHORT TERM LOANS													
Working Capital 1													
Overdraft			0	0	0	0	0	0	0	0	0	0	0
Interest Payments			0	0	0	0	0	0	0	0	0	0	0
TOTAL LONG TERM LOAN DISBURSMENTS													
Domestic Component			0	0	0	0	0	0	0	0	0	0	0
Foreign Component *			0	0	0	0	0	0	0	0	0	0	0
TOTAL LONG TERM LOAN AMORTISATION													
Domestic Component			0	0	0	0	0	0	0	0	0	0	0
Foreign Component *			0	0	0	0	0	0	0	0	0	0	0
TOTAL INTEREST PAYMENTS													
Domestic Component			0	0	0	0	0	0	0	0	0	0	0
Foreign Component *			0	0	0	0	0	0	0	0	0	0	0
TOTAL LOANS OUTSTANDING													
Domestic Component			0	0	0	0	0	0	0	0	0	0	0
Foreign Component *			0	0	0	0	0	0	0	0	0	0	0

* Economic Values

FINANCIAL/ECONOMIC MODEL - CBO TRUST INVESTMENT - MAKGADIKGADI 2010 - BASE CASE

TABLE 11: PROJECT FINANCIAL ANALYSIS - 5 YEARS (Pula, 2010)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
EXPENDITURE						
Capital Expenditure	1113240	481843	0	0	330750	0
Variable Expenditure	13051	78306	130510	130510	130510	130510
Overhead Expenditure	189792	189792	189792	189792	189792	189792
TOTAL EXPENDITURE	1316083	749941	320302	320302	651052	320302
INCOME						
Gross Income	158491	181190	207326	237446	272182	312276
Asset Residual Value	0	0	0	0	0	3318479
TOTAL INCOME	158491	181190	207326	237446	272182	3630755
NET BENEFIT/COST	-1157592	-568752	-112976	-82856	-378870	3310453
PROJ. FINANCIAL RATE OF RETURN (FRR) OVER 5 YEARS = 9.56%						
PROJ. NET PRESENT VALUE (NPV) @ 8.00% = 118251						

TABLE 12: PROJECT FINANCIAL ANALYSIS - 7 YEARS (Pula, 2010)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
EXPENDITURE								
Capital Expenditure	1113240	481843	0	0	330750	0	167231	71670
Variable Expenditure	13051	78306	130510	130510	130510	130510	130510	130510
Overhead Expenditure	189792	189792	189792	189792	189792	189792	189792	189792
TOTAL EXPENDITURE	1316083	749941	320302	320302	651052	320302	487533	391972
INCOME								
Gross Income	158491	181190	207326	237446	272182	312276	358589	412132
Asset Residual Value	0	0	0	0	0	0	0	3932922
TOTAL INCOME	158491	181190	207326	237446	272182	312276	358589	4345054
NET BENEFIT/COST	-1157592	-568752	-112976	-82856	-378870	-8026	-128944	3953082
PROJ. FINANCIAL RATE OF RETURN (FRR) OVER 7 YEARS = 8.77%								
PROJ. NET PRESENT VALUE (NPV) @ 8.00% = 87536								

TABLE 13: PROJECT FINANCIAL ANALYSIS - 10 YEARS (Pula, 2010)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
EXPENDITURE											
Capital Expenditure	1113240	481843	0	0	330750	0	167231	71670	330750	0	0
Variable Expenditure	13051	78306	130510	130510	130510	130510	130510	130510	130510	130510	130510
Overhead Expenditure	189792	189792	189792	189792	189792	189792	189792	189792	189792	189792	189792
TOTAL EXPENDITURE	1316083	749941	320302	320302	651052	320302	487533	391972	651052	320302	320302
INCOME											
Gross Income	158491	181190	207326	237446	272182	312276	358589	412132	474084	545826	628980
Asset Residual Value	0	0	0	0	0	0	0	0	0	0	5286457
TOTAL INCOME	158491	181190	207326	237446	272182	312276	358589	412132	474084	545826	5915437
NET BENEFIT/COST	-1157592	-568752	-112976	-82856	-378870	-8026	-128944	20160	-176968	225524	5595135
PROJ. FINANCIAL RATE OF RETURN (FRR) OVER 10 YEARS = 10.08%											
PROJ. NET PRESENT VALUE (NPV) @ 8.00% = 378292 Per Hectare = 13.32											

FINANCIAL/ECONOMIC MODEL - CBO TRUST INVESTMENT - MAKGADIKGADI 2010 - BASE CASE											
TABLE 14: PLANNED SUBSIDIES TO COMMUNITY (Pula, 2010)											
ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
SUBSIDIES ON EXPENDITURE											
On Capital Expenditure	806805	349209	0	0	239706	0	121198	51942	239706	0	0
On Variable Expenditure	0	0	0	0	0	0	0	0	0	0	0
On Overhead Expenditure	0	0	0	0	0	0	0	0	0	0	0
TOTAL EXPENDITURE	806805	349209	0	0	239706	0	121198	51942	239706	0	0
SUBSIDIES ON INCOME											
On Gross Income	0	0	0	0	0	0	0	0	0	0	0
On Asset Residual Value	0	0	0	0	0	0	0	0	0	0	0
TOTAL INCOME	0	0	0	0	0	0	0	0	0	0	0
TOTAL SUBSIDIES	806805	349209	0	0	239706	0	121198	51942	239706	0	0
TABLE 15: COMMUNITY FINANCIAL ANALYSIS - 5 YEARS (Pula, 2010)											
ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5					
EXPENDITURE											
Capital Expenditure	306435	132634	0	0	91044	0					
Variable Expenditure	13051	78306	130510	130510	130510	130510					
Overhead Expenditure	189792	189792	189792	189792	189792	189792					
TOTAL EXPENDITURE	509278	400732	320302	320302	411346	320302					
INCOME											
Gross Income	158491	181190	207326	237446	272182	312276					
Asset Residual Value	0	0	0	0	0	3318479					
TOTAL INCOME	158491	181190	207326	237446	272182	3630755					
NET BENEFIT/COST	-350787	-219543	-112976	-82856	-139163	3310453					
COMM. FINANCIAL RATE OF RETURN (FRR) OVER 5 YEARS =							39.14%				
COMM. NET PRESENT VALUE (NPV) @ 8.00% =							1327824				
TABLE 16: COMMUNITY FINANCIAL ANALYSIS - 10 YEARS (Pula, 2010)											
ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
EXPENDITURE											
Capital Expenditure	306435	132634	0	0	91044	0	46033	19728	91044	0	0
Variable Expenditure	13051	78306	130510	130510	130510	130510	130510	130510	130510	130510	130510
Overhead Expenditure	189792	189792	189792	189792	189792	189792	189792	189792	189792	189792	189792
TOTAL EXPENDITURE	509278	400732	320302	320302	411346	320302	366335	340030	411346	320302	320302
INCOME											
Gross Income	158491	181190	207326	237446	272182	312276	358589	412132	474084	545826	628980
Asset Residual Value	0	0	0	0	0	0	0	0	0	0	5286457
TOTAL INCOME	158491	181190	207326	237446	272182	312276	358589	412132	474084	545826	5915437
NET BENEFIT/COST	-350787	-219543	-112976	-82856	-139163	-8026	-7745	72102	62738	225524	5595135
COMM. FINANCIAL RATE OF RETURN (FRR) OVER 10 YEARS =							24.04%				
COMM. NET PRESENT VALUE (NPV) @ 8.00% =							1806557 Per Hectare = 63.61				

FINANCIAL/ECONOMIC MODEL - CBO TRUST INVESTMENT - MAKGADIKGADI 2010 - BASE CASE											
TABLE 17: ECONOMIC ANALYSIS - 5 YEARS (Pula, 2010)											
ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5					
ECONOMIC COSTS											
Capital Expenditure	1033597	440723	0	0	315536	0					
Unskilled Wages	58009	58009	58009	58009	58009	58009					
Other Domestic Costs	26558	39838	53117	66396	66396	66396					
Tradable Costs	9495	37978	75956	94945	94945	94945					
Foreign Amortisation	0	0	0	0	0	0					
Foreign Profits	0	0	0	0	0	0					
Foreign Loans Outst.	0	0	0	0	0	0					
TOTAL COSTS	1127660	576548	187082	219351	534886	219351					
ECONOMIC BENEFITS											
Gross Income	167886	191929	219615	251520	288316	330786					
Asset Residual Value	0	0	0	0	0	3008357					
Foreign Financing	0	0	0	0	0	0					
TOTAL BENEFITS	167886	191929	219615	251520	288316	3339143					
NET BENEFIT/COST	-959774	-384618	32533	32170	-246570	3119792					
ECONOMIC RATE OF RETURN (ERR) OVER 5 YEARS				=	17.88%						
NET PRESENT VALUE (NPV) @		8.00%	=	629230	Per Hectare =	22.16					
TABLE 18: ECONOMIC ANALYSIS - 10 YEARS (Pula, 2010)											
ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
ECONOMIC COSTS											
Capital Expenditure	1033597	440723	0	0	315536	0	159538	68374	315536	0	0
Unskilled Wages	58009	58009	58009	58009	58009	58009	58009	58009	58009	58009	58009
Other Domestic Costs	26558	39838	53117	66396	66396	66396	66396	66396	66396	66396	66396
Tradable Costs	9495	37978	75956	94945	94945	94945	94945	94945	94945	94945	94945
Foreign Amortisation	0	0	0	0	0	0	0	0	0	0	0
Foreign Profits	0	0	0	0	0	0	0	0	0	0	0
Foreign Loans Outst.	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	1127660	576548	187082	219351	534886	219351	378889	287724	534886	219351	219351
ECONOMIC BENEFITS											
Gross Income	167886	191929	219615	251520	288316	330786	379844	436561	502185	578180	666263
Asset Residual Value	0	0	0	0	0	0	0	0	0	0	4774561
Foreign Financing	0	0	0	0	0	0	0	0	0	0	0
TOTAL BENEFITS	167886	191929	219615	251520	288316	330786	379844	436561	502185	578180	5440823
NET BENEFIT/COST	-959774	-384618	32533	32170	-246570	111435	956	148837	-32701	358829	5221473
ECONOMIC RATE OF RETURN (ERR) OVER 10 YEARS				=	15.92%						
NET PRESENT VALUE (NPV) @		8.00%	=	1203673	Per Hectare =	42.38					

FINANCIAL/ECONOMIC MODEL - CBO TRUST INVESTMENT - MAKGADIKGADI 2010 - BASE CASE				
TABLE 19: SUMMARY OF RESULTS				
ITEM	UNITS			TOTAL
Conservancy Extent	Hectares			28400
Conservancy Stock	Large Stock Units (LSU)			771
ITEM	% of TCI	Pula/LSU	Pula/Hectare	Pula
Total Financial Capital (TCI)	-	2067.67	56.16	1595084
Financial Gross Income	39.43%	815.33	22.15	628980
Variable Financial Costs	-	169.18	4.60	130510
Fixed Financial Costs	-	446.04	12.12	344092
Net Cash Income	0.10	200.12	5.44	154378
Community Cash Income	0.17	350.51	9.52	270397
Land Rental	-	0.00	0.00	0
Resource Royalty	-	0	0	0
Project FRR (@ 10 Years)	-	-	-	10.08%
Community FRR (@ 10 Years)	-	-	-	24.04%
Project FNPV (@ 8%, @ 10 Years)	-	-	13.32	378292
Community FNPV (@ 8%, @ 10 Years)	-	-	63.61	1806557
Total Economic Capital	-	1911.12	51.91	1474320
Economic Gross Income	0.45	863.66	23.46	666263
Economic Costs	0.23	437.23	11.88	337296
Net Economic Benefit	0.22	426.43	11.58	328967
Net Value Added	0.12	237.15	6.44	182949
ERR (@ 10 Years)	-	-	-	15.92%
ENPV (@ 8%, @ 10 Years)	-	-	42.38	1203673
Economic Capital Cost/Job	-	-	-	163813
Domestic Resource Cost Ratio	-	-	-	0.64
Policy Analysis Matrix	: Effects of Policy / Market Imperfections	: on Output		-37282
		: on Tradable Inputs		-4578
		: on Domestic Factors		13290
	: Net Effects of Policy / Market Imperfections	: on Annual Net Income		-28571
		: on Net Present Value (10 Years)		-825382