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**ECONOMIC RETURNS TO SELECTED LAND USES  
IN NGAMILAND, BOTSWANA**

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by

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for

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## Abstract

This is a desk analysis of the economics of the primary land uses in Ngamiland. Preliminary investigations showed that crop production is localised and unlikely to expand beyond core settlement areas, small scale use of wild plants and wildlife is widespread but secondary and of low value, and intensive wildlife ranching and farming are either of low economic potential or extremely localised. The remaining forms of land use, based on livestock and wildlife, were analysed in detail with financial and economic budget/cost-benefit models. Detailed models for small scale livestock keeping, medium to large scale cattle post livestock production, commercial livestock production, commercial wildlife viewing tourism, community wildlife use in high quality wildlife areas, and community wildlife use in low quality wildlife areas were developed. The contributions of these activities in terms of net value added to the national income in economic prices, private profitability, and local community income were measured. The results from the models were used to assess the economic merits of three different veterinary fencing options.

The results provide some important insights as to how land can be allocated to improve economic returns and meet development objectives. The land uses analysed generate a wide range of different economic benefits. Livestock keeping results in non-market benefits for rural households, as well as some cash. It also contributes to the beef export industry. Wildlife use provides cash income for rural households and communities, as well as some non-market benefits. Wildlife use also ensures preservation of wildlife non-use values, such as existence values (not determined in our study), and contributes to the tourism export industry.

Wildlife-based tourism in high quality wildlife areas such as the Okavango delta is extremely economically efficient, and should get priority where these conditions exist. Community use of wildlife should be promoted where people and adequate wildlife resources coexist, and where the economic values exceed those of livestock (i.e. where wildlife densities and diversity are high enough).

Small-scale production of livestock provides significant household income primarily as a result of subsidies. It has potential to generate high economic values, but tends to be economically inefficient due to the open access grazing system and consequent low herd productivity. It should be promoted but only if accompanied by implementation of community grazing programmes, which allow some destocking. Our results suggest that, in this way, significant economic values could be generated and subsidies could possibly be removed. The results tend to confirm the theoretical premise that de facto open access to grazing results in dissipation of net benefits, where positive returns in good years are cancelled out by negative ones in poor years.

We found that capital intensive commercial livestock ranching is economically inefficient and should not be promoted in Ngamiland. Attempts to promote expansion of beef production in the district should focus on low input systems, such as occurs at cattle posts. Cattle post livestock production was found to be the most economically efficient land use for moderately remote sandveld areas with groundwater and low wildlife densities. However even here, returns per unit of land are low. While small- to large-scale, low input livestock systems appear able to generate positive economic returns in Ngamiland, this does not necessarily confirm the economic efficiency of the livestock sector as a whole.

Community use of wildlife has merit, and should be promoted, in the more remote parts of the sandveld, where transport costs lower the value of cattle production and where wildlife densities are adequate. However, returns per unit of land tend to be low or very low. Wildlife use provides cash, which complements other household income-earning strategies. Wildlife also provides income diversity (reducing risk for households). It provides existence and option values, which are captured by communities as income (through donor-funded assistance to wildlife conservation).

Expansion of Botswana's Foot and Mouth Disease (FMD) free zone into Ngamiland does not appear economically desirable. Fencing costs may not be recovered through economic returns, particularly if the FMD free area is small. Development along recent and current lines, with minor modifications to existing veterinary fences may be more economically efficient. This needs further analysis. In any case, economic viability will require improvements in small-scale livestock herd productivity. Investments, which will improve livestock productivity, should have a high priority.

The findings confirm that economically efficient allocation of land in Ngamiland will revolve around the expansion of two main forms of land use: (1) small- to large-scale traditional livestock production, and (2) wildlife-based tourism development. Other land uses will be secondary or of relatively low value. Both traditional livestock and wildlife-based tourism have real comparative advantage, and as generators of livelihood, they tend to be complementary. There are indications that livestock values will drop in the long term and that livestock may lose its comparative advantage. Wildlife values, on the other hand, are likely to

increase in the long term, increasing the comparative advantage of wildlife-based land uses. These likely future trends need to be considered in planning.

## 1. Introduction

### 1.1 Background

Large-scale cattle development is poised to expand into the southern, western and northern parts of Ngamiland in Botswana. The area is generally lightly inhabited and undeveloped tribal land, and it is now almost completely encircled and crossed by veterinary cordon fences, which make it a target for expansion of large-scale livestock ranching. It surrounds the highly valuable wetlands and wildlife habitats of the internationally renowned Okavango Delta. There is a great need for assembly of information to enable assessment of economically and environmentally beneficial land use alternatives for Ngamiland. This might enable Botswana to avoid economic inefficiencies, resource wastage, and the adverse environmental impacts of inappropriate land uses.

This study embraces an economic analysis of the cattle industry's profitability in Ngamiland (the study area), and an assessment of alternative development options. It will be combined with a second study, which will examine policies and implementing agencies that regulate land use in the study area, at the local, regional, and national levels. The goal of this second policy study is to identify the legislative incentives for large-scale cattle ranching, and the disincentives for conservation and wildlife-based development alternatives.

The economic analysis will provide the basis for recommendations to government regarding development alternatives that are more economically beneficial, more compatible with wildlife movements, and more consistent with land uses in neighbouring Namibia and Zimbabwe. The study will also provide economic data which, when combined with biological data, policy analysis and the results of the other related studies, will provide much of the baseline information needed for a more comprehensive regional corridor analysis.

Although there is a powerful constituency in favour of large-scale cattle development in the Ngamiland, there is also a growing constituency in favour of a wildlife based development strategy. This constituency includes communities, members of government, Botswana NGOs, international NGOs (including the Peace Parks Foundation and IUCN), and development agencies (USAID and the Development Bank of Southern Africa). Conservation International (CI) has also received high level encouragement from the Government of Botswana to undertake this analysis, as well as support from the other organisations listed above.

A detailed environmental impact assessment of the veterinary fences in Ngamiland (the "fences EIA") is being undertaken by the Botswana government. The fences EIA is assessing the ecological costs of maintaining fences, and it embraces an investigation of the economics of the different fencing options. Our economic study is intended as a complement to the fences EIA work, providing detail in the micro-economics of the primary land uses. The results of the proposed study should coincide with the release of the environmental impact analysis.

Trans-boundary natural resource management is essential to the future well being of the Okavango River Basin and the people who rely on it for livelihoods. This study will be important in providing material for policy analysis necessary for effective and responsible management of the Delta. It thus provides an important opportunity to preempt a serious threat to one of the world's most unique wetland ecosystems, and provides a key analytical component necessary to begin work towards a larger regional conservation corridor.

In June 2000, CI commissioned Jonathan Barnes, of Design and Development Services (Pty) Ltd. (the consultant), to undertake the economic study described above. The detailed terms of reference for the project are presented in Appendix 1. This document reports on the study and is a product of the efforts of Jonathan Barnes, James Cannon, Director of Resource Economics Programs at CI, and Karl Morrison, Economist and Coordinator, Southern Africa Programs at CI. The project was initiated as background to CI's Okavango Program.

## 1.2 Approach to the study

The investigation is based on testing the following hypothesis:

*Long term allocation of land uses in Ngamiland will revolve around the expansion of two main forms of land use: (1) small- to large-scale traditional livestock keeping and (2) wildlife-based tourism development. These two activities and derivations of them are the only ones with real comparative advantage. Other land uses will be of lesser importance. For example, crop production will be restricted to localised areas of denser human settlement because of lack of suitable soils and water availability. Commercial livestock production will decline in relative value due to phasing out of the EU beef protocol, and a tendency to reduce cross-subsidisation of transport costs within Botswana. Use of wildlife for meat will continue to be important as a social safety net, but only in certain areas and at low values per unit of land. Use of plant resources has and will have a similar role and importance.*

The challenge of this study is to determine which spacial allocation of land uses maximises the contribution of resources in Ngamiland to Botswana's development. The primary values of interest are *economic* (as they affect social or national welfare) and the most important of these is *net national product*, a direct use value. Where possible consideration is also given to other components of *total economic value* as defined by Pearce and Turner (1990). Where possible, the assessment includes all values (including

indirect use values, and non-use values, such as option and existence values) which could be captured by Botswana. Of importance also are the private (financial) values as manifested for individual investors.

The study area embraces only that part of Ngamiland west of the north-south line traced by the Makalamabedi veterinary fence (west of, and excluding, the NG43 and NG45 controlled hunting areas). The southern boundary is the Kuke veterinary fence, and the western and northern boundaries are both formed by the Namibian border. This is essentially a desk study, and involves the preliminary screening of all potential land use options, before focussing attention on the involving the following primary components:

### *1.2.1 The profitability of livestock production in Ngamiland*

The profitability of cattle keeping/ranching in the study area is analyzed using cost benefit analysis. The analysis takes into account the direct and indirect benefits and costs of developing the cattle industry [for export/domestic markets and traditional livestock raising] in Ngamiland. Indirect benefits and costs include the value of employment and production of other goods and services that support the cattle industry.

Account is taken of both initial investments, such as the costs of constructing fences and drilling boreholes, and recurrent costs such as the costs of herding, veterinary inputs, and marketing. In the case of traditional livestock raising, the analyses include non market benefits (such as home consumption, draft power, store of wealth, use of manure, etc.) The economic incentives provided to the livestock sector through various policies and programs, are examined to see if these have affected the allocation of resources in economically perverse ways.

### *1.2.2 The profitability of alternative land uses in Ngamiland*

Any development strategy has an associated opportunity cost. The opportunity cost associated with cattle keeping/ranching is determined by the loss of economic returns of alternative land use options such as tourism, community-based natural resource management (CBNRM) activities, and wildlife utilisation. Again cost-benefit analysis is used to determine returns to investments in these activities. Wildlife-based tourism is examined in detail as is the use of wildlife resources through CBNRM.

### *1.2.3 Cost benefit analysis of various land use combinations*

Using findings from the first two components, cost-benefit analyses are performed on some different likely land use allocations, with the objective of illustrating the trade-offs which affect attainment of maximum use values, while minimising the loss of non-use values in Ngamiland. Throughout the analyses described above particular attention will be paid to the effects of land use options on poverty alleviation and the well being of communities in Ngamiland.

### 1.3 Acknowledgements

This study has been made possible with funding from CI. We wish to thank Karen Ross of CI southern Africa, for logistical assistance and support. Charlotte Boyd of CI's Resource Economics Program provided vital advice, comments and support in the finalisation of the report. Ann Gollifer, Gary Mullins, as well as Beth Terry, Jeremy Perkins, Jan Isaksen and Jaap Arntzen assisted greatly with assembly of documents and data in Botswana. Deb Gibson did the same in Windhoek and provided a background and overview of the fences EIA. Helga Hoveka designed the cover illustration.

### 1.4 The resource base

Ngamiland is situated in the predominantly flat, semi-arid, northern Kalahari, at medium altitude around 1,000 meters above sea level. In places relict parallel fossil dunes occur. Small inselbergs are very rare. Soils are dominated by very infertile aeolian sands of the Kalahari beds, and in parts these have been redistributed in parts through alluvial influences. In a few localised places, notably in the southwest edges of the delta, medium textured soils have developed. Permanent surface water is absent except along the Kwando river, and the Okavango river system consisting of the panhandle and delta. Here, there is seasonal flooding as waters from Angola arrive in the dry season. Away from the wetlands, groundwater resources are variable, with patches of high salinity, and areas of lower yield (van der Sluis, 1992). We estimate, roughly, that about two thirds of the Kalahari sand areas are suitable for livestock water point development.

The climate is hot in summer and mild in winter, and summer rainfall has mean ranging from 425mm per annum in the south west to about 575mm per annum in the north east. The dominant vegetation is northern Kalahari tree savanna. Tree species such as *Terminalia sericea*, *Lonchocarpus nelsii* and *Acacia fleckii* occur in the drier south west, while in the more mesic north western areas, *Burkea africana* and *Baikaea plurijuga* are found. Floodplain grasslands, sedge wetlands, riverine thicket formations, and *Colophospermum mopane* woodlands occur in mosaics with the savannas in the delta and surrounds.

As rangeland, the habitats in Ngamiland are dominated by bulk grazing resources. Palatable browse exists but its carrying capacity for obligate browsers is low, mainly because dry season leaf-loss results in a bottleneck. The grass sward is dominated by coarse grasses, such as *Eragrostis lehmanniana*, *Eragrostis pallens*, *Stipagrostis uniplumis* and *Aristida stipitata*, so that ungulate populations are dominated by bulk- and certain mixed-feeders. Thus cattle, elephant, buffalo, zebra, goats, and impala can dominate, depending on the locality. The range is suitable for livestock, dominated by the bulk grazer, cattle; or mixed wildlife populations, dominated by bulk feeders.

Rangeland is sweet, i.e. it can produce weight gains in livestock and game throughout the year. Grazing stock suffer limited protein and phosphate deficiencies which can be ameliorated through supplementary licks. "Economic" carrying capacities (those that



can maximise animal production spacially) range from some 15 hectares per large stock unit equivalent (LSU) in the south west, to some 10 hectares per LSU in the north east. Ecological carrying capacities (those that can sustain the maximum number of animals spacially) are some twice as high as the "economic" ones. The extra water availability in the wetlands results in higher carrying capacity and a tendency for slightly sour rangeland conditions.

Wildlife populations are highest and most diverse in the delta, riverine areas and their vicinities. Here, species such as elephant, buffalo, hippopotamus, giraffe, lion, leopard, impala, lechwe, sitatunga, kudu, sable, zebra, roan and many others occur in densities approaching 30 hectares per LSU equivalent. These areas also have high scenic variety and attributes which attract tourist visitors. In the sandveld habitats away from water, the wildlife densities and diversity are lower. Most large charismatic species are absent or rare, and common species of interest include gemsbok, kudu, hartebeest, leopard and ostrich. There are small numbers of species such a giraffe, eland, lion. Wildlife densities range from some 80 hectares to 500 hectares per LSU equivalent. The sandveld savanna areas are generally flat and fairly monotonous so that their potential for tourism is limited.

The veterinary requirements associated with livestock have resulted in Ngamiland being surrounded and crossed with various veterinary fences. The main division is the "buffalo fence", separating livestock-free wildlife land in the north east and the rest of the district. Livestock are thus restricted by policy to the south, west and north west of the district. The policy framework could allow use of wildlife-based land uses within the livestock zone. This zone could also be used to expand that part of Botswana which is certified as free from foot and mouth disease (FMD), and from which beef can be exported to the European Union (EU).

## **2. Options for land use in Ngamiland**

### **2.1 Crops**

Botswana, in comparison with most of its neighbours, has very poor potential for intensive agricultural production. The rainfall, throughout, is low and unreliable and nowhere is the potential for rain-fed crop production better than marginal. In the few parts of the country where water is available for irrigation development, extremely infertile aeolian sands are common, lowering any potential, for this. Further, large scale production of irrigated crops is constrained by high transport costs due to the remoteness of suitable sites (Edwards *et al.*, 1989).

The district of Ngamiland has a small human population of 100,000 people, and is situated in the remote north west of the country. Here, the presence of the endoreic Okavango river and delta system, means that parts are relatively well watered. Water and soils suitable for irrigation can be found together only on several thousand hectares

in the Gumare - Nokaneng area, but the remoteness of the site precludes any economically viable large-scale commercial irrigated production development (SMEC, 1990; Edwards *et al.*, 1989). Potential for very limited irrigated crop production for subsistence, and the very small local market, exists here.

Within Ngamiland, away from the Okavango delta and panhandle, rain-fed crop production is severely constrained by low rainfall and soil infertility. In the populated areas of the southern and western Okavango delta and the "panhandle", there is potential for dryland *molapo* crop production (making use of receding flood waters). However, the generally very infertile soils and the variability of flooding also constrain this potential. Crop production is thus very localised. Nowhere in the district is it likely to contribute more than about half of household annual grain needs. However, in as much as it does this it is an important contributor to livelihoods. As an intensive form of land use, involving clearing of natural vegetation, its impact on the natural environment is high.

## 2.2 Livestock

Nearly all of Ngamiland has high potential as rangeland for *extensive* grazing of livestock. Thus privately owned livestock can be grazed on the natural savanna vegetation, which with the provision of a few supplements, can produce animal weight gains all year. Disease has constrained the marketing of stock from this area, and to some extent reduced production. The potential for commercial cattle production in Ngamiland to serve the national beef export industry has been constrained by several factors. First, the district is outside the "foot and mouth disease (FMD) free" zone; second, it is very far from substantial beef markets; and third, livestock are predominantly kept here within traditional systems for a wider range of use values. More recently, the outbreak of contagious bovine pleuropneumonia (CBPP), and the slaughter of all cattle in the district (Townsend and Sigwele 1998) has obviously severely constrained the potential in the district. Broadly three basic types of livestock system have been identified: traditional livestock keeping, cattle post livestock keeping, and commercial livestock production.

### 2.2.1 Traditional livestock keeping

Livestock keeping amongst the Batawana, Bayei, Hambukushu and Baherero residents of Ngamiland has taken place on communal land, where the household is the agricultural unit. Livestock forms one of the primary household income sources, along with non-farm remuneration/remittances and crop production. Livestock, mostly cattle, but also including goats, are kept at small scale for production of milk, meat, draft power, manure and as a store of value. The production systems are risk-averse and low-input in nature. Herds and flocks are grazed on communally owned land, allocated for grazing, under predominantly open access conditions. Use of land, use of water, and veterinary, marketing and other inputs are subsidised to varying degrees by government. The tendency for open access, and the emphasis on live animal values, results in high stocking rates, and intensive use of the habitat. The high densities of

stock fluctuate around the ecological carrying capacity, herd production indices tend to be low, and periodic drought induced mortalities are common.

Traditional livestock keeping has been widely regarded as being ecologically unsustainable, resulting in land degradation through vegetation change and erosion. However, there is so far no clear scientific evidence that it results in irreversible losses in productivity. Indeed, evidence from Biot (1988, 1993), Abel *et al.* (1987), Abel and Blaikie (1989), Scoones (1990, 1993), Abel (1993), White (1993) suggests, on the contrary, that traditional livestock grazing systems are resilient, and productivity decline is negligible or very slow. Nevertheless, these intensive grazing systems do result in displacement of wild ungulate populations, and loss of both biological and production *diversity* (Barnes, 1998a). The impact of traditional livestock keeping on the environment is moderately high.

### 2.2.2 *Cattle post livestock keeping*

Away from the main areas of human settlement, in more remote southern, western and north western parts of the district, expansion of livestock keeping has taken place around boreholes or "cattle posts". Here the potential for crop production is negligible, and cattle are kept under fairly low-input, unfenced ranching conditions, mainly by absentee owners, primarily as a store of value, but also to produce some milk and meat. Borehole development is often privately funded by individuals or syndicates, and sites are allocated by the district land board. Through this moderately capital intensive investment process the land is effectively privatised to a degree. Current agricultural policy makes it possible for such cattle posts to be fenced off, finishing this privatisation process.

The tendency for enclosure, and the expanding nature of this land use results in generally somewhat lower, but still high, livestock densities on the land. The herd production indices tend to be higher than in the densely settled communal lands. Generally the effect of these systems on the habitat is lower than that for livestock in the more settled areas, with heavy grazing pressure localised around water points (Perkins, 1990, 1991). There is tendency for displacement of wildlife populations and the effects of this form of land use on the environment must be described as moderate to moderately high. So some extent there tends to be a gradation between small-scale and cattle post type production systems.

### 2.2.3 *Commercial livestock production*

On communal land in the south east of the district, relatively close to Maun (the Hainaveld), a block of commercial leasehold ranches have been established under the Tribal Grazing Land Policy (TGLP). Here, 10,000 hectare blocks were leased at subsidised rentals to individuals, with the intention that fenced commercial livestock ranching, for meat production, be developed through National Development Bank loans. Compared with traditional livestock keeping and cattle posts, commercial ranches are highly capital intensive. The investments make it possible for increased production

efficiency through refined herd management. Reviews of the TGLP programme (McGowan International, 1988) have shown that most TGLP ranches are functionally closer to cattle posts than fenced ranches. On them, cattle are kept as a store of value as well as for beef production. Loan repayment has been a problem on these ranches. Elsewhere in Botswana, successful commercial beef production has been possible through the purchase of growth-stressed communal land cattle and finishing these for slaughter. This type of production, sometimes referred to as "speculation" has benefited from the BMC grade price structure, where there is effective cross-subsidisation (McGowan International and Coopers and Lybrand, 1987). There may be some potential for commercial finishing in Ngamiland.

The development of the Botswana Meat Corporation (BMC) abattoir in Maun, with a capacity of about 80 head per day or 20,000 head per year, opened up the potential for some beef exports from the district to selected non-European Union markets, such as South Africa. This abattoir closed after the CBPP outbreak, and the slaughter of all cattle in the district. The market remaining in the district for beef is local, at village and district level. There are plans to expand the FMD free zone (from which exports of beef can be made to the EU market) into the southern and perhaps western parts of Ngamiland. This should be possible, given the recent CBPP-induced fencing developments in the district, and once the bulk of the cattle population is restored.

Because the aim of these systems is to maximise animal production, there is incentive to keep livestock densities well below ecological carrying capacity. Results from at least one long term study (Fourie *et al.*, 1987) indicate that commercial livestock ranching can be ecologically sustainable in the Kalahari. Of all the livestock systems described here, commercial ranching results in the least displacement of wildlife.

In 1990, using data from south eastern Botswana, Barnes (1994, 1998a), found that government subsidies substantially increased the private profitability of commercial beef production. The financial rate of return to the investment over 10 years increased from 2% to 8%. Table 1 shows this. However, in Zimbabwe, Jansen *et al.*, (1992) found that commercial livestock producers were being taxed rather than subsidised.

#### 2.2.4 Broader characteristics of livestock systems

Investment in traditional livestock keeping tends to be risk-averse and involves fairly small recurrent inputs. It is an important contributor to livelihoods in the areas of settlement. Investment in cattle posts is slightly more capital intensive but remains a low input type of ranching system. It has contributed significantly to wealth creation, and has potential to contribute more over a wider area. However, there are strong tendencies for this wealth to be concentrated in upper income groups (Perkins, 1996). Commercial ranching is highly capital intensive and increasingly suffers from low profitability (Table 1, Bekure, 1982; Barnes and de Jager, 1996), as international beef prices have suffered long term real decline. The support which the traditional livestock sector gets from central government (such as through water provision, veterinary and other inputs) is generally not recovered directly through land rentals or taxes. However,

analysis using a social accounting matrix (SAM) model by Townsend and Sigwele (1998) has shown the livestock sector to have a very high full backward linkage (multiplier) effect. As calculated from their SAM model, a P1 million increase in cattle output will increase gross output in the economy by P8.8 million.

Table 1: Comparative financial and economic characteristics for beef breeding and rearing and in the south eastern Kalahari, Botswana, illustrating the effect of government subsidies (Pula '000, 1991)

	Characteristic by type of enterprise		
	Beef* Subsidies	Beef* No subsidies	Game** No subsidies
Ranch scale ('000 hectares)	10	10	10
Stock on hand (hectares per LSU)	0.93	0.93	0.93
<b>Financial Analysis</b>			
Initial Capital Investment	941	985	1,324
<i>At Stability (Full Production)</i>			
Annual Gross Income (Sales)	221	197	242
less Variable Costs	37	71	40
less Fixed Costs	117	123	132
Annual Net Cash Income	67	3	70
<i>Financial Worth over Ten Years</i>			
Financial Rate of Return	8.8%	2.0%	5.9%
Financial Net Present Value (@ 12%)	-159	-512	-399
<b>Economic Analysis</b>			
Capital Outlay	1,026	1,026	1,367
<i>At Stability (Full Production)</i>			
Annual Gross Output	216	216	266
Less Operating Costs	118	118	79
Annual Economic Benefit	98	98	187
<i>Economic Worth over Ten Years</i>			
Economic Rate of Return	2.3%	2.3%	6.6%
Economic Net Present Value (@ 6%)	-272	-272	59

\* Beef breeding and rearing for production of slaughter steers in south east Kalahari

\*\* Mixed-species game ranching for safari hunting and biltong production, south east Kalahari

## 2.3 Wildlife

### 2.3.1 *Tourism*

Botswana and notably Ngamiland has a very rich and diverse wildlife resource, which contains well-known, charismatic, large mammals. The Okavango delta, with its wetlands, floodplains, and riverine environments as well as the adjacent open woodlands, has a very high value for development of wildlife use through tourism (Barnes, 1994, 1998a). This involves consumptive use through safari hunting of trophy quality wildlife, as well as non-consumptive tourism. Large parts of the land to the north and east of the Buffalo veterinary fence are without human settlement. Here, through a tender system and according to policy, the Tawana land board has leased concessions to tourism operators, who pay rent to the board and resource royalties to the district council.

Most operations here serve the top end of the market for wildlife viewing tourism, and rustic but well apportioned lodges and tented camps cater for mostly foreign tourists who are flown to site in small aircraft. Land with relatively high densities of diverse wildlife is needed but the amount of land per tourist bed is small at around 500 to 800 hectares. Such investments tend to be highly capital intensive, but are generally profitable. This profitability has increased in recent years, because of depreciation in local currency values.

Subsidies to the wildlife-based tourism sector occur in terms of DWNP investments in maintaining and managing the wildlife resource, and are relatively low per unit of land (Barnes, 1998a). In the past these investments were not recovered directly through taxes in the sector, but reallocation of concessions and revision of park entry fees in the last decade has changed this. Now, much of the central government's investment is recovered through market driven land and resource rentals, as well as park use fees. The SAM multipliers calculated by Townsend and Sigwele (1998) do not deal specifically with the tourism sector, but nevertheless from their results it can be deduced that this sector has high backward linkage (multiplier) effects. Thus, a P1 million increase in wildlife-based tourism output is likely to increase gross output in the economy by some P6 million.

### 2.3.2 *Community wildlife use*

Botswana has a long tradition of wildlife use by communities, primarily through the special game licenses granted to remote area dwellers, and the licensed hunting system. In both cases community members hunted individually. These hunting systems are centrally controlled, and lacked incentives for community resource management and conservation. Arntzen (1998) provided an assessment of the value of this type of activity. It tends to be low and secondary to other household income strategies, acting as a safety net (Traill Thomson, 1998). Since the middle 1980s more emphasis has been put on the development of projects where communities develop common property management of wildlife resources. Considerable external donor assistance has been

available for this type of development, effectively eliminating the high transaction costs associated with community projects.

Much of the high quality wildlife habitat in Ngamiland, is devoid of human settlement, but there are parts where human settlement lies adjacent to prime wildlife land. The Kwai, Sankuyo, and the Seronga and Nambiya areas are examples. Here communities can derive significant amounts of income through joint tourism ventures, or leasing out suitable sites for tourism developments. Both safari hunting and wildlife viewing are possible. At the same time that the trophy-hunting quota for an area is sold by the community to operators, the remainder of the hunting quota can be allocated to community members for meat harvesting. Successful investments in community wildlife use of high quality wildlife populations have been developed in Ngamiland, the Chobe district, and in neighbouring Namibia and Zimbabwe.

In the less well endowed wildlife areas of south western and northern Ngamiland there is also potential for community wildlife use projects. Here, because of low wildlife densities and lower diversity, there are much lower potential returns per unit of land. The primary form of tourism is safari hunting, with only some lower value wildlife viewing. Game meat harvesting and associated crafts production provides additional income. Barnes (1995a) analysed the 1991 financial and economic values associated with three community projects; two in low value areas and one in a high value area. Table 2 shows some of the results. These suggested that investments by communities would have good financial viability, and that they were economically efficient. Although none of the sites studied is in Ngamiland, the examples are representative of conditions in the district. Particularly in the less well endowed areas, the viability of investments was found to be highly dependent on wildlife densities. Table 3 shows this for a proposed community wildlife project in a low quality area of the Kaiahari.

### 2.3.3 *Nature conservation*

The world renowned wildlife habitats of the Okavango Delta and surrounding land in the centre and northeast of Ngamiland has high potential for nature conservation as a form of land use. This is manifested in the existing, Moremi Game Reserve, and Nxai Pan National Park, which occupy the centres of the core wildlife areas in the district. Here resources of the state are allocated to preservation of the natural wildlife and habitats. The economic returns to this investment are manifested in non-use values (option and existence values, as described by Pearce and Turner, 1990), and use values (through non-consumptive tourism). Non-use values for wildlife are *economic* values, very difficult to measure, and are reflected as willingness to pay, which can potentially be captured for national benefit. Very little research has been done on these, but work by Holland (1993), Oellerman *et al.* (1994), Barnes (1996, 1998a), and Barnes *et al.* (1999), has found evidence of positive non-use values associated with wildlife in southern Africa. Since they could be significant, and we don't know what they are yet, development should be planned to minimise loss of these values (Barnes, 1998a).

**Table 2: Illustrative financial and economic characteristics for three proposed community-based wildlife cropping-other use projects showing the effects of varying site quality, Botswana (Pula '000, 1991\*\*\*\*)**

Project	A*	B**	C***
Site Quality	Poor	Mod.	Good
Land Extent ('000 Hectares)	692	360	303
Game Density (Hectares per Large Stock Unit)	503	88	13
<b>Financial Analysis</b>			
Initial Capital Investment	195	369	319
<i>At Stability (Full Production)</i>			
Annual Gross Income (Sales)	125	399	541
less Variable Costs	22	71	89
less Fixed Costs	57	174	297
Annual Net Cash Income	57	154	155
<i>Financial Worth over Ten Years</i>			
Financial Rate of Return	15.4%	20.7%	26.4%
Financial Net Present Value (@ 12%)	42	253	371
<b>Economic Analysis</b>			
Capital Outlay	205	396	341
<i>At Stability (Full Production)</i>			
Annual Gross Output	138	439	595
Less Operating Costs	52	155	231
Annual Economic Benefit	85	284	364
<i>Economic Worth over Ten Years</i>			
Economic Rate of Return	16.6%	26.3%	67.0%
Economic Net Present Value (@ 6%)	191	885	1917
Economic Net Present Value per Hectare (Pula)	0.22	2.00	6.33

\* Ngwaketse Project, Kalahari region (Southern District)

\*\* Mathlo-a-Phuduhudu Project, Kalahari region (Ghanzi District)

\*\*\* Chobe Enclave Project, Okavango/Chobe region (North West District)

\*\*\*\* Ngwaketse and Mathlo-a-Phuduhudu appraisals were done in 1989; their values are inflated to 1991 for comparison



Table 3: Mathlo-a-Phuduhudu community wildlife project appraisal, Botswana, effect of game scarcity in project area on the annual financial and economic profitability per unit of game (Pula/LSU, 1989)

Item	Annual Profitability (Pula per LSU)	
	Financial*	Economic**
<b>Game Scarcity</b>		
25 Hectares per LSU	57.06	69.74
85 Hectares per LSU	29.91	55.01
145 Hectares per LSU	2.77	40.29
205 Hectares per LSU	-24.37	25.56
265 Hectares per LSU	-51.51	10.83
325 Hectares per LSU	-78.66	-3.89

\* Net Cash Income per LSU (Large Stock Unit equivalent) of game biomass

\*\* Net Economic Benefit per LSU (Large Stock Unit equiv.) of game biomass

#### 2.3.4 Commercial wildlife production

Possible activities include the use of land for commercial wildlife production, either using the natural rangeland (game ranching), or in intensive production systems (ostrich and crocodile).

Proposals have been made for commercial use of wildlife on ranches as an alternative to beef production in Ngamiland and elsewhere. Table 1 above, shows some economic characteristics of game ranch investment in the south eastern Kalahari from analysis done by Barnes (1994, 1998a). This shows relatively low but positive profitability and economic efficiency, mainly due to the very high capital intensity, and the relatively low value of products. Barnes and Kalikawe (1994) analysed the constraints to wildlife ranching in Botswana. These included, lack of market development, lack of management skills, lack of stock, and bureaucratic obstacles. Conybeare and Rozemeijer (1991) confirmed that such constraints precluded development on Game ranching in remote parts of the country. The intensive systems involving crocodile and ostrich make very little use of land and have high value products. They have had relatively high profitability, but have both entered periods of market saturation.

## 2.4 Community use of wild plant resources

Ashley and LaFranchi (1997) found evidence in Namibia's Caprivi region, adjacent to Ngamiland, that use of wild plant resources was an important coping strategy for poorer households, and served as a safety net. This confirms that the findings of others such as Ruitenbeek (1994) in the forests of Cameroon are applicable here in southern African savannas. Nearly all households use plant resources such as thatch grass, reeds, poles and fuel wood, but the more that a household can derive income from other pursuits the less it is likely to be relying on wild plants as income sources.

## 2.5 Selection of alternatives for analysis

In this section we seek to eliminate those land use activities which either do not have a major impact on economic growth or livelihoods, those that can take place regardless of the primary lands uses in place, or those that have small impact on the environment. Our focus will be on the primary land uses, or those which can have a substantial effect on incomes, or those which are incompatible with other uses requiring some exclusivity. It is these that have comparative advantage in the district, and capacity to influence the national welfare significantly.

Past work on the economics of land use alternatives includes that of Barnes (1994, 1998a, 1998b) who used a linear programming model in an attempt to determine the economically efficient allocation of land uses in the Botswana wildlife sector. All land allocated to wildlife (parks, game reserves, wildlife management areas) was included, so that a significant portion of Ngamiland was involved. The possible land uses included commercial livestock ranching as well as a wide range of different wildlife uses. The findings suggested that non-consumptive tourism should dominate in the high value wildlife areas, with community use of wildlife, and safari hunting tourism, occupying land surrounding this. High value ostrich and crocodile production should occupy a small, localised peri-urban niche. Because it has low economic efficiency in remote sites, commercial livestock production should have a negligible role if any on wildlife land. Table 4 shows some of the results. The study unfortunately did not include traditional livestock keeping, the economic values of which were not known at the time.

The use of land for *livestock* generally means exclusion of wildlife, except as a minor, secondary income contributor. Similarly, use of land for *wildlife*-based activities, generally means exclusion of livestock except as a minor, secondary income contributor. Both these uses can be primary contributors to the welfare of resident communities. They are also likely to be complementary, with agro-pastoralism providing livelihoods through a range of products (food, services, and cash), and wildlife use contributing to livelihoods through others (cash, and some food). Selected livestock and wildlife-based land uses are thus treated as primary land uses, and are included in this analysis.

**Table 4: Optimal allocation of capital to maximise gross value added in all wildlife use and/or commercial livestock production on land allocated to wildlife in Botswana at different levels of availability of capital, labour and management (Pula '000,000, 1991)**

Constraint or wildlife/rangeland use	Level of availability of capital, labour and management							
	1	2	3	4	5	6	7	8
Capital (P'000,000)	50	100	150	200	250	300	350	400
Labour (number)	1,500	3,000	4,500	6,000	7,500	9,000	10,500	12,000
Managers (number)	100	200	300	400	500	600	700	800
Wildlife viewing	42.66	88.81	134.95	181.09	227.23	255.81	255.81	255.81
Safari hunting	-	-	-	-	-	6.02	12.15	12.15
Community use, high*	-	-	-	-	-	1.35	1.35	1.35
Community use, low*	-	-	-	-	-	-	1.89	3.20
Game ranching	-	-	-	-	-	-	8.57	8.57
Cattle ranching	-	-	-	-	-	-	15.82	52.63
Ostrich farming	-	-	7.72	11.58	15.44	29.49	44.44	44.44
Crocodile farming	7.33	7.33	7.33	7.33	7.33	7.33	7.33	7.33
Elephant cropping	-	-	-	-	-	-	0.90	0.90
Product processing**	-	-	-	-	-	-	1.74	1.74
<b>Totals</b>	<b>49.99</b>	<b>96.13</b>	<b>150.00</b>	<b>200.00</b>	<b>250.00</b>	<b>300.00</b>	<b>350.00</b>	<b>388.13</b>

\* Community-based wildlife use projects in high-value area (Chobe enclave project) and low-value area (Ngwaketse project)

\*\* Medium scale tanning enterprises

Community use of wild plant resources is possible with all the primary land uses. It generally has a secondary role to play, acting as a safety net for the poorer in society and its value does not change with the different primary uses. It is thus excluded from further analysis. Crop production is restricted to small parts of the core areas of human settlement, and is left out of the analysis, except in as much as it affects traditional livestock keeping. Pure nature conservation, involving proclamation of protected areas

outside the existing ones, is unlikely in the current policy framework, and is excluded from the analysis. Fenced game ranching has low potential for expansion in Ngamiland, due to the long distances from markets, and shortages of suitable skills. It is thus disregarded for the analysis. Intensive production of crocodile and ostrich uses little land in very localised, peri-urban sites and is also excluded from consideration. Small scale household use of wildlife through the hunting license system is similar in nature to the use of wild plant resources, and is being displaced replaced by more focussed community wildlife use programmes. It has also been excluded.

The models developed below are aimed at estimating the financial and economic values of the two primary land uses. The work of Barnes (1998a, 1998b), and others has shown that each of these land uses have areas of core suitability, outside of which there are diminishing returns. The question of how the alternatives can fit together spatially, within the broader policy and land use framework already established in Ngamiland, to maximise overall welfare is the key question.

The models provide base case examples of the main different primary activities. These have been defined as follows:

#### Livestock activities:

- Small-scale livestock keeping in core areas of human settlement. This is mostly along the southern and western edges of the Okavango delta, and along the Okavango panhandle,
- Cattle post livestock keeping in the more remote sandveld areas of in the southern, western parts of the district,
- Commercial livestock production in the south east of Ngamiland, typified by the Hainaveld.

#### Wildlife use activities:

- Wildlife viewing tourism through lodge development in the high quality wildlife areas of the Okavango Delta and along the Kwando/Linyanti river,
- Community use of wildlife in moderate to high quality wildlife areas surrounding the Okavango Delta. Examples of this are the Seronga community, or the Kwai community.
- Community use of wildlife in low quality wildlife areas of the sandveld, west and north of the Okavango Delta. Here, the Quihaba proposed Wildlife Management Area is a typical example.

### 3. Methodology and assumptions

#### 3.1 General

This study was conducted from the literature, making use of data, unpublished reports, and published information on the subject concerned. Extensive use was made of literature and data assembled over the years prior to the study as well as of literature gathered during the study.

The components of welfare or utility considered in this report are assumed to be those of "total economic value" as described by Pearce and Turner (1990). These include direct use, indirect use, option, bequest and existence values associated with the resources. *Direct use values* are derived from the actual *utilisation* of the resource. They contribute tangible value in the form of *income*, and make up the main component of formal economic growth, which in turn is the focus of national development efforts. Indirect use values are derived from ecological or social function (such as erosion protection, waste assimilation, political stability, etc.). Option values reflect the values perceived in retaining the option to use the resource in the future. Bequest values reflect the value perceived in preserving or retaining the resource for others in the future. Existence values reflect the value perceived in retaining the mere existence of the resource. The focus is on direct use values and the others are only treated briefly in discussion.

The primary measure of economic direct use value used is that of *net national income*, as defined by Gittinger (1982) and Pearce (1986). This is the return in net value added to factors of production owned by Botswana nationals. Annual net value added is the gross value added minus annual capital asset depreciation. The *economic cost*, or the cost to society, of using or producing a resource is taken to be its opportunity cost (the value of its best alternative use). The data source is financial expenditure, but where financial prices are considered to differ significantly from opportunity cost then shadow pricing is applied. The measure of value added and net value added is thus presented as opportunity cost (or economic prices, or shadow prices). It is thus a *measure of economic efficiency*, unlike the measures of national income presented in national accounts.

Cost-benefit analysis is used to measure use value. Static budget models of livestock and wildlife-based land uses arrive at a measure of annual net value added to the national economy at shadow prices (*economic value*), as well as an annual financial net cash income for the investor (*financial value*). If these are positive, then they are extended to five- and ten-year net benefit flow models. These arrive at economic net present values and economic internal rates of return at economic prices. The models also arrive at financial net present value and financial internal rate of return. This financial measure gives an indication of the private incentive for investment in the activity. The extent to which private returns differ from the economic ones is taken to indicate the influence of policy and/or market imperfections, as described by Jansen *et al.* (1992).

The cost-benefit models are detailed spreadsheets, subjectively developed to be representative examples of the land uses selected in 2.5, above. Data for the models have been derived from the literature and empirical data collected over the last ten years in Botswana and neighbouring parts of Namibia. Appendix 2 presents the detailed models. Rigorous sensitivity analysis has been used to determine how robust the models and assumptions were, and the strength of conclusions that can be drawn from the results. Interest is excluded from all calculations except for that of the static profitability measure (net cash income). Inflation is excluded from cash flows, and real discount rates are used. In the five- and ten-year models all capital expenditures are included and depreciation (or appreciation) is accounted for in the residual value of assets in the final year of analysis. In all the economic models inflows from, and outflows to, non-nationals are treated as benefits and costs, respectively.

*Shadow pricing* is aimed at ensuring that values applied to inputs and outputs reflect their real scarcity in society (the cost to society of their being used or produced in the specific activities). The criteria were based on those used in the past by the Ministry of Finance and Development Planning, to appraise applications for the Financial Assistance Policy (FAP) grant system. Ministry of Finance and Development Planning (1986) and Matambo (1988) describe these criteria. The approach is similar to those described in manuals developed for South Africa (CEAS, 1989) and the World Bank (Gittinger, 1982).

Where there is unemployment and social pressure for higher wages, the market price of labour is generally higher than its scarcity value. A general shadow price for unskilled and semi-skilled labour of 0.5 of the market price was applied in all models to reflect general unemployment (Barnes 1998a). Wherever there is excess demand for traded and tradable goods and services, economic analysis should include a premium for foreign exchange. Matambo (1988), considered the pula to be overvalued in the short term. There appears to be no tariff effect influencing demand for foreign exchange, and the foreign exchange premium applied in shadow pricing is based on short-term overvaluation of the exchange rate. A foreign exchange premium of ten percent was added to the prices of all tradable items in the models.

The effects of domestic taxes and subsidies on market prices are removed where necessary, to get economic prices. This involves only sales tax, licence/permit fees and some input/market subsidies specific to livestock production. A flat sales tax rate of ten percent is applied to all taxable transactions. Licence and permit fees include BMC levies, entry fees for protected areas, hunting licences, land rentals and resource royalties (payable to local communities). For the static financial analysis, interest rates for long term loans of 18% and short term loans of 27% are used. Interest is excluded from dynamic financial analyses, and from economic analyses, except when foreign loans are considered.

Cost and benefit flows are discounted over time to reflect the time value of money. The Ministry of Finance and Development Planning (1986) and Matambo (1988) recommended use of a discount rate of between six and eight percent for relatively risk-free projects. For this study a discount rate of eight percent is applied to both economic

and financial economic models. Different rates are also applied in sensitivity analysis. In the financial enterprise models, the value of land is reflected as a cost in rentals. In the economic analysis, land rental is treated as a domestic transfer and excluded. The economic measures of land use value are thus made *before* inclusion of land opportunity costs. This allows direct comparison between models regarding returns to land. The economic models also do not include central government expenditures in the wildlife and agricultural sectors.

Cost-benefit models analysing the value of three land allocation options are constructed using the financial and economic enterprise models as basic building blocks. Here, central government expenditures on fencing are included. No attempt is made to incorporate demand or supply effects on price in the models. Thus, except where demand is infinitely price elastic, expansion of different wildlife use activities in models is assumed to take place within the growth rate of *overall* demand for the relevant product(s). The economic cost-benefit models do not take account of any consequential changes in consumer surplus. This is because nearly all output modelled was for export and so any consumer surplus changes would have little effect on national welfare.

Sustainable consumptive off-take from wildlife populations is calculated according to the method used by Spinage (FGU-Kronberg, 1987) and Craig and Lawson (1990). This is based on the simple relationship between the intrinsic rate of increase and body weight for animal species, as described by Caughley (1983). A factor of 0.5 is applied to the intrinsic rate of increase to get to get the sustainable off-take. This based on the assumption that populations are at "ecological" carrying capacity and that, with utilisation, they will stabilise at around 0.5 of that level or at "economic" carrying capacity. Sustainable off-takes for trophy animals are those suggested by Craig and Lawson (1990)

All models, except those for commercial tourism on leased land, contain wildlife or livestock herd/flock projections, developed on 'spreadsheets, incorporating birth rates, mortality rates, off-takes and purchases, within the constraint of site rangeland carrying capacity. Populations of wild game animals are assumed to grow at constant rates of *half* the intrinsic rate of increase for that species. Ecological carrying capacity is defined as the area of habitat required to support one large stock biomass unit, while maximum sustainable yield is possible. Biomass, as the measure of wildlife and livestock density, is calibrated in large stock unit equivalents (LSU). One LSU is the metabolic mass equivalent of a 450 kilogram bovine steer or ox, as determined for various species and intra-specific age groups by Meissner (1982a, 1982b).

Sensitivity analyses were conducted on the base-case models by varying parameters such as livestock calving rates, livestock mortality rates, livestock prices, capital costs, stock purchases, stock off-take rates, and income from tourism. The base-case models are presented in appendices 2 to 7.

## 3.2 Livestock

The assumptions for the livestock models are based on a desk analysis of literature, and own sources of data. Results of the work of Flint (1986), Bailey (1982), McGowan International and Coopers and Lybrand (1987), McGowan International (1988), Townsend and Sigwele (1998), Arntzen (1989, 1998), Abel (1993), Behnke (1982, 1985), Phuti (1984, 1985), Litschauer and Kelley (1981), Hubbard (1982) Bekure (1982) and Vierich, (1979) in Botswana, contributed to the synthesis of models for typical Ngamiland livestock systems. Corroboration of the assumptions was made from results of work done in similar conditions, in Namibia, by Yaron, *et al.* (1992), LaFranchi (1996), Ashley and LaFranchi (1997), and Metzger (1994); and in less similar conditions, in Zimbabwe and South Africa, by Scoones (1992), Barrett (1992), Campbell, *et al.* (2000), Tapson (1991), Loxton, Venn and Associates and Rural Development Services (Pty) Ltd (1985), Division of Economics and Markets (1952), and van Wyk (1967). Analysis of the macro-elements of the livestock sector were assisted by the results of Townsend and Sigwele (1998), Metroeconomica Economic Consultants (1996) and Sigwele and Khupe (1996).

Some key assumptions used in the analysis are shown in Table 5. They are discussed in more detail in the text that follows.

### 3.2.1. *Small-scale traditional livestock keeping*

The base case small scale traditional livestock keeping model involves a household unit with an average size herd of 38 cattle and a small number of goats, situated on the western edge of the Okavango delta. Vegetation is transitional between the northern Kalahari tree savanna and Okavango delta mixed *Acacia* woodland. "economic carrying capacity is 12 Hectares per LSU. Livestock stocking rates (near "ecological carrying capacity) are 6.5 hectares per LSU. Use is made of one communal borehole, with costs of this shared between 20 households. Grazing land is unfenced and effectively open access.

In the model base case, milk (52 percent of gross income), meat (33 percent of gross income), draft (15 percent of gross income) and manure (0.1 percent of gross income) are produced. Herd appreciation occurs at average rates of 0.77 percent reflecting fully stocked land. Milk production is assumed to be 158 litres per lactating cow per annum, or 45 litres per LSU in the herd, based on interpolation of data from Flint (1996), Townsend and Sigwele (1998), Campbell *et al.* (2000), Arntzen (1998) and others. Price of milk is that of Townsend and Sigwele (1998) inflated. Livestock (9 percent of herd by number of head) are sold to BMC and slaughtered informally. The blend price is assumed to equal that of BMC. Off-take is marketed to BMC marketing agents or cooperatives, and sent to the Botswana Meat Commission (BMC) facility in Maun, which is assumed to have been re-opened. Prices for lower grades are 15 percent below those of commercially produced herds (from data of McGowan International and Coopers and Lybrand, 1987). A BMC marketing (agent's) fee amounting to 2.3 percent of turnover is assumed. Draft use is assumed to involve a span of four oxen, in use for 55 days per annum, and valued at prices provided by Townsend and Sigwele (1998), inflated to 2000. Manure use mainly



for housing is assumed at rates and prices of Townsend and Sigwele (1998), inflated to 2000.

**Table 5:** Comparative key assumptions used in base case models for the (a) small scale traditional, (b) medium/large scale cattle post, and (c) large scale commercial livestock systems (Ngamiland; 2000; per annum; see text for details)

Item	(a) Traditional	(b) Cattle Post	(c) Commercial
Land used (Hectares)	180	6,400	10,000
No. Cattle (Head)	35	774	922
No. Goats (Head)	3	59	125
"Economic" Carrying Capacity (Ha/LSU)	12	12	12
Stocking Rate (Ha/LSU)	6.5	8.3	12.9
Calving Rate (% of Cows)	60%	63%	65%
Calving Rate (% of Heifers)	60%	63%	65%
Mortality Rate (% of Calves)	18%	9%	5%
Mortality Rate (% of Others)	11%	5%	3%
Bull Rate (% of Herd)	5%	5%	5%
Goat Reproductive Rate	20%	25%	30%
Average Total Herd Growth Rate	0.77%	8%	4.8%
Cattle Off-take Rate (% of Herd)	9%	12%	18%
Goat Off-take Rate (% of Flock)	20%	25%	30%
Milk Yield (Litres/Lactating Cow/Annum)	158	.*	.*
Transport/Draft (Days/Span of Four/Annum)	55	.*	.*
Cattle Price Variation due to Grading	-15%	-5%	0%
Transport Subsidy (% of Stock Sales Value)	22%	32%	32%
Grade Price Subsidy (% of Stock Sales Value)	-10%	5%	14%
Long Term Borrowing (% of Initial Capital)	0%	5%	25%
Short Term Borrowing (% Recurrent Costs)	0%	10%	20%

\* Milk harvested from small proportion of herd for consumption by labour only, and no use of stock for transport/draft

Calving rate (cows and heifers) is 60%. Mortality rates are 18% for calves and 10.8% for the rest of the herd. Bulls (5% of herd) run free with the herd. Again these are based on interpolation of various forms of empirical data from poor and good seasons (Flint, 1986; Bailey, 1982; Townsend and Sigwele, 1998; McGowan International and Coopers and Lybrand, 1987; Phuti, 1984, 1985; Abel, 1993; Vierich, 1979). Equity of 100% is assumed. No loans on working capital are assumed. Labour requirements for the 38

animals are 1.3 full time labourer equivalents per annum, calculated from data of Bailey (1982) and Flint (1986).

For the economic analysis subsidies are adjusted for. These include removal of the transport subsidy inherent in the BMC freight equalisation scheme (factor of 0.68 on BMC prices), and addition of the effective tax on the lower carcass grades, due to the BMC price differentials (factor of 1.1 on BMC price). These adjustments were determined using the data provided by McGowan International and Coopers and Lybrand (1987) before the freight equalisation scheme was introduced. It is calculated that, before this subsidy was introduced, prices received in Maun were some 32 percent lower than the national average. Lower grade prices resulting from the grade price differentials and prices are currently 10% below the real value. Other subsidies removed were those on veterinary costs, provided by the state (100%), and those on supplements and other ranch inputs, provided from Livestock Advisory Centres (25%).

This and the two other livestock models, described below, do not take into account the possible loss to Botswana, which could arise if, as is likely, price support in beef importing countries (such as the EU protocol) is reduced. Access to the EU market results in a price, estimated to be some 40 percent higher than world prices (Sigwele and Khupe, 1996; Metroeconomica Economic Consultants, 1996; Townsend and Sigwele, 1998). It is arguable whether this international transfer has an opportunity cost to Botswana or not. If (as is most likely) it cannot be transformed into other forms of aid to the country, then, from Botswana's point of view, it is simply an extraneous economic benefit. It is treated as a windfall, and has not been subtracted in the economic model. The economic net value added estimate includes the value of herd appreciation at 0.77% per annum. Other assumptions are clear from examination of the model in Appendix 2.

### 3.2.2. *Cattle post livestock production*

The base case cattle post livestock keeping model involves an unfenced grazing area, on previously unused communal land, with a herd of mostly cattle but with a small number of goats, situated on sandveld of western Ngamiland. The livestock belong to a single owner, or a small syndicate, resident off-site, somewhere in Ngamiland. Vegetation is northern Kalahari tree savanna, dominated by short *Terminalia sericea* and *Acacia* spp. The "economic" carrying capacity is 12 Hectares per LSU. Livestock stocking rates (between "ecological" carrying capacity - about 6 hectares per LSU - and "economic" carrying capacity) are around 10.7 hectares per LSU. Use is made of one borehole, developed privately for the cattle post. Grazing land is unfenced, but access to it by other grazers is limited by remoteness and custom. The assumptions are based on interpolation of various forms of data from Hubbard (1982), McGowan International and Coopers and Lybrand (1987), McGowan International (1988), Bekure (1982), Behnke (1982) and Lange *et al.* (1998).

In the model base case, cattle are mainly sold for meat via BMC, but some milk and meat are consumed on site by hired labour and their families. Herd appreciation occurs at average rates of 8 percent, reflecting the rate of expansion of cattle post herds. The

amount of milk taken for local consumption is assumed to be the same as that for the small scale traditional model, above. Livestock off-take rate is 12 percent of herd by number of head. The prices for livestock off-take are assumed to equal that of BMC. Off-take is trekked to BMC marketing agents buying sites, and sent to the facility of the Botswana Meat Commission (BMC) in Maun, which is assumed to have been re-opened. A BMC marketing (agent's) fee amounting to 2.3 percent of turnover is assumed. Prices are those for upper grades, but slightly lower than those for commercial beef production, described below. They are about 5 percent below those of commercially produced herds (from data of McGowan International and Coopers and Lybrand, 1987).

Calving rate (cows and heifers) is 63 %. Mortality rates are 9% for calves and 5% for the rest of the herd. Bulls (five percent of herd) run free with the herd. Equity of 95% is assumed. Loan of 10% of working capital is assumed. Labour requirements are 4, including one skilled, and three unskilled full time labourers.

For the economic analysis subsidies are adjusted for. These include removal of the transport subsidy inherent in the BMC freight equalisation scheme (factor of 0.68 on BMC prices), and addition of the effective subsidy on the higher carcass grades, due to the BMC price differentials (factor of 0.95 on BMC price). These adjustments were determined in the same way as those for traditional livestock keeping, described above. Higher grade prices received (a blend of grades 1 and 2) result in prices are currently 10% above the real value. Other subsidies removed were those on veterinary costs, provided by the state (100 percent), and those on supplements and other ranch inputs, provided from Livestock Advisory Centres (25 percent).

As for the other livestock models, no account is taken of the loss to Botswana, which will arise if, as is likely, price support in beef importing countries (such as the EU protocol) is reduced. It is considered to have no opportunity cost, and has not been subtracted in the economic model. The economic net value added estimate includes the value of herd appreciation, at 8% per annum. Other assumptions are clear from examination of the model in Appendix 2.

### *3.2.3 Commercial beef production*

The base case beef production model involves breeding for production of three-and-a-half year-old slaughter steers on a 10,000 hectare ranch in the Hainaveld. Very limited use is also made of goats and game. The ranch has 75 kilometres of cattle-proof fencing, and two boreholes with water reticulation to paddocks, allowing refined herd management. Steers are marketed direct to the Botswana Meat Commission (BMC) facility in Maun, which is assumed to have been re-opened. Provision is made for trekking to Maun. From empirical data presented by McGowan International and Coopers and Lybrand (1987), it is calculated that the price is some 15 percent higher than that received by traditional livestock keepers. A BMC marketing (agent's) fee amounting to 2.3% of turnover is assumed. Six staff members are required, including three unskilled labourers, two skilled labourers and one manager.

The calving rate is 66%, based on empirical evidence from commercial beef ranches in Botswana, Namibia and South Africa (Behnke, 1982; McGowan International and Coopers and Lybrand, 1987; Lange *et al.*, 1998; Division of Economics and Markets, 1952; van Wyk, 1967). Higher calving rates (75%) have been demonstrated on experimental ranches in Botswana (Behnke, 1982) but no empirical data from commercial ranches in semi-arid southern Africa show rates this high. Mortality rates are five percent for calves and three percent for other stock. It was assumed that at full production, 20% of cows are replaced annually from heifers bulled at two years, and that bulls, at 5% of the herd, were replaced every three years. The rangeland carrying capacity assumed is 12 hectares per LSU.

In the economic analysis subsidies are adjusted for. These include veterinary inputs (100%), feed supplements (25%) and bull purchases (25%). Adjustment is also made for the subsidy inherent in the freight equalisation scheme (factor of 0.68 on the BMC price) as described above. Adjustment is also made for the cross-subsidisation, which results from the BMC carcass grade price policy. In this case the BMC prices are 14% above real value. The present price differential makes the difference between high and low grades some 16% to 32%. Without any distortion, the difference would be more like 2% to 9%. Economic prices are adjusted to eliminate this subsidy. Commercial beef *finishing* benefits directly from the distortion between (lower grade) purchase and (upper grade) sale prices. Finishing is practised by commercial ranchers elsewhere in Botswana and involves buying low-grade cattle and finishing them for slaughter. It is generally more profitable than breeding and rearing (Loxton, Venn and Associates and Rural Development Services (Pty) Ltd, 1985).

As for the other livestock models, no account is taken of the loss to Botswana, which will arise if, as is likely, price support in beef importing countries (such as the EU protocol) is reduced. It is considered to have no opportunity cost, and has not been subtracted in the economic model.

In the calculation of net value added the average estimated appreciation of the herd is included (4.8 percent per annum). This is the expected likely overall commercial herd rate of increase in Ngamiland, based on past, long-term national growth records (Arntzen and Veenendaal, 1986). Other assumptions are illustrated in the model in Appendix 2.

### 3.3. Wildlife

The models developed in this section are based on those developed in the past by Barnes (1989a, 1989b, 1991a, 1991b, 1995a, 1995b, 1998a) and Barnes and MacGregor (1999). In these, the economic and financial values associated with the use of wildlife on public lands, by tourism operators, for wildlife viewing and safari hunting tourism, in the high quality wildlife areas of northern Botswana, are analysed. Also analysed in these are the economic and financial values associated with use by local communities of wildlife in both the Kalahari and the northern high quality wildlife areas. Community use involves hunting for meat and raw materials for crafts, as well as leasing of rights to wildlife viewing and safari hunting tourism. While a safari hunting tourism model is not

developed here, there is sufficient data from earlier work to use in the projections. For all models, empirical physical and financial data, collected from operators and projects between 1986 and 1999, are used.

### *3.3.1 Commercial tourism*

A financial and economic model of a typical medium- to large-scale wildlife viewing tourism enterprise in the high quality environment of the Okavango delta has been developed. This involves a game lodge near the edge of Moremi Game Reserve, developed using private capital. Unit capacity is 18 beds, an average figure. The land requirement, based on the estimated tourist carrying capacity for the high quality northern areas is 14,400 hectares. The tourist carrying capacity is 800 hectares per bed, and is the result of an empirical analysis of up-market wildlife viewing lodge development, in similar conditions elsewhere in southern Africa. A wildlife population containing a spectrum of high-value species at a density of 30 hectares per large stock unit equivalent (LSU) is assumed. This conforms with recent aerial survey results for the Okavango Delta.

The game lodge enterprise caters primarily for significant, expanding demand for quality game lodge experiences notably in the European, USA and "Pacific Rim" markets. Tourist composition assumed is 55% international long-haul tourists, 20% southern African regional tourists, and 25% Botswana citizens/residents. Based on evidence of Gibson (1990) an average annual occupancy rate of 50% is assumed to be easily attainable. It is assumed that the typical operation is 25 percent loan financed, and that 25% of the total, loan plus equity, investment is foreign. Working capital requirements are assumed to be 30 percent of operating expenditures. The model is for one lodge, but it is assumed that administrative costs are shared between three such units.

For the financial analysis a land rental of five pula per hectare is assumed. This would be extracted by the district land board and would be refunded to the district council. This is, in effect, compensation for government's investment in the wildlife resource. A resource royalty amounting to 12% of turnover is levied for the local community, as part of a community/private sector joint venture agreement. Staff requirements are 21, including 15 unskilled labourers, three skilled labourers, and three managers. Of the managers, one is assumed to be foreign. Other assumptions are illustrated in the model in Appendix 2.

### *3.3.2 Community use of wildlife in high quality areas*

A financial and economic model of wildlife use where the local community has been allocated rights to manage and use the resource, developed for an area near the Okavango delta. Here, the community (700 households) has access to a high quality wildlife area containing species such as elephant and buffalo, on the eastern side of the buffalo fence. Game species composition and abundance is assumed to be typical of those recorded in recent aerial censuses. The overall game density is 54 hectares per large stock unit equivalent (LSU), but it is higher (30 hectares per LSU) in the core area. A stock

projection is included, with the population growth rates, stock off-takes and stock purchases (none in this case) for each species.

A concession of some 80,000 hectares is leased from the district land board by the community for a nominal rental (P0.04/hectare), and used to offer joint venture opportunities with safari and tour operators. On a core portion of some 50,000 hectares, two community campsites, and two joint venture lodges are developed. A joint venture safari hunting camp is developed on the edge of this area. The model measures the costs of the investment in wildlife use made by the community, and the income received from joint venture royalties, community campsites, biltong, meat, veld products and crafts. Royalties are based on empirical results achieved in six actual examples of community projects in adjacent parts of Namibia and in Botswana. Community campsite incomes are similarly derived. The potential values of royalty payments, are also confirmed using commercial tourism models, like that in 3.3.1, above. Prices for consumed and sold products are also based on the empirical examples.

The investment is 100% domestic and 25% of it is loaned. Working capital amounts to 30% of annual operating expenses. Staff requirements are 17, including a manager, two skilled labourers, and 15 unskilled labourers. All staff are assumed to be from the local community.

The ten year *financial* analysis investigates value in two ways. First, the overall *project* financial viability is investigated and second, the attractiveness of the project specifically to *community* is addressed. In the project analysis, costs include those of the community as well as those to be incurred by donors through grants, and benefits include the residual value of wildlife stocks. In the community financial analysis, costs are limited to those borne by the community itself, donor grants are treated as benefits, and the residual value of wildlife stocks is not included. The measure of *economic* net present value includes account of the value of the average annual increase in stock in the concession (numbers of all species increase at an overall rate of 18.9%). Other assumptions are illustrated in the model in Appendix 2.

In the community economic analyses the international donor grants, which benefit the investments, are treated as being fungible and as having an opportunity cost, which means that they could be diverted to other positive interventions in Botswana if not used here. They were thus treated as costs in the economic models. This is unlike the case of international price subsidies in the beef sector, which, as described above, were not considered fungible within Botswana and were treated as benefits in the economic models.

### 3.3.3 *Community use of wildlife in low quality areas*

In this case, a community investment model similar to that for 3.3.2 is constructed, this time for a low quality wildlife area, the Quihaba proposed WMA. The setting here is northern Kalahari tree savanna, dominated by *Terminalia sericea*, *Croton gratissimus*, *Acacia fleckii*, and others. Parts of the area are crossed by fossil river courses, and several pans are present. Here, the community (55 households) makes use of low-density game

populations in a 900,000 hectare area. The main species present are gemsbok, kudu, wildebeest, hartebeest and eland. Game species composition and abundance assumed is typical of those recorded in recent aerial censuses. The overall game density is 54 hectares per large stock unit equivalent (LSU). A stock projection is included, with the population growth rates, stock off-takes and stock purchases (none in this case) for each species.

The 900,000 hectare concession is leased from the district land board by the community for a nominal rental (P0.04/hectare), and used to offer joint venture opportunities with safari and tour operators, as well as use of a community hunting quota. Two community campsites, one joint venture tented tourist camp, and one joint venture safari hunting camp are developed. The model measures the costs of the investment in wildlife use made by the community, and the income received from joint venture royalties, community campsites, biltong, meat, veld products and crafts. The royalties assumed are based on empirical results achieved in six actual examples of community projects in adjacent parts of Namibia and in Botswana. Community campsite incomes are similarly derived. The potential values of royalty payments, are also confirmed using commercial tourism models. Prices for consumed and sold products are also based on the empirical examples.

The investment is 100% domestic and 25% of it is loaned. Working capital amounts to 30% of annual operating expenses. Staff requirements are 19, including two managers, seven skilled labourers, and 10 unskilled labourers. All staff are assumed to be from the local community.

The ten year *financial* analysis investigates value in terms of both the overall *project* and the specific *community*, as described under 3.3.2, above. The measure of economic net present value includes account of the value of the average annual increase in stock in the concession (numbers of all species increase at an overall rate of 11.3%). Other assumptions are illustrated in the model in Appendix 2.

### **3.4 Cost-benefit analysis of land use options**

The fences EIA study has analysed the effects of four fencing and land allocation options for Ngamiland (D. Gibson, 2000, pers. comm.). Here, we use the data generated above to assess the economic merits of three of these options. The approach has been to develop a cost-benefit model in which the costs of fencing, fence maintenance, and FMD vaccination/surveillance, associated with each of the three options, are measured against the *net value added* which would be generated through the fencing developments over 20 years. The *net present value* at 8% discount is the measure obtained. It is not a true measure of value but a relative one, providing indices of relative merit for each option. In addition, the complexities and sensitivities of such models means that wide use of sensitivity analysis is necessary to help guide decision making.

The three land use options investigated are:

*Option 1:* Decommissioning of the existing Setata fence, in western Ngamiland, and the re-alignment of the existing northern buffalo fence towards the west to follow the boundary between NG11 and NG13. Decommissioning of the Caprivi border fence east of the realigned fence. Otherwise wildlife and livestock development would continue as in the past. Foot and mouth disease (FMD) free status is not acquired for any part of Ngamiland. This is similar to “option 2” as examined by the Fences EIA team.

*Option 2:* Construction of new impermeable fence west and then directly south from the western end of the existing southern buffalo fence to meet the Kuke fence at the Kuke gate (on the road between Maun and Ghanzi). Decommissioning of the existing Ikoga and Setata fences. Realignment of the existing northern buffalo fence towards the west to follow the boundary between NG11 and NG13. Decommissioning of the Caprivi border fence east of the realigned fence. This option would enable the development of an FMD-free area in the south east of Ngamiland. This is similar to “option 4” as examined by the Fences EIA team.

*Option 3:* Construction of new impermeable fence west from the western end of the existing southern buffalo fence to the Namibian border fence between NG3 and NG2 (more or less parallel with and some 30 km south of the existing Ikoga fence). Decommissioning of the existing Ikoga and Setata fences. Realignment of the existing northern buffalo fence towards the west to follow the boundary between NG11 and NG13. Decommissioning of the Caprivi border fence east of the realigned fence. This option would enable the development of a large FMD-free area in the south east, south and west of Ngamiland. This is similar to “option 3” as examined by the Fences EIA team.

Assumptions were made about the likely expansion of the various land use types in the 20 years following the adoption of either option. Consideration was taken of the likely patterns of growth of overall demand for products and constraints, such as land suitability and stock availability. In this the detailed analysis of land use potential in the wildlife sector (Barnes 1998a) was used, as well as other sources of information on land capability, such as van der Sluis (1992). The net national income values per hectare for each activity in the base case models, described above, were applied to these expansion trajectories. Land allocation, the annual contribution to net national income, and the annual contribution to local community income, for each land use were calculated for the whole study area (Ngamiland west of the Makalamabedi fence line).

In calculation of the benefits for the cost-benefit model only land south of the southern buffalo fence in the east, and south of (and excluding) NG2 and NG7 in the west, was considered. Here, the value of land use allocations resulting from the different fencing options can be compared with the fencing option costs. Land use in the rest of the Ngamiland district would not be affected by the choice of fencing options, and is hence excluded from the model. Land use activities such as crop production, small-scale wild plant use, small-scale wildlife use outside community initiatives, and intensive wildlife



ranching and farming have been left out for reasons given in section 2.5, above. Their values are either negligible, or are unlikely to be affected by the fencing options. Price responses are not included in the model.

Townsend and Sigwele (1998) used a social accounting matrix (SAM) to analyse the backward linkages for the livestock and other sectors in the Botswana economy. They determined that a P1 million increase in cattle output would, through the full linkage or multiplier effect, increase gross output in the economy by P8.8million. The same factor for other sectors, which include tourism activities, is in the region of 5.8 (a P1 million increase in tourism output would increase gross output in the economy by P5.8 million). In calculating benefits for the model, the aggregate net value added generated directly by each activity was multiplied by these factors (8.8 for livestock activities, and 5.8 for wildlife use) to get a crude measure of overall value in the economy.

The costs of fence construction, decommissioning, and the recurrent fence maintenance costs for the cost-benefit model were derived from data collected by the fences EIA team (Markandya and Dale, 2000). Costs for FMD vaccination and FMD surveillance were derived indirectly from data provided by Townsend and Sigwele (1998) for CBPP control activities. It was assumed that in option 1 vaccination and surveillance activities for FMD would continue indefinitely. In option 3 it was assumed that FMD vaccination and FMD surveillance activities would be phased out in four years and 12 years, respectively. Both these conditions were assumed to apply to option 2, which would have both FMD free and non-FMD free zones.

The discount rate used was 8%. Different assumptions about the productivity of livestock (calving percentages, stock mortalities, milk yields, transport values in the small-scale sector), beef prices, and tourism incomes for the community use of wildlife were tested in the cost-benefit model. The results of this cost benefit analysis, combined with the results from the analysis of individual land uses above, were used to derive guidelines about optimal use of land in Ngamiland, and future investments in development.

## **4. Results and discussion**

### **4.1 General**

The analysis of livestock land uses showed the extent of the various subsidies to this sector in Ngamiland. All producers have access to certain inputs subsidies through the Livestock Advisory Centres and veterinary inputs through the Department of Veterinary Services. Producers selling livestock to the BMC in Ngamiland benefit from a cross subsidy through the freight equalisation scheme. The producers of higher grades receive a subsidy through the distorted grade pricing structure, and producers of lower grades are effectively taxed in this way. Our results (see below) suggest that with the removal of these subsidies certain forms of livestock production can still be economically viable.

We have no picture of the economic efficiencies, or not, of the beef processing sector, so cannot pronounce on the viability of the livestock sector as a whole.

If the EU Beef Protocol is phased out in the future, say in the next ten years, Botswana's beef export prices could be some 40% lower than at present (Sigwele and Khupe, 1996; Metroeconomica Economic Consultants, 1996). According to our results (see sensitivity analyses below), this would severely affect the economic viability of livestock production in Ngamiland. The prices obtainable for stock in newly opened up FMD-free areas would be affected. Even prices in the South African export market would be affected, as these tend to be buoyed indirectly due to the beef subsidies within the EU market. Given the persistent trend towards open international markets, it would seem highly likely that Botswana's access to the subsidised EU beef market will be phased out within the next 20 years.

Wildlife activities analysed in this study tend not to be subsidised in that government investments in the wildlife resource are more or less recovered through market related land rentals and park entry fees levied on wildlife users (Barnes, 1998). Our results confirm this, with economic values for wildlife use being consistently higher than financial ones. In southern Africa in the long term, overall demand for wildlife viewing tourism appears to be growing at between 12 and 15% (Barnes, 1998). Long term declines in wildlife stocks in Africa, combined with this growing demand suggest that tourism values will continue to increase. The increasing scarcity of wildlife resources also point towards increasing international non-use values (option and existence values) for wildlife resources. These are important to Botswana in as much as they can be captured and preferably returned to those investing in the resources.

Below are set out the main results obtained from the land use activity models, as well as the land allocation cost-benefit model. In examining these results it is perhaps pertinent to bear in mind that long term trends in livestock values are likely to be down, while those in wildlife values are likely to be up.

#### 4.2 Livestock

Table 6 sets out selected financial results from the base case models for the three livestock systems analysed. These show the income generated by these activities from the point of view of the investor, and the local community. In general terms the financial profitability (net cash income per hectare, and financial rate of return to the farmer is highest with the small scale traditional system and lowest with the commercial production (which has a negative net cash income). Specific characteristics of each system are discussed a long with the sensitivity analyses below.

The economic characteristics of the three livestock models are presented in Table 7. Here, the *economic rate of return* is highest for the small-scale system (above the discount rate of 8%), and low (2%) for the cattle post system. However, the cattle post system appears to generate higher *net value added* per unit of land (P1.86 per hectare) than the small-scale system (P0.26 per hectare). The sensitivity of this finding is

discussed below. The commercial production system appears to be economically inefficient, generating negative values for all economic measures.

#### 4.2.1. *Small-scale traditional livestock keeping*

The results in Tables 6 and 7 show that traditional livestock keeping is fairly intensive in use of capital and intensive in use of land. This partly because of the open access system of grazing which predominates, resulting in high stocking rates which are around the ecological carrying capacity of the range. Gross income or turnover per unit of land, and even per LSU, is higher than for the other systems, because intensive use is made of a range of products, beside meat. The economic values tend to be lower than the financial ones, illustrating the strong effect of input and transport subsidies, which outweigh the effect of the carcass grade price tax (see Table 5, above). However, even so the financial inputs, per unit of land and stock, tend to be more intensive than for the other two systems.

Table 8 shows the results of sensitivity analysis on the small-scale traditional livestock keeping model. Here, key parameters, such as the calving rates, mortality rates, stock (beef) prices, capital costs, milk yields and use of stock for transport are varied, to show the effect on key economic and financial values. The ranges of variation in this table depict conditions that could or have been recorded in good and bad periods in Botswana. The primary measure of economic efficiency used in this study is the *net value added per hectare*, which is highly sensitive to changes in the tested parameters, particularly those related to herd production. Interpretation of the results indicates several things. Firstly, high economic rents are possible if there could be small improvements in livestock productivity (lower mortality rates, and higher calving rates). Secondly, the open access grazing system, which drives down herd production (high mortalities, low calving rates, low average herd growth), also tends to drive down economic rent to the low levels resulting in the base case. This fits with conventional property rights theory where open access systems tend towards "bionomic equilibria" and dissipated excess profits (Clark, 1985). The third thing suggested by the sensitivities on net value added, is that the range of different products (milk, meat and transport) reduces the vulnerability of the net product to value changes in any one of these. Fourthly, the value of herd appreciation is very low (some 3% of the gross economic income), due, again to the open access system, and high stock densities.

The sensitivity analysis also tests effects on the financial measures; net cash income (farm profit) and the community incomes (local rural incomes) generated by the activity. Here, the results are much more robust, with positive financial profits and incomes being generated through large ranges of parameters. This illustrates the effects of subsidies enjoyed by the small-scale livestock sector. It also explains the motivation for investment in livestock by rural households, and the high demand for this activity. Small-scale livestock keeping generates incomes for households, despite the tendency for economic rents to be dissipated, due to open access. It has a potentially important role to play in future land use allocation. Large economic gains could be expected to result from successful attempts to lower stocking rates through introduction of common-

property range management systems. There is almost no potential for inclusion of wildlife use in this production system.

**Table 6: Comparative financial results in base case models for the (a) small scale traditional, (b) medium/large scale cattle post, and (c) large scale commercial livestock systems (Ngamiland; 2000, per annum)**

Item	(a) Traditional	(b) Cattle Post	(c) Commercial
Land used (Hectares)	180	6,400	10,000
Stock (LSU)	28	774	922
Initial Capital (Pula)	44,000	535,000	1,624,100
Initial Capital (P/Ha)	247	84	162
Initial Capital (P/LSU)	1,605	898	2,101
Financial Gross Income (Pula)	15,500	170,300	366,600
Financial Gross Income (P/Ha)	86	27	37
Financial Gross Income (P/LSU)	560	286	474
Variable Financial Costs (Pula)	3,312	91,630	152,100
Fixed Financial Costs (Pula)	7,483	53,344	250,400
Net Cash Income (Pula)	4,709	25,299	-35,920
Net Cash Income (P/Ha)	26	4	-4
Net Cash Income (P/LSU)	170	42	-46
Local Community Income (Pula)	10,560	22,500	45,000
Local Community Income (P/Ha)	59	4	5
Local Community Income (P/LSU)	381	38	58
Financial Rate of Return (FRR)	11.5%	6.8%	2.9%
Financial Net Present Value (FNPV) (Pula)	381	-52,846	-526,984
Financial Net Present Value (FNPV) (P/Ha)	52	-8	-53
Land Rental (Pula)	0	0	600
Land Rental (P/Ha)	0	0	0.06

Table 7: Comparative *economic* results in base case models for the (a) small scale traditional, (b) medium/large scale cattle post, and (c) large scale commercial livestock systems (Ngamiland; 2000, per annum)

Item	(a) Traditional	(b) Cattle Post	(c) Commercial
Land used (Hectares)	180	6,400	10,000
Stock (LSU)	28	774	922
Initial Capital (Pula)	40,600	501,300	1,570,300
Initial Capital (P/Ha)	225	78	157
Initial Capital (P/LSU)	1,465	841	2,031
Economic Gross Income (Pula)	13,008	194,084	301,576
Economic Gross Income (P/Ha)	72	30	30
Economic Gross Income (P/LSU)	470	325	390
Annual Economic Costs (Pula)	12,085	167,686	345,154
Annual Economic Costs (P/Ha)	67	26	35
Annual Economic Costs (P/LSU)	436	281	446
Gross Value Added (Pula)	922	26,397	-43,579
Gross Value Added (P/Ha)	5.12	4.12	-4.36
Gross Value Added (P/LSU)	33.29	44.31	-56.37
Net Value Added (Pula)	47	11,885	-132,014
Net Value Added (P/Ha)	0.26	1.86	-13.20
Net Value Added (P/LSU)	1.69	19.95	-170.77
Economic Rate of Return (FRR)	10.1%	2.0%	-*
Economic Net Present Value (FNPV) (Pula)	4,679	-235,621	-895,013
Economic Net Present Value (FNPV) (P/Ha)	26	-37	-90
Economic Capital Cost per Job (Pula)	31,214	125,323	224,323

\* Negative economic rate of return

**Table 8: Results of sensitivity analysis on the base case assumptions for the small-scale traditional livestock keeping model (Ngamiland; Pula; 2000; Base case in bold)**

Calving Rate	40%	45%	50%	55%	<b>60%</b>	65%	70%
Net Value Added /Hectare	-25.71	-20.15	-13.68	-7.11	<b>0.26</b>	9.57	18.80
Net Cash Income /Hectare	-2.49	3.89	11.10	18.26	<b>26.16</b>	35.99	45.62
Community Income /Hectare	30.46	36.39	43.04	50.44	<b>58.66</b>	67.73	77.70
<b>Mortality Rate (Calves)</b>	<b>25.5%</b>	<b>23.0%</b>	<b>20.5%</b>	<b>18.0%</b>	15.5%	13.0%	10.5%
Net Value Added /Hectare	-22.40	-16.59	-9.06	<b>0.26</b>	11.70	25.61	41.78
Net Cash Income /Hectare	1.82	8.42	16.54	<b>26.16</b>	37.52	50.89	65.99
Community Income /Hectare	34.24	41.04	49.11	<b>58.66</b>	69.92	83.16	98.69
<b>Beef Prices (Variation)</b>	<b>70%</b>	<b>80%</b>	<b>90%</b>	<b>100%</b>	110%	120%	130%
Net Value Added /Hectare	-3.89	-2.51	-1.12	<b>0.26</b>	1.64	3.03	4.41
Net Cash Income /Hectare	19.40	21.65	23.91	<b>26.16</b>	28.41	30.66	32.92
Community Income /Hectare	51.90	54.15	56.41	<b>58.66</b>	60.91	63.16	65.42
<b>Capital Costs (Variation)</b>	<b>130%</b>	<b>120%</b>	<b>110%</b>	<b>100%</b>	90%	80%	70%
Net Value Added /Hectare	-3.27	-2.09	-0.92	<b>0.26</b>	1.44	2.61	3.79
Net Cash Income /Hectare	24.27	24.90	25.53	<b>26.16</b>	26.79	27.92	28.05
Community Income /Hectare	56.77	57.40	58.03	<b>58.66</b>	59.29	59.92	60.55
<b>Milk Yield (L/Lactating Cow)</b>	<b>128</b>	<b>138</b>	<b>148</b>	<b>158</b>	168	178	188
Net Value Added /Hectare	-5.89	-3.84	-1.79	<b>0.26</b>	2.31	4.36	6.41
Net Cash Income /Hectare	18.93	21.34	23.75	<b>26.16</b>	28.57	30.98	33.38
Community Income /Hectare	51.43	53.84	56.25	<b>58.66</b>	61.07	63.48	65.88
<b>Transport/Draft (Days/Span)</b>	<b>35</b>	<b>45</b>	<b>55</b>	<b>65</b>	75	85	95
Net Value Added /Hectare	-3.10	-1.42	<b>0.26</b>	1.94	3.62	5.30	6.98
Net Cash Income /Hectare	22.21	24.19	<b>26.16</b>	28.13	30.11	32.08	34.06
Community Income /Hectare	54.71	56.69	<b>58.66</b>	60.63	62.61	64.58	66.56

#### 4.2.2. Cattle post livestock production

In Tables 6 and 7 the medium to large-scale cattle post system is shown to involve very low inputs. Positive but moderately low annual financial profits are made, while the financial return on investment is marginal. Economic net value added generated per unit of land and per unit of stock is positive but low, showing the effect of input and price

subsidies enjoyed by cattle post producers. The production of livestock at this scale and in this relatively remote setting, means that the main products are livestock sales (meat) and herd appreciation (which makes up about one third of the annual economic gross output).

Sensitivity analyses for the cattle post model are shown in Table 9. Both financial and economic results are moderately sensitive to changes in herd production values and prices. The cattle post system described in the model has lower stock densities and thus better herd production than the small scale livestock system. The results suggest that the high reliance on beef production, which comes with the larger scale, reduces financial profitability. This is despite the price and input subsidies available, and the relatively low inputs. They also suggest that moderate but positive economic rents can be generated with this type of land use in the more remote sandveld areas of Ngamiland. Expansion of the livestock industry outside the more densely settled areas will rely on this type of production system. There is very little potential for inclusion of wildlife production within this type of land use system.

#### *4.2.3 Commercial beef production*

In Tables 6 and 7 the model depicting large-scale commercial breeding and rearing of cattle for slaughter shows relatively high inputs. The relatively high intensity of capital and recurrent investments in fencing, water development, and herd management is aimed at achieving returns in enhanced herd productivity. However, financial returns are consistently negative, despite subsidies in inputs, the BMC grade price structure, and the freight equalisation scheme. Sensitivity analysis, shown in Table 10, shows that this inherent poor profitability is robust, in the face of large, somewhat unrealistic changes in prices and herd productivity. For example, for a positive net cash income, the calving rate would need to rise from 65% to higher than 75%, the beef price would need to rise by about 20%, or the capital costs would need to be reduced to some 60% of those existing.

Economic returns are also consistently negative for this system. This reflects inherent economic inefficiency, which is likely to persist under a wide range of conditions. For example, calving rates would need to rise to 90%, beef prices would need to rise by 60%, or capital costs would need to drop by 60% for a positive net value added to be generated. These conditions are clearly unrealistic. The economic inefficiency of this system is exacerbated by the location, remote from the main markets, which reduces real product value to some 68% of the national average. However, even without this, the net value added is negative, confirming that this type of production is generally economically inefficient. There is no incentive for small-scale or cattle post producers to move into more intensive commercial beef production. This finding confirms that of Behnke (1982). The effects of international trade liberalisation (Metroeconomica Economic Consultants, 1996; Sigwele and Khupe, 1996), which will likely reduce beef prices available to Botswana, will increase the inefficiency.

**Table 9: Results of sensitivity analysis on the base case assumptions for the cattle post livestock production model (Ngamiland; Pula; 2000; base case in bold)**

Calving Rate	52.5%	57.5%	62.5%	67.5%	72.5%
Net Value Added /Hectare	-2.90	-0.63	<b>1.86</b>	4.58	7.54
Net Cash Income /Hectare	1.64	2.77	<b>3.95</b>	5.20	6.49
<b>Mortality Rate (Calves)</b>	16.0%	13.5%	11.0%	<b>8.5%</b>	6.0%
Net Value Added /Hectare	-7.14	-4.78	-1.75	<b>1.86</b>	6.40
Net Cash Income /Hectare	-0.64	0.64	2.19	<b>3.95</b>	6.08
<b>Beef Prices (Variation)</b>	70%	80%	90%	<b>100%</b>	110%
Net Value Added /Hectare	-4.80	-2.58	-0.36	<b>1.86</b>	4.08
Net Cash Income /Hectare	-1.91	0.05	2.00	<b>3.95</b>	5.91
<b>Capital Costs (Variation)</b>	150%	125%	<b>100%</b>	75%	50%
Net Value Added /Hectare	-0.58	0.64	<b>1.86</b>	3.08	4.29
Net Cash Income /Hectare	2.14	3.05	<b>3.95</b>	4.86	5.76

The question arises as to why commercial beef production still exists in Botswana, if there is no financial incentive. The answer probably lies in the fact that, in existing freehold areas, a significant portion of the capital costs are sunk. The primary investments in this infrastructure would have been made in the past when the terms of trade in beef production were significantly better. In addition, speculation, involving the buying and finishing of slaughter stock, appears to make up a large component of production in freehold areas (Barnes, 1994). This activity is likely to be more financially profitable than breeding and rearing for slaughter (Loxton, Venn and Associates and Rural Development Services (Pty) Ltd., 1985), especially given the subsidy due to the BMC grade price structure.

The prohibitively high capital costs of investing in new commercial ranches, partly explain why there has been no large scale expansion of commercial livestock production in Botswana in recent decades. There has been expansion of TGLP ranches, but these have, despite subsidies, tended to revert to low input production, more like that on cattle posts (McGowan International, 1988). The inclusion of speculation and finishing on commercial ranches would be likely to enhance financial attractiveness. However, since this profitability is directly due to the grade price subsidy, it will not enhance *economic* viability. Intensification of cattle post production systems along the lines of the commercial ranching model cannot be recommended for Ngamiland.



**Table 10: Results of sensitivity analysis on the base case assumptions for the commercial livestock production model (Ngamiland; Pula; 2000; base case in bold)**

<b>Calving Rate</b>	<b>60%</b>	<b>65%</b>	<b>70%</b>	<b>75%</b>	<b>80%</b>	<b>85%</b>	<b>90%</b>
Net Value Added /Hectare	-15.72	<b>-13.20</b>	-10.08	-6.70	-3.51	-0.10	4.06
Economic Rate of Return	-*	<b>-*</b>	-*	-*	0.25%	0.81%	1.40%
Net Cash Income /Hectare	-5.53	<b>-3.59</b>	-1.27	1.17	3.40	5.73	8.49
Financial Rate of Return	2.06	<b>2.89</b>	3.78	4.61%	5.28%	5.91%	6.59%
<b>Mortality Rate (Calves)</b>	-	<b>7.5%</b>	<b>5.0%</b>	2.5%	0.0%	-	-
Net Value Added /Hectare	-	-17.19	<b>-13.20</b>	-8.38	-2.60	-	-
<b>Beef Prices (Variation)</b>	<b>100%</b>	110%	120%	130%	140%	150%	160%
Net Value Added /Hectare	<b>-13.20</b>	-11.02	-8.84	-6.66	-4.47	-2.29	-0.11
Economic Rate of Return	-*	-*	1.21%	2.53%	3.75%	4.86%	5.90%
Net Cash Income /Hectare	<b>-3.59</b>	-1.01	1.58	4.17	6.76	9.34	11.93
Financial Rate of Return	<b>2.89%</b>	4.46%	5.89	7.20%	8.41%	9.52%	10.6%
<b>Capital Costs (Variation)</b>	<b>100%</b>	87.5%	75.0%	62.5%	50.0%	37.5%	25.0%
Net Value Added /Hectare	<b>-13.20</b>	-10.81	-8.41	-6.01	-3.62	-1.22	1.17
Net Cash Income /Hectare	<b>-3.59</b>	-1.59	0.42	2.42	4.43	6.43	8.44

\* Negative economic rate of return

The prohibitively high capital costs of investing in new commercial ranches, partly explain why there has been no large scale expansion of commercial livestock production in Botswana in recent decades. There has been expansion of TGLP ranches, but these have, despite subsidies, tended to revert to low input production, more like that on cattle posts (McGowan International, 1988). The inclusion of speculation and finishing on commercial ranches would be likely to enhance financial attractiveness. However, since this profitability is directly due to the grade price subsidy, it will not enhance *economic* viability. Intensification of cattle post production systems along the lines of the commercial ranching model cannot be recommended for Ngamiland.

### 4.3. Wildlife

Tables 11 and 12 show the financial and economic results respectively for the wildlife use models. Commercial tourism is shown to generate very large financial profits and economic returns. It is these operations, which, through joint venture agreements, provide most of the income for the community wildlife use projects (such as (a) and

(b)). The community projects appear to be viable financially, although returns range from moderate in high quality areas to very low in the low quality areas. They benefit from international donor assistance, which very significantly enhances their financial attractiveness to local communities. Their economic efficiency is very high. However they are dependent on the existence of adequate natural wildlife populations, so are only suited to certain areas. These findings agree generally with those of Barnes (1994, 1998a), except that profitability has increased due to exchange rate changes.

#### 4.3.1 Commercial tourism

The results in Tables 11 and 12 show that in high quality areas, such as the Okavango delta, commercial wildlife viewing tourism can generate large profits, net cash income amounting to some P17 per hectare, as well as community income amounting to some P34 per hectare. About half of this community income is in the form of salaries and wages for employment, and half is in the form of resource royalties payable to local communities as part of lease or joint venture agreements (thus forming income for community wildlife use). In addition, to compensate the government for its investment in wildlife stocks a land rental of P5 per hectare is generated. A financial rate of return amounting to 9.0% is generated, giving a financial net present value amounting to P16 per hectare. Sensitivity analysis, shown in Table 13, shows net cash income to be fairly highly sensitive to changes in occupancy rates and product prices. Financial viability can be severely affected by negative political developments. This has recently happened due to political unrest in neighbouring Namibia and Zimbabwe.

Commercial wildlife viewing is capital intensive, involving some P140 per hectare in initial capital investment. However, in high quality areas, the economic returns generated from this investment are high, including net value added of some P76 per hectare, and economic net present value amounting to some P460 per hectare. The economic rate of return is some 64%. The sensitivity analyses shown in Table 13 indicate that the economic efficiency is very robust in the face of significant reductions in occupancy rates and product prices. The fact that economic values are higher than financial ones, indicates that this form of land use is effectively taxed, and suggests that some subsidisation of it could be justified. As discussed by Barnes (1998a), commercial tourism in low value wildlife areas involves much lower profits per unit of land because the product value is much lower. However, the economic returns are higher than the financial ones and significant royalties can still be paid to communities in joint ventures.

Consumptive (safari hunting) tourism requires relatively low capital inputs and generates significant profits and these remain high in the lower quality wildlife areas. However, safari hunting is constrained by the sustainable production of trophy animals, which generally means that less than 3% of wildlife populations is harvested. This constraint means that the profits tend to be relatively much lower *per unit of land* than they are for wildlife viewing. This is increasingly the case as one moves from the lower quality areas towards the better quality ones. Safari hunting is highly efficient economically (Barnes, 1991a, 1998a), and it has a special niche in the spectrum of wildlife-based tourism activities. Generally, because of the high economic efficiency of

most non-consumptive and consumptive commercial tourism investments, these are highly desirable, and should be promoted.

**Table 11: Comparative *financial* results in base case models for (a) community wildlife use in low quality areas, (b) community wildlife use in high quality areas, and (c) commercial wildlife viewing tourism (Ngamiland; 2000, per annum)**

Item	Community Use - Low Quality (a)	Community Use - High Quality (b)	Commercial Tourism (c)
Land used (Hectares)	900,000	80,100	14,400
Stock (LSU Equivalents)	1,618	1,495	478
Initial Capital (Pula)	1,781,298	1,121,406	2,006,602
Initial Capital (P/Ha)	1.98	14	139
Initial Capital (P/LSU)	1,101	750	4194
Financial Gross Income (Pula)	848,070	935,949	2,387,374
Financial Gross Income (P/Ha)	0.94	11.68	166
Financial Gross Income (P/LSU)	523.99	626	4990
Variable Financial Costs (Pula)	322,456	332,123	839,015
Fixed Financial Costs (Pula)	474,703	542,561	1,249,401
Net Cash Income (Pula)	50,910	61,265	244,958
Net Cash Income (P/Ha)	0.06	0.76	17.01
Net Cash Income (P/LSU)	31.46	40.98	512
Local Community Income (Pula)	231,491	380,224	492,873*
Local Community Income (P/Ha)	0.26	4.75	34.33*
Local Community Income (P/LSU)	143	254	1030*
Project Financial Rate of Return (FRR)	8.0%	8.1%	9.6%
Community FRR	57.3%	109.0%	-
Project Net Present Value (FNPV) (Pula)	3,466	20,302	229,517
Project Net Present Value (FNPV) (P/Ha)	0.00	0.25	15.94
Community FNPV (Pula)	2,262,077	3,044,530	-
Community FNPV (P/Ha)	2.51	38	-
Land Rental (Pula)	36,000	3,204	72,001
Land Rental (P/Ha)	0.04	0.04	5.00

\* Community income here includes local wages and any royalty payments to local communities

Table 12: Comparative *economic* results in base case models for (a) community wildlife use in low quality areas, (b) community wildlife use in high quality areas, and (c) commercial wildlife viewing tourism (Ngamiland; 2000, per annum)

Item	Community Use – Low Quality (a)	Community Use – High Quality (b)	Commercial Tourism (c)
Land used (Hectares)	900,000	80,100	14,400
Stock (LSU)	1,618	1,495	478
Initial Capital (Pula)	1,583,464	985,428	1,971,605
Initial Capital (P/Ha)	1.76	12.30	137
Initial Capital (P/LSU)	978	659	4,121
Economic Gross Income (Pula)	1,021,187	1,293,528	2,579,349
Economic Gross Income (P/Ha)	1.22	16.15	179
Economic Gross Income (P/LSU)	681	865	5392
Annual Economic Costs (Pula)	553,200	434,211	1,272,860
Annual Economic Costs (P/Ha)	0.61	5.42	88
Annual Economic Costs (P/LSU)	342	290	2661
Gross Value Added (Pula)	548,987	859,317	1,306,489
Gross Value Added (P/Ha)	0.61	10.73	91
Gross Value Added (P/LSU)	342	575	2731
Net Value Added (Pula)	449,760	777,176	1,099,100
Net Value Added (P/Ha)	0.50	9.70	76.33
Net Value Added (P/LSU)	278	520	2297
Economic Rate of Return (FRR)	24.8%	54.1%	64.0%
Economic Net Present Value (FNPV) (Pula)	1,799,142	2,938,580	6,576,358
Economic Net Present Value (FNPV) (P/Ha)	2.00	36	457
Economic Capital Cost per Job (Pula)	83,340	57,966	93,886

**Table 13: Results of sensitivity analysis on the base case assumptions for the model of commercial wildlife viewing tourism in high quality areas (Ngamiland; Pula; 2000; Base case in bold)**

<b>Lodge Occupancy Rate</b>	35%	40%	45%	<b>50%</b>	55%	60%	65%
Net Value Added /Hectare	41.27	52.96	64.64	<b>76.33</b>	88.01	99.70	111.4
Net Cash Income /Hectare	-6.65	1.24	9.13	<b>17.01</b>	24.90	32.78	40.67
<b>Product Prices (Variation)</b>	60%	70%	80%	90%	<b>100%</b>	110%	120%
Net Value Added /Hectare	24.94	37.79	50.64	63.48	<b>76.33</b>	89.17	102.0
Net Cash Income /Hectare	-26.10	-15.32	-4.55	6.23	<b>17.01</b>	27.79	38.57

#### 4.3.2 Community use of wildlife in high quality areas

The results in Tables 11 suggest that community wildlife use generates net cash income amounting to P0.76 per hectare, and community income, including wages, dividends and profits, amounting to some P5 per hectare. Financial attractiveness is generally enhanced by the subsidies coming for international donor assistance. These are not strictly subsidies since, like the EU beef price support, they are unlikely to be fungible and thus should be looked on as windfall benefits rather than transfers. Such benefits are likely to be easily obtainable for any future development in Ngamiland. The financial attractiveness of this form of use is sensitive to changes in tourism income and changes in wildlife densities. This is in broad agreement with the findings of Barnes (1995a).

The results in Table 12 indicate that, in high quality wildlife areas, communities using wildlife generate significant economic rents, in this model net value added amounting to some P10 per hectare. Significantly high economic rates of return are realised (in our model 54%), due partly to increases in wildlife stocks which result from the investment. Economic net present value, amounting to some P36 per hectare is possible. This form of land use is economically efficient and the results of sensitivity analysis (Table 14) suggest that this efficiency is highly robust in the face of changes in tourism income and wildlife densities. Because of this robust economic efficiency, community wildlife use should be promoted wherever possible.

#### 4.3.3 Community use of wildlife in low quality areas

The results in Tables 11 show that the net cash income generated by community wildlife use in low quality areas, such as the sandveld of western Ngamiland, is much lower, dropping to P0.06 per hectare. Local community income, generated through wages, dividends and profits is higher, at P0.26 per hectare, but this lower than that that can be generated in similar environments with cattle post development (some P3.5 per hectare in our base case cattle post model). Sensitivity analysis on the effects of increasing

game densities and increasing tourism income on the financial returns to this type of investment (Table 15) suggest that these values will remain low. Relatively poor wildlife diversity, the lack of some key wildlife species, and low wildlife species densities, are the reason that higher financial values cannot be generated. This is in broad agreement with the findings of Barnes (1995a).

**Table 14: Results of sensitivity analysis on the base case assumptions for the model of community wildlife use in high quality areas (Ngamiland; Pula; 2000; Base case in bold)**

Tourism Income (Variation)	70%	80%	90%	<b>100%</b>	110%	120%	130%
Net Value Added /Hectare	6.82	7.78	8.74	<b>9.70</b>	10.66	11.63	12.59
Net Cash Income /Hectare	-0.97	-0.39	0.19	<b>0.76</b>	1.34	1.92	2.50
Community Income /Hectare	2.43	3.20	3.97	<b>4.75</b>	5.52	6.29	7.06
<b>Wildlife Densities (Ha/LSU)</b>	<b>134</b>	<b>89</b>	<b>67</b>	<b>54</b>	<b>45</b>	<b>38</b>	<b>33</b>
Net Value Added /Hectare	5.65	7.00	8.35	<b>9.70</b>	11.05	12.40	13.75
Net Cash Income /Hectare	-0.44	-0.04	0.36	<b>0.76</b>	1.17	1.57	1.97
Community Income /Hectare	3.14	3.67	4.21	<b>4.75</b>	5.28	5.82	6.35

From the results in Table 15 it can be seen that communities using wildlife in lower quality areas do generate positive economic rents (net value added of some P0.50 per hectare). However this less than the net value added generated in the cattle post base case model (P1.9 per hectare). It is noteworthy that extensive community wildlife use generates fairly high economic rates of return (in our model 25%). This is much higher than that for the cattle post system (some 2%), and is due to the ongoing increases in wildlife stocks, resulting from community investments. The sensitivity analysis results in Table 15 show that the small but positive economic rents are robust in the face of changes in wildlife density and tourism incomes.

Allocation of land in the sandveld areas of southern, western and northern Ngamiland must be between cattle post livestock production and extensive wildlife use as described here. Both have attractive features and have a role to play. Cattle post livestock production should be promoted in the parts less remote from markets, where wildlife densities are lowest, and where good ground water is available. Wildlife use projects should be promoted in the more remote sites where access is difficult, wildlife densities are adequate, and where long term capture of wildlife non-use values (as described in section 3.1, above) is likely to be possible.

**Table 15: Results of sensitivity analysis on the base case assumptions for the model of community wildlife use in low quality areas (Ngamiland; Pula; 2000; Base case in bold)**

<b>Tourism Income</b> (Variation)	70%	80%	90%	<b>100%</b>	110%	120%	130%
Net Value Added /Hectare	0.39	0.42	0.46	<b>0.50</b>	0.54	0.57	0.61
Net Cash Income /Hectare	-0.03	0.00	0.03	<b>0.06</b>	0.09	0.12	0.15
Community Income /Hectare	0.17	0.20	0.23	<b>0.26</b>	0.29	0.32	0.35
<b>Wildlife Densities</b> (Ha/LSU)	1112	741	<b>556</b>	371	278	222	185
Net Value Added /Hectare	0.06	0.29	<b>0.50</b>	0.86	1.23	1.59	1.96
Net Cash Income /Hectare	-0.21	-0.07	<b>0.06</b>	0.27	0.48	0.69	0.90
Community Income /Hectare	-0.02	0.13	<b>0.26</b>	0.47	0.68	0.90	1.11

#### 4.4 Cost-benefit analysis of land use options

Table 16 shows the allocation of land in the whole study area, i.e., Ngamiland west of the Makalamabedi fence, which could be expected with the different fencing options described in 3.4, above. These results indicate that, compared with option 1, option 2 would result in increased livestock production, particularly that around cattle posts. This expansion would be stimulated by the phased development of an FMD-free area in the south east of the district. Land use allocation outside of this area would be similar between options 1 and 2. Option 3 would result in the same expansion of livestock production in the south eastern parts, and further expansion cattle posts in the west of the district. This would be accompanied by a corresponding reduction in the amount of land allocated to wildlife use by communities in the west. The area under commercial tourism, which will expand north and east of the buffalo fences, will not be affected by the choice of fencing options discussed here.

Table 17 shows the calculated annual contribution of each land use activity to the net national income 20 years after the adoption of each fencing option. The patterns of variation between options resemble those for the allocation of land in table 16. The striking thing about the results in Table 17 is the extremely high value of commercial tourism in the high quality wildlife areas of the Okavango delta and Kwando/Linyanti systems.

Table 18 shows the calculated annual aggregate contribution of the different land use activities to community income, 20 years after the adoption of each fencing option. The values here include market related and non-market related household profits, wages accruing to local households, and royalties paid to communities by wildlife users. The patterns of variation between options resemble those for Tables 16 and 17, but the values generated by the different land uses are different. Here, extremely high values are generated from small-scale livestock keeping, high values are generated in cattle

post livestock production, and very high values are generated from commercial tourism operations. In the case of livestock the high community income values do not match the economic values (in Table 17) and this reflects the effective subsidies in place. In the case of commercial tourism, about half the very high community income values reflect local wages and the other half reflects the royalties paid to communities (mainly the district council). Generally, with wildlife use, the community income values are lower than the economic values. There are no subsidies involved here, and this reflects the fact that others, namely the private sector and government, also benefit from these activities.

**Table 16: The anticipated spatial allocation of land among different land uses in the Ngamiland study area 20 years after adoption of each fencing option (km<sup>2</sup>)**

Land use	Option 1	Option 2	Increase on Option 1 (%)	Option 3	Increase on Option 1 (%)
Small scale livestock	8,642	9,322	8%	9,322	8%
Med./large scale cattle post	13,442	15,362	14%	18,453	37%
Low quality wildlife use	10,566	10,566	0%	7,675	-27%
High quality wildlife use	1,700	1,700	0%	1,500	-12%
Commercial tourism	3,050	3,050	0%	3,050	0%
Unused	11,600	9,000	-22%	9,000	-22%
<b>Total</b>	<b>49,000</b>	<b>49,000</b>	<b>0%</b>	<b>49,000</b>	<b>0%</b>

Table 19 shows the results of the cost benefit analysis. Here, as discussed in section 3.4 above, the analysis only covers the area south of the southern buffalo fence in the east, and south of (and excluding) NG2 and NG7 in the west. Here, the value of land use allocations resulting from the different fencing options can be compared with the fencing option costs.

The results in Table 19 provide comparative indices of merit for the three fencing options in terms of economic returns in net value added to fencing and FMD control investments. They suggest that option 1 tends consistently to be the most favourable, or least unfavourable, option. The indication is thus that small modifications to the fencing system, and ongoing FMD vaccination, will be more economically efficient than establishment of any FMD free area in Ngamiland. Ongoing FMD control is justified economically by the low fencing investments in this option. The results also suggest that



if the decision is made to develop an FMD free zone in the district, then option 3 is more economically desirable than option 2. This is because, for a similar fencing investment, option 3 will allow expansion of more relatively high value cattle post production and will also allow phasing out of FMD vaccination and surveillance activities over a larger area than in option 2.

**Table 17: The anticipated annual net value added to national income generated among different land uses in the Ngamiland study area 20 years after adoption of each fencing option (P million; 2000)**

Land use	Option 1	Option 2	Increase on Option 1 (%)	Option 3	Increase on Option 1 (%)
Small scale livestock	0.22	0.24	8%	0.24	8%
Med./large scale cattle post	2.50	2.86	14%	3.43	37%
Low quality wildlife use	0.53	0.53	0%	0.38	-27%
High quality wildlife use	1.65	1.65	0%	1.46	-12%
Commercial tourism	23.28	23.28	0%	23.28	0%
Unused	-	-	0%	-	0%
<b>Total</b>	<b>28,18</b>	<b>28.56</b>	<b>1.33%</b>	<b>28.79</b>	<b>2.17%</b>

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production and will also allow phasing out of FMD vaccination and surveillance activities over a larger area than in option 2.

Table 18: The anticipated annual local community income generated among different land uses in the Ngamiland study area 20 years after adoption of each fencing option (P million; 2000)

Land use	Option 1	Option 2	Increase on Option 1 (%)	Option 3	Increase on Option 1 (%)
Small scale livestock	50.70	54.69	8%	54.69	8%
Med./large scale cattle post	4.73	5.41	14%	6.50	37%
Low quality wildlife use	0.27	0.27	0%	0.20	-27%
High quality wildlife use	0.81	0.81	0%	0.71	-12%
Commercial tourism	10.47	10.47	0%	10.47	0%
Unused	-	-	0%	-	0%
Total	66.99	71.65	6.96%	72.57	8.23%

The predominance of negative net present values in Table 19 raises the question of whether investments in veterinary health in the livestock sector in Ngamiland can be economically sound. The cost-benefit model of Townsend and Sigwele (1998) showed that even less gains would be made without any such investments, so the economic merits of investing in the district's livestock sector at all are uncertain. Our results cannot answer this question. The investments, in as much as they protect the large beef export industry in the rest of the country, may still be economically desirable. More ongoing research on these issues is needed.

The results do show that relatively small increases in small-scale livestock herd productivity could have a very significant effect on the economic viability of the livestock investments. Policies and programmes aimed at achieving this have high economic merit. The low herd productivity of small scale livestock is primarily due to the high stocking rates, which in turn are due to the open access nature of grazing. Livestock development programmes should thus be focused on addressing the *property rights* issues, of communal grazing. Economies of scale exist, making common property management important. However, *fencing* of grazing land, although it helps ensure property rights, introduces high capital costs, severely reducing economic efficiency and should not be promoted. The results in Table 19 suggest that changes in tourism

income, associated with wildlife use, will not make much difference. This is because the economic values for wildlife use in this part of the district are relatively low, and cannot be improved easily.

Table 19: The net present values\* associated with the three fencing options and various sensitivity analyses conducted on the cost-benefit model\*\* (P million; 2000)

	Fencing option		
	1	2	3
Base case	<u>-39.2</u>	-51.1	-42.5
Small-scale calving rates up 5%	<u>33.4</u>	30.1	30.8
Small-scale calving rates down 5%	<u>-96.6</u>	-115.4	-100.6
Beef prices up 20%	42.9	45.2	<u>61.5</u>
Beef prices down 20%	<u>-121.2</u>	-147.4	-146.5
Milk yield up 30 litres / lactating cow	8.8	2.6	5.9
Milk yield down 30 litres / lactating cow	<u>-87.8</u>	-105.5	-91.7
Tourism incomes up 40%	<u>-37.9</u>	-49.8	-42.4
Tourism incomes down 40%	<u>-40.5</u>	-52.4	-42.7

\* Returns (NPV over 20 years at 8%) in net value added, to fencing and FMD control investments

\*\* Highest values between options: bold and underlined, second highest values: bold

## 5. Conclusions and policy implications

The results of this study do not directly provide the means to determine the allocation of land uses in the study area which would maximise economic values. For this, better data giving the marginal values associated with each land use at different points of expansion would be needed. Optimal allocation would occur at the point where the marginal net benefits of the competing land uses are equal to each other. Complicating such an analysis would be the different *nature* of the values associated with each land use. Livestock keeping results in diverse indispensable non-market benefits for rural households, as well as some cash. It also contributes to the beef export industry. Wildlife use provides highly significant cash income for rural households and communities, as well as some non-market benefits. Wildlife use also ensures preservation of wildlife non-use values, such as existence values (not determined in our study), and it contributes to the tourism export industry. Optimal allocation depends on the relative importance placed on these different types of economic value.

Our results do, however, give us some important insights as to how land can be allocated to improve economic returns. They also give us pointers as to how land uses should be promoted, to ensure that development objectives are met.

Wildlife-based tourism in high quality wildlife areas such as the Okavango delta is extremely economically efficient. This form of land use should get priority where these conditions exist. Community use of wildlife should be promoted where conditions permit, and where the economic values exceed those of livestock (i.e. where wildlife densities and diversity are high enough). Community use of wildlife provides significant cash income, which can effectively complement livestock keeping, livestock production and crop production, where communities live in or near higher value wildlife areas. In addition to the high direct use values measured here, investment in wildlife is likely to attract high foreign non-use values, which can be captured by Botswana. This further enhances its value as an investment.

Small-scale production of livestock provides significant household income primarily as a result of subsidies. While this land use has potential to generate high economic values, it tends to be economically inefficient due to the open access grazing system and consequent low herd productivity. It should be promoted but only if accompanied by implementation of community grazing programmes, which allow some de-stocking. Our results suggest that, in this way, significant economic values could be generated and, in addition, subsidies could likely be removed. The results tend to confirm the theoretical premise that *de facto* open access to grazing results in dissipation of net benefits, where positive returns in good years are cancelled out by negative ones in poor years.

Our results indicate that capital intensive commercial livestock ranching is economically inefficient and should not be promoted in Ngamiland. Attempts to promote the expansion of livestock production in unsettled areas, should focus on beef production through low input systems, such as occurs at cattle posts. Cattle post livestock production was found to be the most economically efficient land use for sandveld areas, moderately remote from human settlement, with good groundwater quality, and with relatively low wildlife densities. However, returns per unit of land in this environment are low. Although our study cannot categorically confirm the economic efficiency of the livestock sector as a whole, the indications are that small- to large-scale, low input livestock systems can generate positive economic returns in Ngamiland.

Community use of wildlife has merit in the more remote parts of the sandveld, where transport costs reduce the value of cattle post livestock production, or where water quality is poor, and where wildlife densities are adequate (denser than about 200 hectares per LSU equivalent). However, returns per unit of land with this form of use are low. As stated, wildlife use tends to provide cash, which can complement the other income-earning strategies of households. Wildlife also provides diversity in income, reducing risk for households. Further, investment in wildlife stocks by communities can draw foreign existence and option values, which can often be captured by communities as income (such as through donor-funded assistance to wildlife conservation).

Expansion of Botswana's FMD-free zone into Ngamiland does not appear to be economically desirable. The high costs of erecting and maintaining fences for this purpose may not be recovered through reduced disease control costs and economic returns in land-based activities. Our evidence suggests that the larger the FMD free area the greater the possibility of economic efficiency. But more likely to be economically efficient would be investment in minor modifications to the existing fencing system, and development of land uses along current lines. Even in this case, the investment in veterinary inputs may not be recovered, unless there is improvement in small-scale herd productivity. Development of appropriate property rights in communal grazing land, could result in small increases in livestock herd productivity, which in turn would result in large increases in economic efficiency. Improvements/reductions in the long term mean calving rates/mortality rates, of 3 to 5%, could have this effect.

The findings confirm the hypothesis that economically efficient allocation of land in Ngamiland will revolve around the expansion of two main forms of land use: (1) small-to large-scale traditional livestock production, and (2) wildlife-based tourism development. Other forms of use will be secondary or of relatively low value. Both traditional livestock and wildlife-based tourism have real comparative advantage, and as generators of livelihood, regionally and sometimes locally, they tend to be complementary. The indications are that livestock values will drop in the long term and that livestock may lose its comparative advantage. Wildlife values, on the other hand are likely to increase in the long term, increasing the comparative advantage of wildlife-based land uses.

The findings raise interesting questions for future research. Further work could focus on refining the models developed in this study perhaps using *Monte Carlo* simulations, and development of optimisation models for land use allocations. Probably most important, the conditions for economic efficiency in the broader livestock sector, as a whole with all linkages included, should be studied.

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## Appendices



## **Appendix 1: Terms of Reference**

### **An Economic Analysis of Cattle Ranching in Botswana: A Commodities Case Study for the Center for Applied Biodiversity Sciences**

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Consultant

#### **Background:**

Large-scale cattle development is poised to move into the Northeastern Okavango Delta. The region is lightly inhabited and undeveloped tribal land, and is now almost completely encircled with veterinary cordon fences, making it a prime target for large-scale ranching. The objective of the proposed work is to assemble the information necessary to assess economically and environmentally beneficial land use alternatives for the study area to avoid the adverse environmental impacts of intensive cattle ranching.

This study will be an economic analysis of the cattle industry's profitability in Ngamiland, and an assessment of alternative development options. This study will be combined with a second which will examine policies and implementing agencies at the local, regional, and national levels that regulate land use in the study area. The goal of the policy component is to identify the legislative incentives for large-scale cattle ranching, and the disincentives for conservation and wildlife-based development alternatives.

The economic analysis will provide the basis for recommendations to government regarding development alternatives that are more economically beneficial, more compatible with wildlife movements, and more consistent with land uses in neighboring Namibia and Zimbabwe. The study will also provide economic data which, when combined with biological data, policy analysis and the results of the Government of Botswana's Environmental Impact Analysis on fences, will provide much of the baseline information needed for a more comprehensive regional corridor analysis.

Although there is a powerful constituency in favor of large-scale cattle development in the Northeastern Okavango Delta, there is also a growing constituency in favor of a wildlife based development strategy. This constituency includes communities, members of government, Botswana NGOs, international NGOs (including the Peace Parks Foundation and IUCN), and development agencies (AID and the Development Bank of South Africa). CI has also received high level encouragement from the Government of Botswana to undertake this analysis, as well as support from the other organizations listed above.

An EIA has been undertaken by the Government of Botswana to assess the ecological costs of maintaining fences . This study will in many ways complement the EIA. The results of the proposed study should coincide with the release of the environmental impact analysis. Transboundary natural resource management is essential to the future well being of the Okavango River Basin and the people who rely on it for survival. This study will be an important component in providing socio-economic and policy analysis necessary for effective and responsible management of the Delta.

Thus, this study provides an ideal opportunity to preempt a serious threat to one of the world's most unique wetland ecosystems, and provides a key analytical component necessary to begin work towards a an even larger transfrontier conservation corridor.

### **Planned Work:**

The proposed work will involve an economic assessment of current and alternative land uses in Ngamiland. Analyses of both private and public costs/benefits are necessary to assess the economic performance of alternative development strategies. The following is a brief overview of the development strategies to be analyzed, detailing the components of the analysis and the data that will be necessary for the economic assessment.

#### *1. The profitability of livestock production in Ngamiland.*

First, the profitability of cattle ranching in Botswana will be analyzed using cost benefit analyses. This analysis will take into account the direct and indirect benefits and costs of developing the cattle industry [for export ,domestic market and traditional livestock raising] in Ngamiland. Indirect benefits and costs include the value of employment and production of other goods and services that support the cattle industry.

The study will measure both initial investments, including the costs of constructing fences and drilling boreholes, and recurrent costs associated with cattle production in Botswana. Recurrent costs include the cost of veterinary control and rangeland degradation due to cattle ranching. Assessing veterinary costs involves compiling data and detailing the costs of maintaining a quarantine system, funding the Department of Animal Health and Protection and the Botswana Meat Commission, veterinary surveillance/monitoring and fence maintenance. Other recurrent costs may be more indirect. For example, ranches holding leases sometimes graze their cattle on communal lands while their lands recover from over-grazing. In the case of traditional livestock raising, the analysis will include non-market benefits (e.g. draft power, store of wealth, food security, etc.)

Land use in Botswana has been heavily influenced by a number of economic incentives provided to the livestock sector through various policies and programs. The major instruments that have been used include subsidies (Lome Convention, input subsidies, tax incentives, etc.) and property rights. Some of these measures have imposed high costs on the Government of Botswana, and others have made the cattle industry artificially attractive to the Government from an economic perspective. This part of the

analysis will include a scenario in which the Botswana cattle industry receives varying levels of these and other subsidies. The analysis will expand from a strict financial analysis to a broader economic analysis including private and social costs.

## 2. *The profitability of alternative land uses in Ngamiland.*

Any development strategy has an associated opportunity cost. The opportunity cost associated with cattle ranching is determined by the loss of economic returns of alternative land use options e.g. ecotourism, CBNRM activities, and wildlife utilization. This part of the analysis will examine the economics of these various options from both the government's and communities' perspectives.

### a. Ecotourism

Wildlife based tourism is significantly increasing in northern Botswana; in the 1980s, for example, the number of hotels and lodges in the Okavango more than doubled. This part of the study will analyze the direct, indirect and induced benefits and costs associated with the ecotourism industry.

On a community level, the benefits of ecotourism are generated primarily as a result of a Community Based Natural Resource Management (CBNRM) Program instituted through the Tourism Policy (1990). The analysis will include the profitability of CBNRM and its potential to generate income to communities in the region.

### b. Commercial wildlife utilization

In addition to national parks, there are two land-use designations in Botswana dedicated to wildlife management: Wildlife Management Areas (WMAs), occupying roughly 22 percent of the surface area of the country, and Controlled Hunting Areas (CHAs). Commercial enterprises for wildlife utilization include, for example, safari hunting and game farming and ranching. Preliminary research in Botswana has shown that commercial wildlife use can result in attractive financial and economic returns and that wildlife ranching in neighboring countries (South Africa and Zimbabwe) has been a valuable source of income. This part of the analysis will examine the profitability of these industries.

## 3. *Cost benefit analysis of the various land use options*

Using findings from the first two components, cost benefit analyses will be performed to determine land use allocations which maximize use values and minimizes the loss of non use values in Ngamiland. This will be the main output of the report.

Throughout the analyses described above particular attention will be paid to the effects of land use options on poverty alleviation and the well being of communities in Ngamiland.



## **Summary of Outputs:**

The main output of the consultancy will be a report analyzing alternative land use options in Ngamiland, and their effects on the well being of communities in Ngamiland. The report will include:

- An analysis of the profitability of livestock production in Ngamiland, including: analyses of the profitability of cattle raising for export, the domestic market and traditional livestock raising; an analysis of current subsidies to the cattle industry and its effects on profitability of the industry and private incentives, including scenarios where these subsidies are reduced or removed.
- The profitability of alternative land uses in Ngamiland, including: an analysis of the tourism industry (consumptive and non consumptive) in Ngamiland (including direct, indirect and induced benefits and costs associated with the tourism industry), and; an analysis of small-scale use of wildlife and plant products.
- Cost benefit analyses of the various land use scenarios and a determination of scenarios which maximize use values and livelihoods, and minimize non use losses.
- Summary of analysis and recommendations.

Use the above results to develop a separate stand-alone report providing an economic analysis of the EIA report and the options considered therein.

## **Schedule and Level of Effort**

The total level of effort allocated for this activity is up to 20 days (@ U.S.\$300/day) to be expended in the months of June and July.

## **Expense Budget**

Expenses associated with the study will be reimbursed up to a total of U.S.\$300, upon provision of an expense report and original receipts.

## **Travel**

Any travel expenses must be approved in writing prior to travel by the Director, Resource Economics Program or his designee.

## **Supervision and reporting structure**

The consultant will report to the Director of Conservation International's Resource Economics Program.

**Appendix 2: Small-scale livestock keeping financial/economic model**



APPENDIX 2  
 FINANCIAL/ECONOMIC MODEL - TRADITIONAL CATTLE KEEPING - NGAMILAND - BASE CASE  
 [2000]

ASSUMPTIONS\*

Production System:	Small-scale cattle keeping for milk, meat, draft, manure and as a store of value with secondary use of goats										
Site:	Communal grazing in northern Kalahari tree savanna/delta transition with Acacia erioloba, Terminalia sericea and Acacia fle with water provided from communal borehole and "economic" rangeland carrying capacity of 12 ha per large stock unit										
Grazing land Size:	180	Hectares or,	1.8	Square Kilometres							
Carrying Capacity:	12	Hectares per LSU Equivalent or,	8.33	LSU Equivalents/Sq. Km.							
Stock Density:	15.39	LSU Equivalents/Sq. Km. or,	6.5	Hectares per LSU Equivalent							
	<u>100%</u>	Initial Purchase of Breeding Co	10								
Calving Rates	<u>100%</u>	Heifers:	60%	Cows less than 7 Yrs:	60%	Cows more than 7 Yrs:	60%				
Bull Rate	<u>100%</u>	5.0%	Bull Replacement Rate:	10%							
Mortality Rates	<u>100%</u>	Calves:	18.0%	Cows:	10.8%	Steers:	10.8%	Heifers:	10.8%	Bulls	10.8%
Selected Prices:	<u>100%</u>	Capital Items	<u>100%</u>	Livestock	(Variations from Normal for Sensitivity Analysis)						
Capital Sources:	<u>100%</u>	Loan =	0%	Equity =	100%	and:	<u>100%</u>	Foreign	0%	Domestic	100%
Interest Rates:	<u>100%</u>	Rate for Capital Loans:	18%	Rate for Working Capital Loans:	27%						
Working Capital as Proportion of Annual Operating Costs	0%										
Marketing Fees	<u>100%</u>	BMC/Agents Fee as Percentage of Turnover	2.28%								
Land Rental and Resource Royalty (N\$):	<u>100%</u>	Rental:	0.00	per Ha.	<u>100%</u>	Royalty:	0%	of Turnover			
Manpower Needs:	<u>100%</u>	Managers	0	Skilled Labour	0	Unskilled Labour	1.3				
		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>	10%	Adjustment Factor =	1.10							
Tax Adjustments:	<u>100%</u>	General VAT/Sales Tax:	11%	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.

\* Shaded cells indicate degree of conformity with base case values. Percentages in underlined shaded cells can be changed

## FINANCIAL/ECONOMIC MODEL - TRADITIONAL CATTLE KEEPING - NGAMILAND - BASE CASE

TABLE 1: CAPITAL REQUIREMENTS

ITEM	UNIT	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	18750	0	40	0	0	0	1.00	0.89	0	
Houses Labour		1	500	650	40	121	16	14	1.00	0.89	650	
Office/Storerooms		0	6000	0	40	0	0	0	1.00	0.89	0	
Tourist/Hunter Lodges		0	20000	0	40	0	0	0	1.00	0.89	0	
Boreholes		0.05	42500	2125	40	397	53	47	1.00	0.89	1891	
Plunge Dip		0	12000	0	40	0	0	0	1.00	0.89	0	
Reservoirs/Pipes/Troughs		0	4675	0	40	0	0	0	1.00	0.89	0	
Firebreaks/Roads (km)		0	1000	0	40	0	0	0	1.00	0.89	0	
Power/Road to Site		0	6375	0	40	0	0	0	1.00	0.89	0	
CONTINGENCIES @ 5%				139	40	26	3	3	1.00	0.89	123	
SUBTOTAL DOMESTIC ITEMS				2914							2665	
TRADABLE ITEMS												
Pens, Boma		1	5600	5600	20	1046	280	274	1.10	0.89	5482	
Scale and Crush		0.25	1500	375	15	74	25	24	1.10	0.89	367	
Pump/Windmill/Borehole Equipment		0.05	9450	473	15	93	32	31	1.10	0.89	463	
Fencing Perimeter (km)		0.00	4510	0	15	0	0	0	1.10	0.89	0	
Fencing Crop Lands (km)		0.40	4100	1640	15	322	109	107	1.10	0.89	1606	
CONTINGENCIES @ 5%				404	15	79	27	26	1.10	0.89	396	
SUBTOTAL TRADABLES				8492							8314	
SUBTOTAL- FIXED CAPITAL				11406							10978	
MOVABLE CAPITAL												
TRADABLE ITEMS												
LDVs/Trucks/Carts/Sleds		1	300	300	4	112	75	73	1.10	0.89	294	
Tools/Ranch Equipment		1	1500	1500	6	429	250	245	1.10	0.89	1469	
Office/Other Equipment		0	19000	0	6	0	0	0	1.10	0.89	0	
Feed/Salt Drums		0	1125	0	6	0	0	0	1.10	0.89	0	
CONTINGENCIES @ 10%				180	6	51	30	29	1.10	0.89	176	
SUBTOTAL TRADABLES				1980							1938	
DOMESTIC ITEMS												
Breeding Stock/Calves (batch)		1	20326	20326	40	3797			1.00	0.89	18090	
Other Heifers, Steers (batch)		1	6273	6273	40	1172			1.00	0.89	5583	
Bulls (batch)		1	966	966	40	180			1.00	0.89	859	
Goats/Sheep (batch)		1	633	633	40	118			1.00	0.89	564	
Game (batch)		1	0	0	40	0			2.00	0.89	0	
Horses and Donkeys (batch)		1	57	57	40	11			1.00	0.89	51	
CONTINGENCIES @ 10%				2825	40	528			1.00	0.89	2515	
SUBTOTAL- DOMESTIC ITEMS				31080							27662	
SUBTOTAL- MOVABLE CAPITAL				33060							29600	
WORKING CAPITAL												
				LOAN INTEREST								
VARIABLE				0	0							
OVERHEAD				0	0					1.10	1.00	0
SUBTOTAL- WORKING CAPITAL				0	0					1.10	1.00	0
TOTALS				44466	0	8557	901	875				40578

## FINANCIAL/ECONOMIC MODEL - TRADITIONAL CATTLE KEEPING - NGAMILAND - BASE CASE

TABLE 2: STOCK COMPOSITION BY SPECIES AT FULL PRODUCTION

ITEM	HEAD	OFF-TAKE (NO.)	LSU FACTOR	LSU	
Breeding Cows	12	1	1.00	12	
Breeding Heifers	3	0	0.70	2	
Bulls	1	0	1.33	1	
Surplus Heifers	0	0	1.00	0	
Calves	7	0	0.31	2	
1st Year Steers	3	0	0.71	2	
1st Year Heifers	3	0	0.61	2	
2 Year Steers	2	1	0.89	2	
3 Year Steers	1	0	1.11	2	
4 Year Oxen	1	0	1.18	1	
5 Year Oxen	1	0	1.25	1	
6 Year Oxen	0	0	1.25	1	
7 Year Oxen	0	0	1.25	0	
8 Year Oxen	0	0	1.25	0	
9 Year Oxen	0	0	1.25	0	
Goats/Sheep	3	1	0.14	0	
Donkeys/Horses	0	0	0.63	0	
Gemsbok	0	0	0.40	0	
Kudu	0	0	0.45	0	
Ostrich	0	0	0.26	0	
<b>TOTAL</b>	<b>38</b>	<b>4</b>		<b>28</b>	
STOCK DENSITY:	15.39	LSU PER SQ.KM.;	GRAZING LAND SIZE:	180	HECTARES

TABLE 3: SALES AT FULL PRODUCTION

ITEM	QUANTITY	PRICE (PULA)	FINANCIAL VALUE	MEAT	FOREX ADJ.	TAX ADJ.	ECON. VALUE
Cull Cows	1 Head		1162		1.10	1.00	1097
Cull Heifers	0 Head		225		1.10	1.00	213
Heifers	0 Head		236		1.10	1.00	223
Steers/Oxen	2 Head		2952		1.10	1.00	2786
Weaners	0 Head		0		1.10	1.00	0
Bulls	0 Head		440		1.10	1.00	416
Goats/Sheep	1 Head		127	5142	1.10	1.00	139
Milk	1373 Litres	5.86	8041		1.10	1.00	6014
Manure (houses and crops)	306 Kgs	0.07	21		1.10	1.00	16
Draft (transport and ploughing)	260 Oxen day	10.43	2712		1.10	1.00	2028
Donkeys/Horses	0 Head		5		1.10	1.00	4
<b>TOTALS</b>	<b>4 Head</b>	<b>GROSS INCOME :</b>	<b>15922</b>				<b>12936</b>

FINANCIAL/ECONOMIC MODEL - TRADITIONAL CATTLE KEEPING - NGAMILAND - BASE CASE

TABLE 4: VARIABLE EXPENDITURE AT FULL PRODUCTION

ITEM	FINANCIAL VALUES			FOREX ADJ.	TAX ADJ.	ECONOMIC VALUES		
	P/LSU	PS/HA.	VALUE			P/LSU	PS/HA.	VALUE
<b>TRADABLE ITEMS</b>								
Supplements	0.00	0.00	0	1.10	0.89	104.75	16.12	2902
Dip Costs	0.00	0.00	0	1.10	0.89	0.00	0.00	0
Replacement Bulls	11.92	1.83	330	1.10	0.89	15.90	2.45	440
Ear Tags	0.00	0.00	0	1.10	0.89	0.00	0.00	0
Transport	0.00	0.00	0	1.10	0.89	0.00	0.00	0
Water Costs	24.70	3.80	684	1.10	0.89	24.18	3.72	670
Live Game: Aerial Support	0.00	0.00	0	1.10	0.89	0.00	0.00	0
: Field Ops.	0.00	0.00	0	1.10	0.89	0.00	0.00	0
: Transport	0.00	0.00	0	1.10	0.89	0.00	0.00	0
Cropping: Ammunition	0.00	0.00	0	1.10	0.89	0.00	0.00	0
: Supplies and Packaging	0.00	0.00	0	1.10	0.89	0.00	0.00	0
: Transport	0.00	0.00	0	1.10	0.89	0.00	0.00	0
: Other	0.00	0.00	0	1.10	0.89	0.00	0.00	0
Miscellaneous Costs	13.34	2.05	369	1.10	0.89	13.06	2.01	362
<b>SUBTOTAL TRADABLES</b>	<b>49.96</b>	<b>7.69</b>	<b>1384</b>			<b>157.89</b>	<b>24.30</b>	<b>4373</b>
<b>DOMESTIC ITEMS</b>								
Veterinary and Medicine Costs	0.00	0.00	0	1.00	0.89	32.42	4.99	898
BMC Marketing Fees	8.62	1.33	239	1.00	1.00	0.00	0.00	0
Game Licence Fees	0.00	0.00	0	1.00	1.00	0.00	0.00	0
VAT/Sales Tax	63.23	9.73	1751	1.00	1.00	0.00	0.00	0
<b>SUBTOTAL DOMESTIC ITEMS</b>	<b>71.85</b>	<b>11.06</b>	<b>1990</b>			<b>32.42</b>	<b>4.99</b>	<b>898</b>
<b>TOTAL VARIABLE EXPENDITURE</b>	<b>121.81</b>	<b>18.74</b>	<b>3374</b>			<b>190.31</b>	<b>29.29</b>	<b>5271</b>

TABLE 5: OPERATING OVERHEAD EXPENDITURE AT FULL PRODUCTION

ITEM	FINANCIAL VALUES			FOREX ADJ.	TAX ADJ.	ECONOMIC VALUES		
	P/LSU	PS/HA.	VALUE			P/LSU	PS/HA.	VALUE
<b>DOMESTIC ITEMS</b>								
Salaries and Wages: Unskilled Labour	211.19	32.50	5850	1.00	1.00	211.19	32.50	2925
: Skilled Labour	0.00	0.00	0	1.00	1.00	0.00	0.00	0
: Managers	0.00	0.00	0	1.00	1.00	0.00	0.00	0
Administration	18.05	2.78	500	1.00	0.89	18.05	2.78	445
Maintenance and Repairs	8.41	1.29	233	1.00	0.89	8.41	1.29	207
Insurance	0.00	0.00	0	1.00	0.89	0.00	0.00	0
Miscellaneous Fixed Costs	0.00	0.00	0	1.00	0.89	0.00	0.00	0
<b>TOTAL OPERATING OVERHEAD EXPEND.</b>	<b>237.65</b>	<b>36.57</b>	<b>6583</b>			<b>237.65</b>	<b>36.57</b>	<b>3577</b>

FINANCIAL/ECONOMIC MODEL - TRADITIONAL CATTLE KEEPING - NGAMILAND - BASE CASE

TABLE 6: STATIC FINANCIAL MODEL (AT FULL PRODUCTION)

ITEM	UNITS		TOTAL
Ranch Extent	Hectares		180
Ranch Stock	Large Stock Units (LSU)		28
Total Capital Requirement	PULA		44466
	P/LSU	P/HECTARE	PULA
GROSS INCOME	574.79	88.45	15922
VARIABLE COSTS	121.81	18.74	3374
GROSS MARGIN	452.98	69.71	12548
OVERHEAD COSTS			
Overhead Operating Costs	237.65	36.57	6583
Loan Amortisation and Interest	0.00	0.00	0
Provisions for Capital Replacement	32.51	5.00	901
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	270.16	41.57	7483
NET CASH INCOME	182.82	28.13	5064
NET CASH INCOME/P100 TOTAL CAPITAL INVESTMENT	11.39		
"TOTAL BENEFITS"*/P100 TOTAL CAPITAL INVESTMENT	29.02		
"TOTAL BENEFITS"*/HECTARE	71.69		

\* "Total Benefits" = all of Net Cash Income, Salaries and Wages, Licences and Duties, Rental and Royalties.



## FINANCIAL/ECONOMIC MODEL - TRADITIONAL CATTLE KEEPING - NGAMILAND - BASE CASE

TABLE 7: STATIC ECONOMIC MODEL (AT FULL PRODUCTION)

ITEM	UNITS		TOTAL
Ranch Extent	Hectares		180
Ranch Stock	Large Stock Units (LSU)		28
Total Capital Requirement	PULA		40578
Economic Depreciation Cost	PULA		875
Foreign Financing (Prorated)	PULA		0
Foreign Amortisation	PULA		0
Foreign Capital Replacement Provision	PULA		0
Foreign Interest Cost	PULA		0
Domestic Interest Cost	PULA		7656
<hr/>			
ECONOMIC BENEFITS	P/LSU	P/HECTARE	PULA
Gross Income	467.01	71.87	12936
Stock Appreciation	13.85	2.13	384
TOTAL ECONOMIC BENEFITS	480.85	74.00	13320
 ECONOMIC COSTS			
DOMESTIC COMPONENT			
Shadow Unskilled Citizen Wages	105.60	16.25	2925
Other Citizen Wages	0.00	0.00	0
Opportunity Cost of Capital	117.19	18.03	3246
Other Domestic Economic Costs	55.97	8.61	1550
SUBTOTAL DOMESTIC COMPONENT	278.76	42.90	7721
 TRADABLE COMPONENT			
Foreign Remuneration	0.00	0.00	0
Foreign Services	0.00	0.00	0
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	157.89	24.30	4373
SUBTOTAL TRADABLE COMPONENT	157.89	24.30	4373
TOTAL ECONOMIC COSTS	436.64	67.19	12095
<hr/>			
NET ECONOMIC BENEFIT (Gross Value Added)	44.21	6.80	1225
NET VALUE ADDED (Excluding Depreciation)	12.62	1.94	349
 DOMESTIC RESOURCE COST RATIO =			
NET VALUE ADDED/P100 TOTAL CAPITAL COST =	1.80		
CAPITAL COST/EMPLOYMENT OPPORTUNITY CREATED =	0.86		
NUMBER OF EMPLOYMENT OPPORTUNITIES/1000 HA.	31214		
	7.22		

FINANCIAL/ECONOMIC MODEL - TRADITIONAL CATTLE KEEPING - NGAMILAND - BASE CASE

TABLE 3: 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
<b>DEPRECIABLE ASSETS</b>												
"Forty Year" Items	40											
Total Expenditure		2914										
Phased Expenditure		1748	1166	0	0	0	0	0	0	0	0	0
Depreciation		44	73	73	73	73	73	73	73	73	73	73
Residual value		1748	2870	2797	2724	2652	2579	2506	2433	2360	2287	2214
"Twenty Year" Items	20											
Total Expenditure		5600										
Phased Expenditure		5600	0	0	0	0	0	0	0	0	0	0
Depreciation		280	280	280	280	280	280	280	280	280	280	280
Residual value		5600	5320	5040	4760	4480	4200	3920	3640	3360	3080	2800
"Fifteen Year" Items	15											
Total Expenditure		2892										
Phased Expenditure		1735	1157	0	0	0	0	0	0	0	0	0
Depreciation		116	193	193	193	193	193	193	193	193	193	193
Residual value		1735	2776	2583	2391	2198	2005	1812	1619	1427	1234	1041
"Six Year" Items	6						6					
Total Expenditure		1680						1680				
Phased Expenditure		1176	504	0	0	0	0	1176	504	0	0	0
Depreciation		196	280	280	280	280	280	280	280	280	280	280
Residual value		1176	1484	1204	924	644	364	1260	1484	1204	924	644
"Four Year" Items	4											
Total Expenditure		300				300				300		
Phased Expenditure		300	0	0	0	300	0	0	0	300	0	0
Depreciation		75	75	75	75	75	75	75	75	75	75	75
Residual value		300	225	150	75	300	225	150	75	300	225	150
<b>NON DEPRECIABLE ASSETS</b>												
Stock	-											
Phased Fin. Expenditure		27564	377	377	383	418	447	442	438	440	441	440
Phased Econ. Expenditure		27564	377	377	383	418	447	442	438	440	441	440
Residual value		28255	31013	33311	35794	38583	39845	40661	41201	41507	41658	41763
Working Capital	-											
Phased Expenditure		0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL PHASED CAPITAL EXPENDITURE</b>												
Domestic Component		29313	1543	377	383	418	447	442	438	440	441	440
Tradable Component		8811	1661	0	0	300	0	1176	504	300	0	0
Total Financial Value		38124	3204	377	383	718	447	1618	942	740	441	440
Total Economic Value		34714	2999	336	341	666	398	1544	883	685	392	392
<b>TOTAL ASSET RESIDUAL VALUE</b>												
Domestic Component		30003	33883	36108	38519	41234	42424	43166	43634	43867	43945	43977
Tradable Component		8811	9805	8977	8150	7622	6794	7142	6818	6291	5463	4635
Financial Value		38814	43688	45086	46668	48856	49218	50309	50452	50158	49408	48612
Economic Value		35329	39755	40925	42260	44160	44408	45410	45509	45200	44459	43678

FINANCIAL/ECONOMIC MODEL - TRADITIONAL CATTLE KEEPING - NGAMILAND - BASE CASE

TABLE 9: STOCK PROJECTION

STOCK ON HAND (AUGUST)

	Growth	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Breeding Cows		10	12	11	11	12	12	12	12	12	12	12
Breeding Heifers		3	1	2	3	2	2	2	3	3	3	3
Bulls		0	1	1	1	1	1	1	1	1	1	1
Surplus Heifers		0	0	0	0	0	0	0	0	0	0	0
Calves		4	6	6	6	7	7	7	7	7	7	7
1st Year Steers		1	2	3	3	3	3	3	3	3	3	3
1st Year Heifers		1	2	3	3	3	3	3	3	3	3	3
2 Year Steers		1	1	1	2	2	2	2	2	2	2	2
3 Year Steers		1	1	0	1	1	1	1	1	1	1	1
4 Year Oxen		1	0	0	0	1	1	1	1	1	1	1
5 Year Oxen		1	0	0	0	0	0	1	1	1	1	1
6 Year Oxen		0	0	0	0	0	0	0	0	0	0	0
7 Year Oxen		0	0	0	0	0	0	0	0	0	0	0
8 Year Oxen		0	0	0	0	0	0	0	0	0	0	0
9 Year Oxen		0	0	0	0	0	0	0	0	0	0	0
Goats/Sheep	0.20	3	3	3	3	3	3	3	3	3	3	3
Donkeys/Horses	0.10	0	0	0	0	0	0	0	0	0	0	0
Gemsbok	0.12	0	0	0	0	0	0	0	0	0	0	0
Kudu	0.12	0	0	0	0	0	0	0	0	0	0	0
Ostrich	0.14	0	0	0	0	0	0	0	0	0	0	0
TOTALS		26	29	31	33	35	36	37	37	38	38	38
PERCENT OF ORIGINAL NO.		100%	112%	121%	129%	137%	142%	145%	146%	147%	147%	148%
PERCENT OF FINAL NO.		68%	76%	82%	87%	93%	96%	98%	99%	100%	100%	100%
ANNUAL INCREASE (%)			12%	8%	6%	7%	3%	2%	1%	1%	0%	0%

STOCK SALES (No.)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Breeding Cows	0	0	0	0	0	1	1	1	1	1	1
Breeding Heifers	0	0	0	0	0	0	0	0	0	0	0
Bulls	0	0	0	0	0	0	0	0	0	0	0
Surplus Heifers	0	0	0	0	0	0	0	0	0	0	0
Calves	0	0	0	0	0	0	0	0	0	0	0
1st Year Steers	0	0	0	0	0	0	0	0	0	0	0
1st Year Heifers	0	0	0	0	0	0	0	0	0	0	0
2 Year Steers	0	0	0	1	1	1	1	1	1	1	1
3 Year Steers	0	0	0	0	0	0	0	0	0	0	0
4 Year Oxen	0	0	0	0	0	0	0	0	0	0	0
5 Year Oxen	0	0	0	0	0	0	0	0	0	0	0
6 Year Oxen	0	0	0	0	0	0	0	0	0	0	0
7 Year Oxen	0	0	0	0	0	0	0	0	0	0	0
8 Year Oxen	0	0	0	0	0	0	0	0	0	0	0
9 Year Oxen	0	0	0	0	0	0	0	0	0	0	0
Goats/Sheep	0	1	1	1	1	1	1	1	1	1	1
Donkeys/Horses	0	0	0	0	0	0	0	0	0	0	0
Gemsbok	0	0	0	0	0	0	0	0	0	0	0
Kudu	0	0	0	0	0	0	0	0	0	0	0
Ostrich	0	0	0	0	0	0	0	0	0	0	0
TOTALS	1	1	1	1	2	3	3	3	3	3	3
PERCENT OFFTAKE RATE	3%	4%	4%	4%	5%	8%	8%	9%	9%	9%	9%
PERCENT OF FINAL SALES	22%	33%	34%	41%	46%	80%	90%	95%	99%	99%	100%

## FINANCIAL/ECONOMIC MODEL - TRADITIONAL CATTLE KEEPING - NGAMILAND - BASE CASE

TABLE 9: STOCK PROJECTION (Continued)

## 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
Breeding Cows	10	0	0	0	0	0	0	0	0	0	0
Breeding Heifers	3	0	0	0	0	0	0	0	0	0	0
Bulls	0	0	0	0	0	0	0	0	0	0	0
Surplus Heifers	0	0	0	0	0	0	0	0	0	0	0
Calves	4	0	0	0	0	0	0	0	0	0	0
1st Year Steers	1	0	0	0	0	0	0	0	0	0	0
1st Year Heifers	1	0	0	0	0	0	0	0	0	0	0
2 Year Steers	1	0	0	0	0	0	0	0	0	0	0
3 Year Steers	1	0	0	0	0	0	0	0	0	0	0
4 Year Oxen	1	0	0	0	0	0	0	0	0	0	0
5 Year Oxen	1	0	0	0	0	0	0	0	0	0	0
6 Year Oxen	0	0	0	0	0	0	0	0	0	0	0
7 Year Oxen	0	0	0	0	0	0	0	0	0	0	0
8 Year Oxen	0	0	0	0	0	0	0	0	0	0	0
9 Year Oxen	0	0	0	0	0	0	0	0	0	0	0
Goats/Sheep	3	0	0	0	0	0	0	0	0	0	0
Donkeys/Horses	0	0	0	0	0	0	0	0	0	0	0
Gemsbok	0	0	0	0	0	0	0	0	0	0	0
Kudu	0	0	0	0	0	0	0	0	0	0	0
Ostrich	0	0	0	0	0	0	0	0	0	0	0
<b>TOTALS</b>	<b>22</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

## LSU ON HAND (AUGUST)

LSU /UNIT	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Breeding Cows	1.00	10	12	11	11	12	12	12	12	12	12
Breeding Heifers	0.70	2	1	1	2	2	2	2	2	2	2
Bulls	1.33	1	1	1	1	1	1	1	1	1	1
Surplus Heifers	1.00	0	0	0	0	0	0	0	0	0	0
Calves	0.31	1	2	2	2	2	2	2	2	2	2
1st Year Steers	0.71	1	1	2	2	2	2	2	2	2	2
1st Year Heifers	0.61	1	1	2	2	2	2	2	2	2	2
2 Year Steers	0.89	1	1	1	2	2	2	2	2	2	2
3 Year Steers	1.11	1	1	0	1	1	1	1	2	2	2
4 Year Oxen	1.18	1	1	0	0	1	1	1	1	1	1
5 Year Oxen	1.25	1	0	0	0	0	1	1	1	1	1
6 Year Oxen	1.25	1	0	0	0	0	0	0	0	0	1
7 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0
8 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0
9 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0
Goats/Sheep	0.14	0	0	0	0	0	0	0	0	0	0
Donkeys/Horses	0.63	0	0	0	0	0	0	0	0	0	0
Gemsbok	0.40	0	0	0	0	0	0	0	0	0	0
Kudu	0.45	0	0	0	0	0	0	0	0	0	0
Ostrich	0.26	0	0	0	0	0	0	0	0	0	0
<b>TOTAL STOCK LSU</b>	<b>19</b>	<b>20</b>	<b>21</b>	<b>23</b>	<b>25</b>	<b>26</b>	<b>26</b>	<b>27</b>	<b>27</b>	<b>27</b>	<b>27</b>
<b>PERCENT OF ORIGINAL LSU</b>	<b>100%</b>	<b>108%</b>	<b>115%</b>	<b>124%</b>	<b>134%</b>	<b>138%</b>	<b>142%</b>	<b>144%</b>	<b>145%</b>	<b>146%</b>	<b>147%</b>
<b>PERCENT OF FINAL LSU</b>	<b>68%</b>	<b>74%</b>	<b>79%</b>	<b>85%</b>	<b>91%</b>	<b>94%</b>	<b>97%</b>	<b>98%</b>	<b>99%</b>	<b>100%</b>	<b>100%</b>



## FINANCIAL/ECONOMIC MODEL - TRADITIONAL CATTLE KEEPING - NGAMILAND - BASE CASE

TABLE 9: STOCK PROJECTION (Continued)

VALUE OF STOCK ON HAND (AUGUST) (PULA)												
	Value (Pula)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Breeding Cows	1370.20	13702	15831	15159	15374	16813	16527	16331	16187	16260	16284	16279
Breeding Heifers	1218.05	3596	1035	1846	3088	2957	2999	3017	3224	3186	3158	3172
Bulls	2027.90	966	1258	1275	1395	1490	1473	1460	1466	1468	1468	1469
Surplus Heifers	1043.80	0	0	0	0	0	0	0	0	0	0	0
Calves	794.75	3028	5065	4850	4919	5379	5747	5679	5629	5654	5663	5661
1st Year Steers	1043.80	994	1773	2967	2841	2881	3151	3366	3327	3297	3312	3317
1st Year Heifers	1043.80	994	1773	2967	2841	2881	3151	3366	3327	3297	3312	3317
2 Year Steers	1218.05	928	776	1385	2316	2218	2249	2460	2628	2597	2574	2586
3 Year Steers	1493.52	996	761	637	1136	1900	1819	1845	2018	2156	2130	2112
4 Year Oxen	1493.45	853	666	509	426	760	1271	1217	1234	1350	1442	1425
5 Year Oxen	1456.11	832	557	434	332	278	496	829	794	805	880	941
6 Year Oxen	1418.78	676	542	363	283	217	181	323	540	517	525	574
7 Year Oxen	1344.11	0	285	229	153	120	91	77	136	228	219	222
8 Year Oxen	1269.43	0	0	0	0	0	0	0	0	0	0	0
9 Year Oxen	1194.76	0	0	0	0	0	0	0	0	0	0	0
Goats/Sheep	190.00	633	633	633	633	633	633	633	633	633	633	633
Donkeys/Horses	600.00	57	57	57	57	57	57	57	57	57	57	57
Gemsbok	706.00	0	0	0	0	0	0	0	0	0	0	0
Kudu	792.00	0	0	0	0	0	0	0	0	0	0	0
Ostrich	1100.00	0	0	0	0	0	0	0	0	0	0	0
<hr/>												
TOTALS		28255	31013	33311	35794	38583	39845	40661	41201	41507	41658	41763
PERCENT OF ORIGINAL NO.		100%	110%	118%	127%	137%	141%	144%	146%	147%	147%	148%
PERCENT OF FINAL NO.		68%	74%	80%	86%	92%	95%	97%	99%	99%	100%	100%
ANNUAL VALUE INCREASE			2758	2298	2483	2788	1262	816	540	306	151	105
<hr/>												
VALUE OF SALES (PULA)												
	Value (Pula)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Breeding Cows	1370.20	0	0	0	0	0	1200	1179	1165	1155	1160	1162
Breeding Heifers	1218.05	0	0	0	0	0	211	214	215	230	227	225
Bulls	2027.90	0	290	377	383	418	447	442	438	440	441	440
Surplus Heifers	1043.80	0	0	0	0	0	0	225	240	237	235	236
Calves	794.75	0	0	0	0	0	0	0	0	0	0	0
1st Year Steers	1043.80	0	0	0	0	0	0	0	0	0	0	0
1st Year Heifers	1043.80	0	0	0	0	0	0	0	0	0	0	0
2 Year Steers	1218.05	232	259	462	772	739	750	820	876	866	858	862
3 Year Steers	1493.52	249	254	212	379	633	606	615	673	719	710	704
4 Year Oxen	1493.45	213	222	170	142	253	424	406	411	450	481	475
5 Year Oxen	1456.11	208	186	145	111	93	165	276	265	268	293	314
6 Year Oxen	1418.78	169	181	121	94	72	60	108	180	172	175	191
7 Year Oxen	1344.11	0	285	229	153	120	91	77	136	228	219	222
8 Year Oxen	1269.43	0	0	240	193	129	101	77	64	115	192	184
9 Year Oxen	1194.76	0	0	0	0	0	0	0	0	0	0	0
Goats/Sheep	190.00	0	127	127	127	127	127	127	127	127	127	127
Donkeys/Horses	600.00	0	5	5	5	5	5	5	5	5	5	5
Gemsbok	706.00	0	0	0	0	0	0	0	0	0	0	0
Kudu	792.00	0	0	0	0	0	0	0	0	0	0	0
Ostrich	1100.00	0	0	0	0	0	0	0	0	0	0	0
<hr/>												
TOTALS		1071	1676	1716	2034	2329	3955	4361	4600	4766	4799	4831
PERCENT OF FINAL VALUE		22%	35%	36%	42%	48%	82%	90%	95%	99%	99%	100%

FINANCIAL/ECONOMIC MODEL - TRADITIONAL CATTLE KEEPING - NGAMILAND - BASE CASE

TABLE 9: STOCK PROJECTION (Continued)

FINANCIAL VALUE OF PURCHASES (PULA)

	Value (Pula)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Brooding Cows	1370.20	13702	0	0	0	0	0	0	0	0	0	0
Breeding Heifers	1218.05	3596	0	0	0	0	0	0	0	0	0	0
Bulls	2027.90	966	290	377	383	418	447	442	438	440	441	440
Surplus Heifers	1043.80	0	0	0	0	0	0	0	0	0	0	0
Calves	794.75	3028	0	0	0	0	0	0	0	0	0	0
1st Year Steers	1043.80	994	0	0	0	0	0	0	0	0	0	0
1st Year Heifers	1043.80	994	0	0	0	0	0	0	0	0	0	0
2 Year Steers	1218.05	928	0	0	0	0	0	0	0	0	0	0
3 Year Steers	1493.52	996	0	0	0	0	0	0	0	0	0	0
4 Year Oxen	1493.45	853	0	0	0	0	0	0	0	0	0	0
5 Year Oxen	1456.11	832	0	0	0	0	0	0	0	0	0	0
6 Year Oxen	1418.78	676	0	0	0	0	0	0	0	0	0	0
7 Year Oxen	1344.11	0	0	0	0	0	0	0	0	0	0	0
8 Year Oxen	1269.43	0	0	0	0	0	0	0	0	0	0	0
9 Year Oxen	1194.76	0	0	0	0	0	0	0	0	0	0	0
Goats/Sheep	190.00	633	0	0	0	0	0	0	0	0	0	0
Donkeys/Horses	600.00	57	0	0	0	0	0	0	0	0	0	0
Gemsbok	706.00	0	0	0	0	0	0	0	0	0	0	0
Kudu	792.00	0	0	0	0	0	0	0	0	0	0	0
Ostrich	1100.00	0	0	0	0	0	0	0	0	0	0	0
<b>TOTALS</b>		<b>27564</b>	<b>377</b>	<b>377</b>	<b>383</b>	<b>418</b>	<b>447</b>	<b>442</b>	<b>438</b>	<b>440</b>	<b>441</b>	<b>440</b>

ECONOMIC VALUE OF PURCHASES (PULA)

	Value (Pula)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Breeding Cows	1370.20	13702	0	0	0	0	0	0	0	0	0	0
Breeding Heifers	1218.05	3596	0	0	0	0	0	0	0	0	0	0
Bulls	2027.90	966	290	377	383	418	447	442	438	440	441	440
Surplus Heifers	1043.80	0	0	0	0	0	0	0	0	0	0	0
Calves	794.75	3028	0	0	0	0	0	0	0	0	0	0
1st Year Steers	1043.80	994	0	0	0	0	0	0	0	0	0	0
1st Year Heifers	1043.80	994	0	0	0	0	0	0	0	0	0	0
2 Year Steers	1218.05	928	0	0	0	0	0	0	0	0	0	0
3 Year Steers	1493.52	996	0	0	0	0	0	0	0	0	0	0
4 Year Oxen	1493.45	853	0	0	0	0	0	0	0	0	0	0
5 Year Oxen	1456.11	832	0	0	0	0	0	0	0	0	0	0
6 Year Oxen	1418.78	676	0	0	0	0	0	0	0	0	0	0
7 Year Oxen	1344.11	0	0	0	0	0	0	0	0	0	0	0
8 Year Oxen	1269.43	0	0	0	0	0	0	0	0	0	0	0
9 Year Oxen	1194.76	0	0	0	0	0	0	0	0	0	0	0
Goats/Sheep	190.00	633	0	0	0	0	0	0	0	0	0	0
Donkeys/Horses	600.00	57	0	0	0	0	0	0	0	0	0	0
Gemsbok	706.00	0	0	0	0	0	0	0	0	0	0	0
Kudu	792.00	0	0	0	0	0	0	0	0	0	0	0
Ostrich	1100.00	0	0	0	0	0	0	0	0	0	0	0
<b>TOTALS</b>		<b>27564</b>	<b>377</b>	<b>377</b>	<b>383</b>	<b>418</b>	<b>447</b>	<b>442</b>	<b>438</b>	<b>440</b>	<b>441</b>	<b>440</b>





FINANCIAL/ECONOMIC MODEL - TRADITIONAL CATTLE KEEPING - NGAMLAND - 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
<b>LONG TERM LOANS</b>													
<b>TWENTY YEAR LOAN</b>	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
<b>FIFTEEN YEAR LOAN</b>	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
<b>SIX YEAR LOAN</b>	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
<b>FOUR YEAR LOAN</b>	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
<b>SHORT TERM LOANS</b>													
<b>Working Capital</b>	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
<b>TOTAL LONG TERM LOAN DISBURSMENTS</b>													
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
<b>TOTAL LONG TERM LOAN AMORTISATION</b>													
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
<b>TOTAL INTEREST PAYMENTS</b>													
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
<b>TOTAL LOANS OUTSTANDING</b>													
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 - TRADITIONAL CATTLE KEEPING - NGAMILAND - BASE CASE

TABLE 11: PROJECT FINANCIAL ANALYSIS - 5 YEARS (PULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
<b>EXPENDITURE</b>						
Capital Expenditure	38124	3204	377	383	718	447
Variable Expenditure	337	2024	3374	3374	3374	3374
Overhead Expenditure	6583	6583	6583	6583	6583	6583
<b>TOTAL EXPENDITURE</b>	<b>45044</b>	<b>11811</b>	<b>10334</b>	<b>10340</b>	<b>10675</b>	<b>10404</b>
<b>INCOME</b>						
Gross Income	10772	11823	12699	13646	14709	15190
Asset Residual Value	0	0	0	0	0	49218
<b>TOTAL INCOME</b>	<b>10772</b>	<b>11823</b>	<b>12699</b>	<b>13646</b>	<b>14709</b>	<b>64408</b>
<b>NET BENEFIT/COST</b>	<b>-34272</b>	<b>12</b>	<b>2365</b>	<b>3307</b>	<b>4034</b>	<b>54004</b>

PROJ. FINANCIAL RATE OF RETURN (FRR) OVER 5 YEARS = 14.16%  
 PROJ. NET PRESENT VALUE (NPV) @ 8.00% = 9362 Per Hectare = 52.01

TABLE 12: PROJECT FINANCIAL ANALYSIS - 7 YEARS (PULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
<b>EXPENDITURE</b>								
Capital Expenditure	38124	3204	377	383	718	447	1618	942
Variable Expenditure	337	2024	3374	3374	3374	3374	3374	3374
Overhead Expenditure	6583	6583	6583	6583	6583	6583	6583	6583
<b>TOTAL EXPENDITURE</b>	<b>45044</b>	<b>11811</b>	<b>10334</b>	<b>10340</b>	<b>10675</b>	<b>10404</b>	<b>11575</b>	<b>10899</b>
<b>INCOME</b>								
Gross Income	10772	11823	12699	13646	14709	15190	15501	15707
Asset Residual Value	0	0	0	0	0	0	0	50452
<b>TOTAL INCOME</b>	<b>10772</b>	<b>11823</b>	<b>12699</b>	<b>13646</b>	<b>14709</b>	<b>15190</b>	<b>15501</b>	<b>66159</b>
<b>NET BENEFIT/COST</b>	<b>-34272</b>	<b>12</b>	<b>2365</b>	<b>3307</b>	<b>4034</b>	<b>4786</b>	<b>3927</b>	<b>55261</b>

PROJ. FINANCIAL RATE OF RETURN (FRR) OVER 7 YEARS = 13.18%  
 PROJ. NET PRESENT VALUE (NPV) @ 8.00% = 10494 Per Hectare = 58.30

TABLE 13: PROJECT FINANCIAL ANALYSIS - 10 YEARS (PULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<b>EXPENDITURE</b>											
Capital Expenditure	38124	3204	377	383	718	447	1618	942	740	441	440
Variable Expenditure	337	2024	3374	3374	3374	3374	3374	3374	3374	3374	3374
Overhead Expenditure	6583	6583	6583	6583	6583	6583	6583	6583	6583	6583	6583
<b>TOTAL EXPENDITURE</b>	<b>45044</b>	<b>11811</b>	<b>10334</b>	<b>10340</b>	<b>10675</b>	<b>10404</b>	<b>11575</b>	<b>10899</b>	<b>10697</b>	<b>10397</b>	<b>10397</b>
<b>INCOME</b>											
Gross Income	10772	11823	12699	13646	14709	15190	15501	15707	15824	15881	15922
Asset Residual Value	0	0	0	0	0	0	0	0	0	0	48612
<b>TOTAL INCOME</b>	<b>10772</b>	<b>11823</b>	<b>12699</b>	<b>13646</b>	<b>14709</b>	<b>15190</b>	<b>15501</b>	<b>15707</b>	<b>15824</b>	<b>15881</b>	<b>64534</b>
<b>NET BENEFIT/COST</b>	<b>-34272</b>	<b>12</b>	<b>2365</b>	<b>3307</b>	<b>4034</b>	<b>4786</b>	<b>3927</b>	<b>4808</b>	<b>5127</b>	<b>5484</b>	<b>54137</b>

PROJ. FINANCIAL RATE OF RETURN (FRR) OVER 10 YEARS = 12.38%  
 PROJ. NET PRESENT VALUE (NPV) @ 8.00% = 11559 Per Hectare = 64.22

## FINANCIAL/ECONOMIC MODEL - TRADITIONAL CATTLE KEEPING - NGAMLAND - BASE CASE

TABLE 14: ECONOMIC ANALYSIS - 5 YEARS (PULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
<b>ECONOMIC COSTS</b>						
Capital Expenditure	34714	2999	336	341	666	398
Unskilled Wages	2925	2925	2925	2925	2925	2925
Other Domestic Costs	620	930	1240	1550	1550	1550
Tradable Costs	437	1749	3499	4373	4373	4373
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
<b>TOTAL COSTS</b>	<b>38697</b>	<b>8603</b>	<b>8000</b>	<b>9189</b>	<b>9515</b>	<b>9247</b>
<b>ECONOMIC BENEFITS</b>						
Gross Income	8752	9606	10318	11087	11951	12342
Asset Residual Value	0	0	0	0	0	44408
Foreign Financing	0	0	0	0	0	0
<b>TOTAL BENEFITS</b>	<b>8752</b>	<b>9606</b>	<b>10318</b>	<b>11087</b>	<b>11951</b>	<b>56750</b>
<b>NET BENEFIT/COST</b>	<b>-29945</b>	<b>1003</b>	<b>2318</b>	<b>1898</b>	<b>2436</b>	<b>47504</b>
<b>ECONOMIC RATE OF RETURN (ERR) OVER 5 YEARS = 14.09%</b>						
<b>NET PRESENT VALUE (NPV) @ 8.00% = 7962</b>						<b>Per Hectare = 44.23</b>

TABLE 15: ECONOMIC ANALYSIS - 10 YEARS (PULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<b>ECONOMIC COSTS</b>											
Capital Expenditure	34714	2999	336	341	666	398	1544	383	685	392	392
Unskilled Wages	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925	2925
Other Domestic Costs	620	930	1240	1550	1550	1550	1550	1550	1550	1550	1550
Tradable Costs	437	1749	3499	4373	4373	4373	4373	4373	4373	4373	4373
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
<b>TOTAL COSTS</b>	<b>38697</b>	<b>8603</b>	<b>8000</b>	<b>9189</b>	<b>9515</b>	<b>9247</b>	<b>10393</b>	<b>9732</b>	<b>9534</b>	<b>9241</b>	<b>9241</b>
<b>ECONOMIC BENEFITS</b>											
Gross Income	8752	9606	10318	11087	11951	12342	12595	12762	12857	12903	12936
Asset Residual Value	0	0	0	0	0	0	0	0	0	0	43678
Foreign Financing	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL BENEFITS</b>	<b>8752</b>	<b>9606</b>	<b>10318</b>	<b>11087</b>	<b>11951</b>	<b>12342</b>	<b>12595</b>	<b>12762</b>	<b>12857</b>	<b>12903</b>	<b>56614</b>
<b>NET BENEFIT/COST</b>	<b>-29945</b>	<b>1003</b>	<b>2318</b>	<b>1898</b>	<b>2436</b>	<b>3095</b>	<b>2201</b>	<b>3030</b>	<b>3323</b>	<b>3663</b>	<b>47373</b>
<b>ECONOMIC RATE OF RETURN (ERR) OVER 10 YEARS = 10.94%</b>											
<b>NET PRESENT VALUE (NPV) @ 8.00% = 6575</b>											<b>Per Hectare = 36.53</b>

## FINANCIAL/ECONOMIC MODEL - TRADITIONAL CATTLE KEEPING - NGAMILAND - BASE CASE

TABLE 16: SUMMARY OF RESULTS

ITEM	UNITS	TOTAL		
Grazing Land Extent	Hectares	180		
Stock	Large Stock Units (LSU)	28		
ITEM	% of TCI	P/LSU	P/HECTARE	PULA
Total Financial Capital (TCI)	-	1605.28	247.03	44466
Financial Gross Income	35.81%	574.79	88.45	15922
Variable Financial Costs	-	121.81	18.74	3374
Fixed Financial Costs	-	270.16	41.57	7483
Net Cash Income	11.39%	182.82	28.13	5064
Local Community Cash Income	24.54%	394.01	60.63	10914
Land Rental	-	0.00	0.00	0
Resource Royalty	-	0.00	0.00	0
FRR (@ 10 Years)	-	-	-	12.38%
FNPV (@ 8%, @ 10 Years)	-	-	64.22	11559
Total Economic Capital	-	1464.92	225.43	40578
Economic Gross Income	32.82%	480.85	74.00	13320
Economic Costs	29.81%	436.64	67.19	12095
Net Economic Benefit	3.02%	44.21	6.80	1225
Net Value Added	0.86%	12.62	1.94	349
ERR (@ 10 Years)	-	-	-	10.94%
ENPV (@ 8%, @ 10 Years)	-	-	36.53	6575
Economic Capital Cost/Job	-	-	-	31214
Domestic Resource Cost Ratio	-	-	-	1.80
Policy Analysis Matrix	: Effects of Policy / Market Imperfections	: on Output		2602
		: on Tradable Inputs		2990
		: on Domestic Factors		-877
	: Net Effects of Policy / Market Imperfections	: on Annual Net Income		4715
		: on Net Present Value (10 Years)		4985



**Appendix 3: Cattle post livestock production financial/economic model**



APPENDIX 3  
 FINANCIAL/ECONOMIC MODEL - CATTLE POST - NGAMILAND - BASE CASE  
 [2000]

ASSUMPTIONS\*

Production System:	Beef breeding and rearing for production of three to six year old steers/oxen, with very limited use of milk, goats and game										
Site:	Cattle post in northern Kalahari tree savanna with Terminalia sericea and Acacia fleckii with very small numbers of kudu, ge and ostrich, with water provided from one borehole and "economic" rangeland carrying capacity of 12 ha per large stock unit										
Grazing land Size:	6400	Hectares or,	64	Square Kilometres							
Carrying Capacity:	12	Hectares per LSU Equivalent or,	8.33	LSU Equivalents/Sq. Km.							
Stock Density:	9.31	LSU Equivalents/Sq. Km. or,	10.7	Hectares per LSU Equivalent							
	<u>100%</u>	Initial Purchase of Breeding Co	105								
Calving Rates	<u>100%</u>	Heifers:	62.5%	Cows less than 7 Yrs:	63%	Cows more than 7 Yrs:	63%				
Bull Rate	<u>100%</u>	5.0%	Bull Replacement Rate:	15%							
Mortality Rates	<u>100%</u>	Calves:	8.5%	Cows:	5.1%	Steers:	5.1%	Heifers:	5.1%	Bulls	5.1%
Selected Prices:	<u>100%</u>	Capital Items	<u>100%</u>	Livestock	(Variations from Normal for Sensitivity Analysis)						
Capital Sources:	<u>100%</u>	Loan =	5%	Equity =	95%	and:	<u>100%</u>	Foreign	0%	Domestic	100%
Interest Rates:	<u>100%</u>	Rate for Capital Loans:	18%	Rate for Working Capital Loans:	27%						
Working Capital as Proportion of Annual Operating Costs	10%										
Marketing Fees	<u>100%</u>	BMC/Agents Fee as Percentage of Turnover	2.28%								
Land Rental and Resource Royalty (NS):	<u>100%</u>	Rental:	0.00	per Ha.	<u>100%</u>	Royalty:	0%	of Turnover			
Manpower Needs:	<u>100%</u>	Managers	0	Skilled Labour	1	Unskilled Labour	3				
		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>	10%	Adjustment Factor =	1.10							
Tax Adjustments:	<u>100%</u>	General VAT/Sales Tax:	11%	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%									
<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. Percentages in underlined shaded cells can be changed



## FINANCIAL/ECONOMIC MODEL - CATTLE POST - NGAMILAND - BASE CASE

TABLE 1: CAPITAL REQUIREMENTS

ITEM	UNIT	QUANT.	PRICE PULA	FINAN. COST	LIFE Years	AMORT. + INT.	DEPRECIATION	ECON. DEPR.	FOREX ADJ.	TAX ADJ.	ECON. COST	
FIXED CAPITAL												
DOMESTIC ITEMS												
Houses Manager		0	18750	0	40	0	0	0	1.00	0.89	0	
Houses Labour		4	500	2000	40	374	50	45	1.00	0.89	2000	
Office/Storerooms		1	6000	6000	40	1121	150	134	1.00	0.89	5340	
Tourist/Hunter Lodges		0	20000	0	40	0	0	0	1.00	0.89	0	
Boreholes		1	42500	42500	40	7940	1063	946	1.00	0.89	37825	
Plunge Dip		0	12000	0	40	0	0	0	1.00	0.89	0	
Reservoirs/Pipes/Troughs		1	4675	4675	40	873	117	104	1.00	0.89	4161	
Firebreaks/Roads	(km)	0	1000	0	40	0	0	0	1.00	0.89	0	
Power/Road to Site		1	6375	6375	40	1191	159	142	1.00	0.89	5674	
CONTINGENCIES @ 5%				3078	40	575	77	68	1.00	0.89	2739	
SUBTOTAL DOMESTIC ITEMS				64628							57738	
TRADABLE ITEMS												
Pens, Boma		1	5600	5600	20	1046	280	274	1.10	0.89	5482	
Scale and Crush		1	1500	1500	15	295	100	98	1.10	0.89	1469	
Pump/Windmill/Borehole Equipment		1	9450	9450	15	1856	630	617	1.10	0.89	9252	
Fencing Perimeter	(km)	0.00	4510	0	15	0	0	0	1.10	0.89	0	
Fencing Internal	(km)	0.00	4100	0	15	0	0	0	1.10	0.89	0	
CONTINGENCIES @ 5%				828	15	163	55	54	1.10	0.89	810	
SUBTOTAL TRADABLES				17378							17013	
SUBTOTAL- FIXED CAPITAL				82005							74751	
MOVABLE CAPITAL												
TRADABLE ITEMS												
LDVs/Trucks		1	35000	35000	4	13011	8750	8566	1.10	0.89	34265	
Tools/Ranch Equipment		1	15000	15000	6	4289	2500	2448	1.10	0.89	14685	
Office/Other Equipment		0	19000	0	6	0	0	0	1.10	0.89	0	
Feed/Salt Drums		1	1125	1125	6	322	188	184	1.10	0.89	1101	
CONTINGENCIES @ 10%				5113	6	1462	852	834	1.10	0.89	5005	
SUBTOTAL TRADABLES				56238							55057	
DOMESTIC ITEMS												
Breeding Stock/Calves	(batch)	1	238529	238529	40	44562			1.00	0.89	212291	
Other Heifers, Steers	(batch)	1	73615	73615	40	13753			1.00	0.89	65518	
Bulls	(batch)	1	11332	11332	40	2117			1.00	0.89	10086	
Goats/Sheep	(batch)	1	6650	6650	40	1242			1.00	0.89	5919	
Game	(batch)	1	17706	17706	40	3308			2.00	0.89	31517	
Horses and Donkeys	(batch)	1	1800	1800	40	336			1.00	0.89	1602	
CONTINGENCIES @ 10%				34963	40	6532			1.00	0.89	31117	
SUBTOTAL- DOMESTIC ITEMS				384596							358049	
SUBTOTAL- MOVABLE CAPITAL				440833							413105	
WORKING CAPITAL												
				LOAN	INTEREST							
VARIABLE				9163	2474					1.10	1.00	10079
OVERHEAD				3051	824					1.10	1.00	3356
SUBTOTAL- WORKING CAPITAL				12214	3298							13435
TOTALS												
				535052	3298	106366	14970	14512			501291	

FINANCIAL/ECONOMIC MODEL - CATTLE POST - NGAMILAND - BASE CASE

TABLE 2: STOCK COMPOSITION BY SPECIES AT FULL PRODUCTION

ITEM	HEAD	OFF-TAKE (NO.)	LSU FACTOR	LSU	
Breeding Cows	266	24	1.00	266	
Breeding Heifers	65	6	0.70	45	
Bulls	17	5	1.33	22	
Surplus Heifers	0	7	1.00	0	
Calves	178	0	0.31	55	
1st Year Steers	79	0	0.71	56	
1st Year Heifers	79	0	0.61	48	
2 Year Steers	54	18	0.89	48	
3 Year Steers	36	12	1.11	40	
4 Year Oxen	0	30	1.18	0	
5 Year Oxen	0	0	1.25	0	
6 Year Oxen	0	0	1.25	0	
7 Year Oxen	0	0	1.25	0	
8 Year Oxen	0	0	1.25	0	
9 Year Oxen	0	0	1.25	0	
Goats/Sheep	35	9	0.14	5	
Donkeys/Horses	3	0	0.63	2	
Gemsbok	9	1	0.40	4	
Kudu	6	1	0.45	3	
Ostrich	6	1	0.26	2	
<b>TOTAL</b>	<b>833</b>	<b>113</b>		<b>596</b>	
STOCK DENSITY:	9.31	LSU PER SQ.KM.;	GRAZING LAND SIZE:	6400	HECTARES

TABLE 3: SALES AT FULL PRODUCTION

ITEM	QUANTITY (HEAD)	FINANCIAL VALUE	FOREX ADJ.	TAX ADJ.	ECON. VALUE
Cull Cows	24	36255	1.10	1.00	25762
Cull Heifers	6	7947	1.10	1.00	5647
Heifers	7	8385	1.10	1.00	5958
Steers/Oxen	60	95208	1.10	1.00	67655
Weaners	0	0	1.10	1.00	0
Bulls	5	10572	1.10	1.00	7513
Goats/Sheep	9	1663	1.10	1.00	1829
Gemsbok	1	762	1.10	1.00	839
Kudu	1	570	1.10	1.00	627
Ostrich	1	911	1.10	1.00	1002
Milk		8000	1.10	1.00	8800
<b>TOTALS</b>	<b>113</b>	<b>GROSS INCOME :</b>	<b>170273</b>		<b>125632</b>

## FINANCIAL/ECONOMIC MODEL - CATTLE POST - NGAMILAND - BASE CASE

TABLE 4: VARIABLE EXPENDITURE AT FULL PRODUCTION

ITEM	FINANCIAL VALUES			FOREX ADJ.	TAX ADJ.	ECONOMIC VALUES		
	P/LSU	PS/HA	VALUE			P/LSU	PS/HA	VALUE
<b>TRADABLE ITEMS</b>								
Supplements	80.25	7.47	47807	1.10	0.89	104.75	9.75	62404
Dip Costs	0.00	0.00	0	1.10	0.89	0.00	0.00	0
Replacement Bulls	13.31	1.24	7929	1.10	0.89	17.75	1.65	10572
Ear Tags	1.43	0.13	852	1.10	0.89	1.40	0.13	834
Transport	3.86	0.36	2300	1.10	0.89	3.78	0.35	2252
Fuels, Oils	9.35	0.87	5570	1.10	0.89	9.15	0.85	5453
Live Game: Aerial Support	0.00	0.00	0	1.10	0.89	0.00	0.00	0
: Field Ops.	0.00	0.00	0	1.10	0.89	0.00	0.00	0
: Transport	0.00	0.00	0	1.10	0.89	0.00	0.00	0
Cropping: Ammunition	0.13	0.01	79	1.10	0.89	0.13	0.01	77
: Supplies and Packaging	0.05	0.00	32	1.10	0.89	0.05	0.00	31
: Transport	0.76	0.07	450	1.10	0.89	0.74	0.07	440
: Other	0.00	0.00	0	1.10	0.89	0.00	0.00	0
Miscellaneous Costs	6.63	0.62	3950	1.10	0.89	6.49	0.60	3867
<b>SUBTOTAL TRADABLES</b>	<b>115.77</b>	<b>10.78</b>	<b>68969</b>			<b>144.25</b>	<b>13.43</b>	<b>85931</b>
<b>DOMESTIC ITEMS</b>								
Veterinary and Medicine Costs	0.00	0.00	0	1.00	0.89	33.18	3.09	19767
BMC Marketing Fees	5.72	0.53	3405	1.00	1.00	0.00	0.00	0
Game Licence Fees	0.88	0.08	526	1.00	1.00	0.00	0.00	0
VAT/Sales Tax	31.44	2.93	18730	1.00	1.00	0.00	0.00	0
<b>SUBTOTAL DOMESTIC ITEMS</b>	<b>38.04</b>	<b>3.54</b>	<b>22661</b>			<b>33.18</b>	<b>3.09</b>	<b>19767</b>
<b>TOTAL VARIABLE EXPENDITURE</b>	<b>153.81</b>	<b>14.32</b>	<b>91630</b>			<b>177.43</b>	<b>16.52</b>	<b>105698</b>

TABLE 5: OPERATING OVERHEAD EXPENDITURE AT FULL PRODUCTION

ITEM	FINANCIAL VALUES			FOREX ADJ.	TAX ADJ.	ECONOMIC VALUES		
	P/LSU	PS/HA	VALUE			P/LSU	PS/HA	VALUE
<b>DOMESTIC ITEMS</b>								
Salaries and Wages: Unskilled Labour	22.66	2.11	13500	1.00	1.00	22.66	2.11	6750
: Skilled Labour	15.11	1.41	9000	1.00	1.00	15.11	1.41	8010
: Managers	0.00	0.00	0	1.00	1.00	0.00	0.00	0
Administration	1.68	0.16	1000	1.00	0.89	1.68	0.16	890
Maintenance and Repairs	7.04	0.66	4194	1.00	0.89	7.04	0.66	3733
Insurance	4.72	0.44	2812	1.00	0.89	4.72	0.44	2503
Miscellaneous Fixed Costs	0.00	0.00	0	1.00	0.89	0.00	0.00	0
<b>TOTAL OPERATING OVERHEAD EXPEND.</b>	<b>51.21</b>	<b>4.77</b>	<b>30506</b>			<b>51.21</b>	<b>4.77</b>	<b>21885</b>

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TABLE 6: STATIC FINANCIAL MODEL (AT FULL PRODUCTION)

ITEM	UNITS		TOTAL
Ranch Extent	Hectares		6400
Ranch Stock	Large Stock Units (LSU)		596
Total Capital Requirement	PULA		535052
	P/LSU	P/HECTARE	PULA
GROSS INCOME	285.83	26.61	170273
VARIABLE COSTS	153.81	14.32	91630
GROSS MARGIN	132.01	12.29	78643
OVERHEAD COSTS			
Overhead Operating Costs	51.21	4.77	30506
Loan Amortisation and Interest	8.93	0.83	5318
Provisions for Capital Replacement	23.87	2.22	14222
Interest on Variable Working Capital	4.15	0.39	2474
Interest on Overhead Working Capital	1.38	0.13	824
Land Rental	0.00	0.00	0
Resource Royalty	0.00	0.00	0
TOTAL OVERHEAD COSTS	89.54	8.34	53344
NET CASH INCOME	42.47	3.95	25299
NET CASH INCOME/P100 TOTAL CAPITAL INVESTMENT	4.73		
"TOTAL BENEFITS"/P100 TOTAL CAPITAL INVESTMENT	13.17		
"TOTAL BENEFITS"/HECTARE	11.01		

\* "Total Benefits" = all of Net Cash Income, Salaries and Wages, Licences and Duties, Rental and Royalties.

## FINANCIAL/ECONOMIC MODEL - CATTLE POST - NGAMILAND - BASE CASE

TABLE 7: STATIC ECONOMIC MODEL (AT FULL PRODUCTION)

ITEM	UNITS		TOTAL
Ranch Extent	Hectares		6400
Ranch Stock	Large Stock Units (LSU)		596
Total Capital Requirement	PULA		501291
Economic Depreciation Cost	PULA		14512
Foreign Financing (Prorated)	PULA		0
Foreign Amortisation	PULA		0
Foreign Capital Replacement Provision	PULA		0
Foreign Interest Cost	PULA		0
Domestic Interest Cost	PULA		94693
<hr/>			
ECONOMIC BENEFITS	P/LSU	P/HECTARE	PULA
Gross Income	210.89	19.63	125632
Stock Appreciation	114.90	10.70	68451
TOTAL ECONOMIC BENEFITS	325.79	30.33	194084
ECONOMIC COSTS			
DOMESTIC COMPONENT			
Shadow Unskilled Citizen Wages	11.33	1.05	6750
Other Citizen Wages	13.45	1.25	8010
Opportunity Cost of Capital	67.32	6.27	40103
Other Domestic Economic Costs	45.14	4.20	26892
SUBTOTAL DOMESTIC COMPONENT	137.24	12.77	81756
TRADABLE COMPONENT			
Foreign Remuneration	0.00	0.00	0
Foreign Services	0.00	0.00	0
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	144.25	13.43	85931
SUBTOTAL TRADABLE COMPONENT	144.25	13.43	85931
TOTAL ECONOMIC COSTS	281.48	26.20	167686
<hr/>			
NET ECONOMIC BENEFIT (Gross Value Added)	44.31	4.12	26397
NET VALUE ADDED (Excluding Depreciation)	19.95	1.86	11885
DOMESTIC RESOURCE COST RATIO =	4.44		
NET VALUE ADDED/P100 TOTAL CAPITAL COST =	2.37		
CAPITAL COST/EMPLOYMENT OPPORTUNITY CREATED =	125323		
NUMBER OF EMPLOYMENT OPPORTUNITIES/1000 HA.	0.63		

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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
<b>DEPRECIABLE ASSETS</b>												
"Forty Year" Items	40											
Total Expenditure		64628										
Phased Expenditure		38777	25851	0	0	0	0	0	0	0	0	0
Depreciation		969	1616	1616	1616	1616	1616	1616	1616	1616	1616	1616
Residual value		38777	63658	62042	60427	58811	57195	55580	53964	52348	50733	49117
"Twenty Year" Items	20											
Total Expenditure		5600										
Phased Expenditure		5600	0	0	0	0	0	0	0	0	0	0
Depreciation		280	280	280	280	280	280	280	280	280	280	280
Residual value		5600	5320	5040	4760	4480	4200	3920	3640	3360	3080	2800
"Fifteen Year" Items	15											
Total Expenditure		11778										
Phased Expenditure		7067	4711	0	0	0	0	0	0	0	0	0
Depreciation		471	785	785	785	785	785	785	785	785	785	785
Residual value		7067	11306	10521	9736	8951	8166	7381	6595	5810	5025	4240
"Six Year" Items	6						6					
Total Expenditure		21238						21238				
Phased Expenditure		14866	6371	0	0	0	0	14866	6371	0	0	0
Depreciation		2478	3540	3540	3540	3540	3540	3540	3540	3540	3540	3540
Residual value		14866	18760	15220	11681	8141	4601	15928	18760	15220	11681	8141
"Four Year" Items	4											
Total Expenditure		35000				35000				35000		
Phased Expenditure		35000	0	0	0	35000	0	0	0	35000	0	0
Depreciation		8750	8750	8750	8750	8750	8750	8750	8750	8750	8750	8750
Residual value		35000	26250	17500	8750	35000	26250	17500	8750	35000	26250	17500
<b>NON DEPRECIABLE ASSETS</b>												
Stock	-											
Phased Fin. Expenditure		323476	4710	4710	5083	6014	6920	7876	9023	9489	9930	10572
Phased Econ. Expenditure		323476	4710	4710	5083	6014	6920	7876	9023	9489	9930	10572
Residual value		349632	410411	475386	547304	620430	693312	782311	851904	914850	975185	1035569
Working Capital	-											
Phased Expenditure		12214	0	0	0	0	0	0	0	0	0	0
<b>TOTAL PHASED CAPITAL EXPENDITURE</b>												
Domestic Component		362253	30561	4710	5083	6014	6920	7876	9023	9489	9930	10572
Tradable Component		62533	11082	0	0	35000	0	14866	6371	35000	0	0
Total Financial Value		424786	41644	4710	5083	41014	6920	22742	15394	44489	9930	10572
Total Economic Value		383625	38049	4192	4523	39617	6159	21564	14268	42710	8838	9409
<b>TOTAL ASSET RESIDUAL VALUE</b>												
Domestic Component		388409	474069	537429	607731	679241	750507	837891	905868	967198	1025918	1084686
Tradable Component		62533	61636	48281	34927	56572	43217	44729	37745	59390	46036	32681
Financial Value		450942	535705	585710	642657	735813	793724	882620	943613	1026588	1071954	1117367
Economic Value		406904	482263	525579	573073	659909	710261	789512	843175	918949	958136	997365

FINANCIAL/ECONOMIC MODEL - CATTLE POST - NGAMILAND - BASE CASE

TABLE 9: STOCK PROJECTION

STOCK ON HAND (AUGUST)

	Growth	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Breeding Cows		105	129	131	142	168	193	220	227	238	249	266
Breeding Heifers		31	9	18	35	36	38	46	52	54	62	65
Bulls		5	7	7	9	10	12	13	14	15	16	17
Surplus Heifers		0	0	0	0	0	0	0	0	0	0	0
Calves		40	78	79	85	101	116	132	152	160	167	178
1st Year Steers		10	19	37	38	41	48	55	63	72	76	79
1st Year Heifers		10	19	37	38	41	48	55	63	72	76	79
2 Year Steers		8	7	14	26	27	29	34	39	45	51	54
3 Year Steers		7	6	5	10	19	19	21	24	28	32	36
4 Year Oxen		6	0	0	0	0	0	0	0	0	0	0
5 Year Oxen		6	6	0	0	0	0	0	0	0	0	0
6 Year Oxen		5	6	5	0	0	0	0	0	0	0	0
7 Year Oxen		0	5	5	5	0	0	0	0	0	0	0
8 Year Oxen		0	0	5	5	5	0	0	0	0	0	0
9 Year Oxen		0	0	0	4	5	5	0	0	0	0	0
Goats/Sheep	0.25	35	35	35	35	35	35	35	35	35	35	35
Donkeys/Horses	0.0955	3	3	3	3	3	3	3	3	3	3	3
Gemsbok	0.12	9	9	9	9	9	9	9	9	9	9	9
Kudu	0.12	6	6	6	6	6	6	6	6	6	6	6
Ostrich	0.138	6	6	6	6	6	6	6	6	6	6	6
<b>TOTALS</b>		<b>292</b>	<b>349</b>	<b>403</b>	<b>456</b>	<b>510</b>	<b>567</b>	<b>635</b>	<b>693</b>	<b>742</b>	<b>787</b>	<b>833</b>
PERCENT OF ORIGINAL NO.		100%	120%	138%	156%	175%	194%	218%	237%	254%	270%	285%
PERCENT OF FINAL NO.		35%	42%	48%	55%	61%	68%	76%	83%	89%	95%	100%
ANNUAL INCREASE (%)			20%	15%	13%	12%	11%	12%	9%	7%	6%	6%

STOCK SALES (No.)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Breeding Cows	0	0	0	0	0	0	0	21	22	23	24
Breeding Heifers	0	0	0	0	0	0	0	4	5	5	6
Bulls	0	2	2	2	3	3	3	4	4	4	5
Surplus Heifers	0	0	0	0	0	0	0	0	6	7	7
Calves	0	0	0	0	0	0	0	0	0	0	0
1st Year Steers	0	0	0	0	0	0	0	0	0	0	0
1st Year Heifers	0	0	0	0	0	0	0	0	0	0	0
2 Year Steers	2	2	5	9	9	10	11	13	15	17	18
3 Year Steers	2	2	2	3	6	6	7	8	9	11	12
4 Year Oxen	6	7	5	5	9	18	18	20	23	27	30
5 Year Oxen	0	0	0	0	0	0	0	0	0	0	0
6 Year Oxen	0	0	0	0	0	0	0	0	0	0	0
7 Year Oxen	0	0	0	0	0	0	0	0	0	0	0
8 Year Oxen	0	0	0	0	0	0	0	0	0	0	0
9 Year Oxen	0	0	0	0	0	0	0	0	0	0	0
Goats/Sheep	0	9	9	9	9	9	9	9	9	9	9
Donkeys/Horses	0	0	0	0	0	0	0	0	0	0	0
Gemsbok	0	1	1	1	1	1	1	1	1	1	1
Kudu	0	1	1	1	1	1	1	1	1	1	1
Ostrich	0	1	1	1	1	1	1	1	1	1	1
<b>TOTALS</b>	<b>10</b>	<b>12</b>	<b>14</b>	<b>19</b>	<b>27</b>	<b>37</b>	<b>40</b>	<b>70</b>	<b>84</b>	<b>93</b>	<b>102</b>
PERCENT OFFTAKE RATE	3%	4%	3%	4%	5%	6%	6%	10%	11%	12%	12%
PERCENT OF FINAL SALES	10%	12%	13%	19%	26%	36%	39%	69%	83%	92%	100%

FINANCIAL/ECONOMIC MODEL - CATTLE POST - NGAMILAND - BASE CASE

TABLE 9: STOCK PROJECTION (Continued)

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
Breeding Cows	105	0	0	0	0	0	0	0	0	0	0
Breeding Heifers	31	0	0	0	0	0	0	0	0	0	0
Bulls	5	2	2	2	3	3	3	4	4	4	5
Surplus Heifers	0	0	0	0	0	0	0	0	0	0	0
Calves	40	0	0	0	0	0	0	0	0	0	0
1st Year Steers	10	0	0	0	0	0	0	0	0	0	0
1st Year Heifers	10	0	0	0	0	0	0	0	0	0	0
2 Year Steers	8	0	0	0	0	0	0	0	0	0	0
3 Year Steers	7	0	0	0	0	0	0	0	0	0	0
4 Year Oxen	6	0	0	0	0	0	0	0	0	0	0
5 Year Oxen	6	0	0	0	0	0	0	0	0	0	0
6 Year Oxen	5	0	0	0	0	0	0	0	0	0	0
7 Year Oxen	0	0	0	0	0	0	0	0	0	0	0
8 Year Oxen	0	0	0	0	0	0	0	0	0	0	0
9 Year Oxen	0	0	0	0	0	0	0	0	0	0	0
Goats/Sheep	35	0	0	0	0	0	0	0	0	0	0
Donkeys/Horses	3	0	0	0	0	0	0	0	0	0	0
Gemsbok	9	0	0	0	0	0	0	0	0	0	0
Kudu	6	0	0	0	0	0	0	0	0	0	0
Ostrich	6	0	0	0	0	0	0	0	0	0	0
<b>TOTALS</b>	<b>233</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>5</b>

LSU ON HAND (AUGUST)

LSU /UNIT	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Breeding Cows	1.00	105	129	131	142	168	193	220	227	238	249	266
Breeding Heifers	0.70	22	7	13	25	25	27	32	37	38	43	45
Bulls	1.33	7	9	10	12	14	15	18	19	19	21	22
Surplus Heifers	1.00	0	0	0	0	0	0	0	0	0	0	0
Calves	0.31	12	24	25	27	31	36	41	47	49	52	55
1st Year Steers	0.71	7	13	26	27	29	34	39	45	51	54	56
1st Year Heifers	0.61	6	12	23	23	25	29	34	38	44	46	48
2 Year Steers	0.89	7	6	12	23	24	26	30	35	40	46	48
3 Year Steers	1.11	8	6	6	11	21	21	25	27	31	35	40
4 Year Oxen	1.18	7	0	0	0	0	0	0	0	0	0	0
5 Year Oxen	1.25	8	7	0	0	0	0	0	0	0	0	0
6 Year Oxen	1.25	6	7	7	0	0	0	0	0	0	0	0
7 Year Oxen	1.25	0	6	7	6	0	0	0	0	0	0	0
8 Year Oxen	1.25	0	0	6	6	6	0	0	0	0	0	0
9 Year Oxen	1.25	0	0	0	5	6	6	0	0	0	0	0
Goats/Sheep	0.14	5	5	5	5	5	5	5	5	5	5	5
Donkeys/Horses	0.63	2	2	2	2	2	2	2	2	2	2	2
Gemsbok	0.40	4	4	4	4	4	4	4	4	4	4	4
Kudu	0.45	3	3	3	3	3	3	3	3	3	3	3
Ostrich	0.26	2	2	2	2	2	2	2	2	2	2	2
<b>TOTAL STOCK LSU</b>	<b>195</b>	<b>227</b>	<b>258</b>	<b>295</b>	<b>336</b>	<b>382</b>	<b>437</b>	<b>474</b>	<b>511</b>	<b>546</b>	<b>581</b>	
<b>PERCENT OF ORIGINAL LSU</b>	<b>100%</b>	<b>117%</b>	<b>133%</b>	<b>151%</b>	<b>173%</b>	<b>196%</b>	<b>224%</b>	<b>243%</b>	<b>262%</b>	<b>280%</b>	<b>298%</b>	
<b>PERCENT OF FINAL LSU</b>	<b>34%</b>	<b>39%</b>	<b>44%</b>	<b>51%</b>	<b>58%</b>	<b>66%</b>	<b>75%</b>	<b>82%</b>	<b>88%</b>	<b>94%</b>	<b>100%</b>	



FINANCIAL/ECONOMIC MODEL - CATTLE POST - NGAMILAND - BASE CASE

TABLE 9: STOCK PROJECTION (Continued)

LSU SALES

LSU /UNIT	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Breeding Cows	1.00	0	0	0	0	0	0	21	22	23	24	
Breeding Heifers	0.70	0	0	0	0	0	0	3	3	4	4	
Bulls	1.33	0	2	3	3	4	4	5	6	6	6	
Surplus Heifers	1.00	0	0	0	0	0	0	0	6	7	7	
Calves	0.31	0	0	0	0	0	0	0	0	0	0	
1st Year Steers	0.71	0	0	0	0	0	0	0	0	0	0	
1st Year Heifers	0.61	0	0	0	0	0	0	0	0	0	0	
2 Year Steers	0.89	2	2	4	8	8	9	10	12	13	15	
3 Year Steers	1.11	2	2	2	4	7	7	8	9	10	12	
4 Year Oxen	1.18	0	0	0	0	0	0	0	0	0	0	
5 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0	
6 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0	
7 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0	
8 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0	
9 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0	
Goats/Sheep	0.14	0	1	1	1	1	1	1	1	1	1	
Donkeys/Horses	0.63	0	0	0	0	0	0	0	0	0	0	
Gemsbok	0.40	0	0	0	0	0	0	0	0	0	0	
Kudu	0.45	0	0	0	0	0	0	0	0	0	0	
Ostrich	0.26	0	0	0	0	0	0	0	0	0	0	
<b>TOTAL LSU SALES</b>		<b>4</b>	<b>6</b>	<b>9</b>	<b>14</b>	<b>18</b>	<b>20</b>	<b>22</b>	<b>50</b>	<b>60</b>	<b>66</b>	<b>71</b>
<b>PERCENT OFFTAKE RATE (L</b>		<b>2%</b>	<b>3%</b>	<b>3%</b>	<b>5%</b>	<b>5%</b>	<b>5%</b>	<b>5%</b>	<b>11%</b>	<b>12%</b>	<b>12%</b>	<b>12%</b>
<b>BEEF PRODUCTION (% LSU)</b>		<b>5%</b>	<b>9%</b>	<b>12%</b>	<b>20%</b>	<b>26%</b>	<b>28%</b>	<b>32%</b>	<b>71%</b>	<b>85%</b>	<b>93%</b>	<b>100%</b>

LSU PURCHASES

LSU /UNIT	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Breeding Cows	1.00	105	0	0	0	0	0	0	0	0	0
Breeding Heifers	0.70	22	0	0	0	0	0	0	0	0	0
Bulls	1.33	7	2	3	3	4	4	5	6	6	6
Surplus Heifers	1.00	0	0	0	0	0	0	0	0	0	0
Calves	0.31	12	0	0	0	0	0	0	0	0	0
1st Year Steers	0.71	7	0	0	0	0	0	0	0	0	0
1st Year Heifers	0.61	6	0	0	0	0	0	0	0	0	0
2 Year Steers	0.89	7	0	0	0	0	0	0	0	0	0
3 Year Steers	1.11	8	0	0	0	0	0	0	0	0	0
4 Year Oxen	1.18	7	0	0	0	0	0	0	0	0	0
5 Year Oxen	1.25	8	0	0	0	0	0	0	0	0	0
6 Year Oxen	1.25	6	0	0	0	0	0	0	0	0	0
7 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0
8 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0
9 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0
Goats/Sheep	0.14	5	0	0	0	0	0	0	0	0	0
Donkeys/Horses	0.63	2	0	0	0	0	0	0	0	0	0
Gemsbok	0.40	4	0	0	0	0	0	0	0	0	0
Kudu	0.45	3	0	0	0	0	0	0	0	0	0
Ostrich	0.26	2	0	0	0	0	0	0	0	0	0
<b>TOTAL LSU PURCHASES</b>		<b>195</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>4</b>	<b>4</b>	<b>5</b>	<b>5</b>	<b>6</b>	<b>6</b>

FINANCIAL/ECONOMIC MODEL - CATTLE POST - NGAMLAND - BASE CASE

TABLE 9: STOCK PROJECTION (Continued)

VALUE OF STOCK ON HAND (AUGUST) (PULA)

	Value (Pula)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Breeding Cows	1531.40	160797	197649	201360	217268	257085	295827	336690	347150	365062	382029	406748
Breeding Heifers	1361.35	42202	12919	24521	47677	48573	52410	62015	71360	73095	83740	88061
Bulls	2266.47	11332	15701	16942	20047	23068	26254	30077	31629	33099	35241	37430
Surplus Heifers	1166.60	0	0	0	0	0	0	0	0	0	0	0
Calves	888.25	35530	69084	70381	75941	89858	103400	117682	134820	141777	148366	157966
1st Year Steers	1166.60	11666	22142	43052	43861	47326	55999	64438	73339	84019	88355	92461
1st Year Heifers	1166.60	11666	22142	43052	43861	47326	55999	64438	73339	84019	88355	92461
2 Year Steers	1361.35	10891	9689	18390	35758	36430	39307	46511	53520	60913	69784	73385
3 Year Steers	1669.23	11685	9505	8456	16050	31207	31793	34304	40591	46708	53160	60901
4 Year Oxen	1669.15	10015	0	0	0	0	0	0	0	0	0	0
5 Year Oxen	1627.42	9765	9267	0	0	0	0	0	0	0	0	0
6 Year Oxen	1585.69	7928	9029	8568	0	0	0	0	0	0	0	0
7 Year Oxen	1502.24	0	7128	8117	7703	0	0	0	0	0	0	0
8 Year Oxen	1418.78	0	0	6389	7276	6904	0	0	0	0	0	0
9 Year Oxen	1335.32	0	0	0	5706	6498	6167	0	0	0	0	0
Goats/Sheep	190.00	6650	6650	6650	6650	6650	6650	6650	6650	6650	6650	6650
Donkeys/Horses	600.00	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Gemsbok	706.00	6354	6354	6354	6354	6354	6354	6354	6354	6354	6354	6354
Kudu	792.00	4752	4752	4752	4752	4752	4752	4752	4752	4752	4752	4752
Ostrich	1100.00	6600	6600	6600	6600	6600	6600	6600	6600	6600	6600	6600
TOTALS		349632	410411	475386	547304	620430	693312	782311	851904	914850	975185	1035569
PERCENT OF ORIGINAL NO.		100%	117%	136%	157%	177%	198%	224%	244%	262%	279%	296%
PERCENT OF FINAL NO.		34%	40%	46%	53%	60%	67%	76%	82%	88%	94%	100%
ANNUAL VALUE INCREASE			60778	64976	71918	73126	72881	89000	69593	62945	60336	60384

VALUE OF SALES (PULA)

	Value (Pula)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Breeding Cows	1531.40	0	0	0	0	0	0	0	31952	32944	34644	36255
Breeding Heifers	1361.35	0	0	0	0	0	0	0	5885	6772	6937	7947
Bulls	2266.47	0	3400	4710	5083	6014	6920	7876	9023	9489	9930	10572
Surplus Heifers	1166.60	0	0	0	0	0	0	0	0	6960	7973	8385
Calves	888.25	0	0	0	0	0	0	0	0	0	0	0
1st Year Steers	1166.60	0	0	0	0	0	0	0	0	0	0	0
1st Year Heifers	1166.60	0	0	0	0	0	0	0	0	0	0	0
2 Year Steers	1361.35	2723	3230	6130	11919	12143	13102	15504	17840	20304	23261	24462
3 Year Steers	1669.23	2921	3168	2819	5350	10402	10598	11435	13530	15569	17720	20300
4 Year Oxen	1669.15	10015	11088	9019	8024	15230	29614	30170	32553	38519	44324	50446
5 Year Oxen	1627.42	0	0	0	0	0	0	0	0	0	0	0
6 Year Oxen	1585.69	0	0	0	0	0	0	0	0	0	0	0
7 Year Oxen	1502.24	0	0	0	0	0	0	0	0	0	0	0
8 Year Oxen	1418.78	0	0	0	0	0	0	0	0	0	0	0
9 Year Oxen	1335.32	0	0	0	0	0	0	0	0	0	0	0
Goats/Sheep	190.00	0	1663	1663	1663	1663	1663	1663	1663	1663	1663	1663
Donkeys/Horses	600.00	0	172	172	172	172	172	172	172	172	172	172
Gemsbok	706.00	0	762	762	762	762	762	762	762	762	762	762
Kudu	792.00	0	570	570	570	570	570	570	570	570	570	570
Ostrich	1100.00	0	911	911	911	911	911	911	911	911	911	911
TOTALS		15659	20886	22679	30376	43790	60234	64984	110784	130558	144789	158367
PERCENT OF FINAL VALUE		10%	13%	14%	19%	28%	38%	41%	70%	82%	91%	100%

FINANCIAL/ECONOMIC MODEL - CATTLE POST - NGAMILAND - BASE CASE

TABLE 9: STOCK PROJECTION (Continued)

FINANCIAL VALUE OF PURCHASES (PULA)

	Value (Pula)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Breeding Cows	1531.40	160797	0	0	0	0	0	0	0	0	0	0
Breeding Heifers	1361.35	42202	0	0	0	0	0	0	0	0	0	0
Bulls	2266.47	11332	3400	4710	5083	6014	6920	7876	9023	9489	9930	10572
Surplus Heifers	1166.60	0	0	0	0	0	0	0	0	0	0	0
Calves	888.25	35530	0	0	0	0	0	0	0	0	0	0
1st Year Steers	1166.60	11666	0	0	0	0	0	0	0	0	0	0
1st Year Heifers	1166.60	11666	0	0	0	0	0	0	0	0	0	0
2 Year Steers	1361.35	10891	0	0	0	0	0	0	0	0	0	0
3 Year Steers	1669.23	11685	0	0	0	0	0	0	0	0	0	0
4 Year Oxen	1669.15	10015	0	0	0	0	0	0	0	0	0	0
5 Year Oxen	1627.42	9765	0	0	0	0	0	0	0	0	0	0
6 Year Oxen	1585.69	7928	0	0	0	0	0	0	0	0	0	0
7 Year Oxen	1502.24	0	0	0	0	0	0	0	0	0	0	0
8 Year Oxen	1418.78	0	0	0	0	0	0	0	0	0	0	0
9 Year Oxen	1335.32	0	0	0	0	0	0	0	0	0	0	0
Goats/Sheep	190.00	6650	0	0	0	0	0	0	0	0	0	0
Donkeys/Horses	600.00	1800	0	0	0	0	0	0	0	0	0	0
Gemsbok	706.00	6354	0	0	0	0	0	0	0	0	0	0
Kudu	792.00	4752	0	0	0	0	0	0	0	0	0	0
Ostrich	1100.00	6600	0	0	0	0	0	0	0	0	0	0
<b>TOTALS</b>		<b>323476</b>	<b>4710</b>	<b>4710</b>	<b>5083</b>	<b>6014</b>	<b>6920</b>	<b>7876</b>	<b>9023</b>	<b>9489</b>	<b>9930</b>	<b>10572</b>

ECONOMIC VALUE OF PURCHASES (PULA)

	Value (Pula)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Breeding Cows	1531.40	160797	0	0	0	0	0	0	0	0	0	0
Breeding Heifers	1361.35	42202	0	0	0	0	0	0	0	0	0	0
Bulls	2266.47	11332	3400	4710	5083	6014	6920	7876	9023	9489	9930	10572
Surplus Heifers	1166.60	0	0	0	0	0	0	0	0	0	0	0
Calves	888.25	35530	0	0	0	0	0	0	0	0	0	0
1st Year Steers	1166.60	11666	0	0	0	0	0	0	0	0	0	0
1st Year Heifers	1166.60	11666	0	0	0	0	0	0	0	0	0	0
2 Year Steers	1361.35	10891	0	0	0	0	0	0	0	0	0	0
3 Year Steers	1669.23	11685	0	0	0	0	0	0	0	0	0	0
4 Year Oxen	1669.15	10015	0	0	0	0	0	0	0	0	0	0
5 Year Oxen	1627.42	9765	0	0	0	0	0	0	0	0	0	0
6 Year Oxen	1585.69	7928	0	0	0	0	0	0	0	0	0	0
7 Year Oxen	1502.24	0	0	0	0	0	0	0	0	0	0	0
8 Year Oxen	1418.78	0	0	0	0	0	0	0	0	0	0	0
9 Year Oxen	1335.32	0	0	0	0	0	0	0	0	0	0	0
Goats/Sheep	190.00	6650	0	0	0	0	0	0	0	0	0	0
Donkeys/Horses	600.00	1800	0	0	0	0	0	0	0	0	0	0
Gemsbok	706.00	6354	0	0	0	0	0	0	0	0	0	0
Kudu	792.00	4752	0	0	0	0	0	0	0	0	0	0
Ostrich	1100.00	6600	0	0	0	0	0	0	0	0	0	0
<b>TOTALS</b>		<b>323476</b>	<b>4710</b>	<b>4710</b>	<b>5083</b>	<b>6014</b>	<b>6920</b>	<b>7876</b>	<b>9023</b>	<b>9489</b>	<b>9930</b>	<b>10572</b>



FINANCIAL/ECONOMIC MODEL - CATTLE POST - NGAMILAND - 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
<b>LONG TERM LOANS</b>													
<b>TWENTY YEAR LOAN</b>	<b>20</b>												
Total Expenditure		22741											
Loan Disbursements		13645	9096	0	0	0	0	0	0	0	0	0	0
Loan Payments		2549	4249	4249	4249	4249	4249	4249	4249	4249	4249	4249	4249
Amortisation		682	1137	1137	1137	1137	1137	1137	1137	1137	1137	1137	1137
Interest Payments		1867	3111	3111	3111	3111	3111	3111	3111	3111	3111	3111	3111
Loans Outstanding		13645	22059	20922	19785	18648	17511	16374	15237	14100	12962	11825	
<b>FIFTEEN YEAR LOAN</b>	<b>15</b>												
Total Expenditure		589											
Loan Disbursements		442	147	0	0	0	0	0	0	0	0	0	0
Loan Payments		87	116	116	116	116	116	116	116	116	116	116	116
Amortisation		29	39	39	39	39	39	39	39	39	39	39	39
Interest Payments		57	76	76	76	76	76	76	76	76	76	76	76
Loans Outstanding		442	559	520	481	442	402	363	324	285	245	206	
<b>SIX YEAR LOAN</b>	<b>6</b>							6					
Total Expenditure		1062							1062				
Loan Disbursements		743	319	0	0	0	0	0	743	319	0	0	0
Loan Payments		213	304	304	304	304	304	304	304	304	304	304	304
Amortisation		124	177	177	177	177	177	177	177	177	177	177	177
Interest Payments		89	127	127	127	127	127	127	127	127	127	127	127
Loans Outstanding		743	938	761	584	407	230	796	938	761	584	407	
<b>FOUR YEAR LOAN</b>	<b>4</b>												
Total Expenditure		1750				1750					1750		
Loan Disbursements		1750	0	0	0	1750	0	0	0	1750	0	0	0
Loan Payments		651	651	651	651	651	651	651	651	651	651	651	651
Amortisation		438	438	438	438	438	438	438	438	438	438	438	438
Interest Payments		213	213	213	213	213	213	213	213	213	213	213	213
Loans Outstanding		1750	1313	875	438	1750	1313	875	438	1750	1313	875	
<b>SHORT TERM LOANS</b>													
<b>Working Capital</b>	<b>1</b>												
Overdraft		12214	12214	12214	12214	12214	12214	12214	12214	12214	12214	12214	12214
Interest Payments		3298	3298	3298	3298	3298	3298	3298	3298	3298	3298	3298	3298
<b>TOTAL LONG TERM LOAN DISBURSMENTS</b>													
Domestic Component		16580	9562	0	0	1750	0	743	319	1750	0	0	0
Foreign Component *		0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL LONG TERM LOAN AMORTISATION</b>													
Domestic Component		1273	1791	1791	1791	1791	1791	1791	1791	1791	1791	1791	1791
Foreign Component *		0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL INTEREST PAYMENTS</b>													
Domestic Component		5524	6825	6825	6825	6825	6825	6825	6825	6825	6825	6825	6825
Foreign Component *		0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL LOANS OUTSTANDING</b>													
Domestic Component		16580	24869	23078	21287	21246	19456	18408	16936	16895	15104	13314	
Foreign Component *		0	0	0	0	0	0	0	0	0	0	0	

\* Economic Values

FINANCIAL/ECONOMIC MODEL - CATTLE POST - NGAMILAND - BASE CASE

TABLE 11: PROJECT FINANCIAL ANALYSIS - 5 YEARS (PULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
<b>EXPENDITURE</b>						
Capital Expenditure	424786	41644	4710	5083	41014	6920
Variable Expenditure	9163	54978	91630	91630	91630	91630
Overhead Expenditure	30506	30506	30506	30506	30506	30506
TOTAL EXPENDITURE	464455	127128	126846	127218	163150	129056
<b>INCOME</b>						
Gross Income	57488	67482	78165	89990	102014	113997
Asset Residual Value	0	0	0	0	0	793724
TOTAL INCOME	57488	67482	78165	89990	102014	907721
NET BENEFIT/COST	-406967	-59646	-48681	-37228	-61136	778665
<b>PROJ. FINANCIAL RATE OF RETURN (FRR) OVER 5 YEARS = 5.81%</b>						
<b>PROJ. NET PRESENT VALUE (NPV) @ 8.00% = -44883 Per Hectare = -7.01</b>						

TABLE 12: PROJECT FINANCIAL ANALYSIS - 7 YEARS (PULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
<b>EXPENDITURE</b>								
Capital Expenditure	424786	41644	4710	5083	41014	6920	22742	15394
Variable Expenditure	9163	54978	91630	91630	91630	91630	91630	91630
Overhead Expenditure	30506	30506	30506	30506	30506	30506	30506	30506
TOTAL EXPENDITURE	464455	127128	126846	127218	163150	129056	144878	137530
<b>INCOME</b>								
Gross Income	57488	67482	78165	89990	102014	113997	128631	140074
Asset Residual Value	0	0	0	0	0	0	0	943613
TOTAL INCOME	57488	67482	78165	89990	102014	113997	128631	1083687
NET BENEFIT/COST	-406967	-59646	-48681	-37228	-61136	-15059	-16247	946157
<b>PROJ. FINANCIAL RATE OF RETURN (FRR) OVER 7 YEARS = 6.57%</b>								
<b>PROJ. NET PRESENT VALUE (NPV) @ 8.00% = -43365 Per Hectare = -6.78</b>								

TABLE 13: PROJECT FINANCIAL ANALYSIS - 10 YEARS (PULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<b>EXPENDITURE</b>											
Capital Expenditure	424786	41644	4710	5083	41014	6920	22742	15394	44489	9930	10572
Variable Expenditure	9163	54978	91630	91630	91630	91630	91630	91630	91630	91630	91630
Overhead Expenditure	30506	30506	30506	30506	30506	30506	30506	30506	30506	30506	30506
TOTAL EXPENDITURE	464455	127128	126846	127218	163150	129056	144878	137530	166625	132066	132708
<b>INCOME</b>											
Gross Income	57488	67482	78165	89990	102014	113997	128631	140074	150424	160344	170273
Asset Residual Value	0	0	0	0	0	0	0	0	0	0	1117367
TOTAL INCOME	57488	67482	78165	89990	102014	113997	128631	140074	150424	160344	1287640
NET BENEFIT/COST	-406967	-59646	-48681	-37228	-61136	-15059	-16247	2544	-16201	28279	1154932
<b>PROJ. FINANCIAL RATE OF RETURN (FRR) OVER 10 YEARS = 6.82%</b>											
<b>PROJ. NET PRESENT VALUE (NPV) @ 8.00% = -52846 Per Hectare = -8.26</b>											

## FINANCIAL/ECONOMIC MODEL - CATTLE POST - NGAMILAND - BASE CASE

TABLE 14: ECONOMIC ANALYSIS - 5 YEARS (PULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
<b>ECONOMIC COSTS</b>						
Capital Expenditure	383625	38049	4192	4523	39617	6159
Unskilled Wages	6750	6750	6750	6750	6750	6750
Other Domestic Costs	13961	20941	27922	34902	34902	34902
Tradable Costs	8593	34372	68745	85931	85931	85931
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
<b>TOTAL COSTS</b>	<b>412929</b>	<b>100113</b>	<b>107609</b>	<b>132107</b>	<b>167201</b>	<b>133742</b>
<b>ECONOMIC BENEFITS</b>						
Gross Income	42416	49790	57672	66397	75269	84110
Asset Residual Value	0	0	0	0	0	710261
Foreign Financing	0	0	0	0	0	0
<b>TOTAL BENEFITS</b>	<b>42416</b>	<b>49790</b>	<b>57672</b>	<b>66397</b>	<b>75269</b>	<b>794371</b>
<b>NET BENEFIT/COST</b>	<b>-370512</b>	<b>-50323</b>	<b>-49936</b>	<b>-65709</b>	<b>-91932</b>	<b>660629</b>
<b>ECONOMIC RATE OF RETURN (ERR) OVER 5 YEARS = 1.30%</b>						
<b>NET PRESENT VALUE (NPV) @ 8.00% = -120409 Per Hectare = -18.81</b>						

TABLE 15: ECONOMIC ANALYSIS - 10 YEARS (PULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<b>ECONOMIC COSTS</b>											
Capital Expenditure	383625	38049	4192	4523	39617	6159	21564	14268	42710	8838	9409
Unskilled Wages	6750	6750	6750	6750	6750	6750	6750	6750	6750	6750	6750
Other Domestic Costs	13961	20941	27922	34902	34902	34902	34902	34902	34902	34902	34902
Tradable Costs	8593	34372	68745	85931	85931	85931	85931	85931	85931	85931	85931
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
<b>TOTAL COSTS</b>	<b>412929</b>	<b>100113</b>	<b>107609</b>	<b>132107</b>	<b>167201</b>	<b>133742</b>	<b>149147</b>	<b>141851</b>	<b>170293</b>	<b>136421</b>	<b>136992</b>
<b>ECONOMIC BENEFITS</b>											
Gross Income	42416	49790	57672	66397	75269	84110	94908	103350	110987	118307	125632
Asset Residual Value	0	0	0	0	0	0	0	0	0	0	997365
Foreign Financing	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL BENEFITS</b>	<b>42416</b>	<b>49790</b>	<b>57672</b>	<b>66397</b>	<b>75269</b>	<b>84110</b>	<b>94908</b>	<b>103350</b>	<b>110987</b>	<b>118307</b>	<b>1122997</b>
<b>NET BENEFIT/COST</b>	<b>-370512</b>	<b>-50323</b>	<b>-49936</b>	<b>-65709</b>	<b>-91932</b>	<b>-49632</b>	<b>-54239</b>	<b>-38501</b>	<b>-59306</b>	<b>-18114</b>	<b>986005</b>
<b>ECONOMIC RATE OF RETURN (ERR) OVER 10 YEARS = 2.03%</b>											
<b>NET PRESENT VALUE (NPV) @ 8.00% = -235621 Per Hectare = -36.82</b>											

## FINANCIAL/ECONOMIC MODEL - CATTLE POST - NGAMILAND - BASE CASE

TABLE 16: SUMMARY OF RESULTS

ITEM	UNITS	TOTAL		
Grazing Land Extent	Hectares	6400		
Stock	Large Stock Units (LSU)	596		
ITEM	% of TCI	P/LSU	P/HECTARE	PULA
Total Financial Capital (TCI)	-	898.15	83.60	535052
Financial Gross Income	31.82%	285.83	26.61	170273
Variable Financial Costs	-	153.81	14.32	91630
Fixed Financial Costs	-	89.54	8.34	53344
Net Cash Income	4.73%	42.47	3.95	25299
Local Community Cash Income	4.21%	37.77	3.52	22500
Land Rental	-	0.00	0.00	0
Resource Royalty	-	0.00	0.00	0
FRR (@ 10 Years)	-	-	-	6.82%
FNPV (@ 8%, @ 10 Years)	-	-	-8.26	-52846
Total Economic Capital	-	841.48	78.33	501291
Economic Gross Income	38.72%	325.79	30.33	194084
Economic Costs	33.45%	281.48	26.20	167686
Net Economic Benefit	5.27%	44.31	4.12	26397
Net Value Added	2.37%	19.95	1.86	11885
ERR (@ 10 Years)	-	-	-	2.03%
ENPV (@ 8%, @ 10 Years)	-	-	-36.82	-235621
Economic Capital Cost/Job	-	-	-	125323
Domestic Resource Cost Ratio	-	-	-	4.44
Policy Analysis Matrix	: Effects of Policy / Market Imperfections	: on Output		-23811
		: on Tradable Inputs		16962
		: on Domestic Factors		20263
	: Net Effects of Policy / Market Imperfections	: on Annual Net Income		13414
		: on Net Present Value (10 Years)		182775





**Appendix 4: Commercial livestock production financial/economic model**



APPENDIX 4  
FINANCIAL/ECONOMIC MODEL - COMMERCIAL BEEF BREEDING AND REARING - NGAMILAND - BASE CASE

ASSUMPTIONS\*

Production System:	Beef breeding and rearing for production of three and a half year old steers, with very limited use of goats and game										
Site:	Ranch in northern Kalahari tree savanna with Terminalia sericea and Acacia fleckii with small numbers of kudu, gemsbok and ostrich, with water provided from two boreholes and "economic" rangeland carrying capacity of 12 ha per large stock unit										
Ranch Size:	10000	Hectares or,	100	Square Kilometres							
Carrying Capacity:	12	Hectares per LSU Equivalent or,	8.33	LSU Equivalents/Sq. Km.							
Stock Density:	7.73	LSU Equivalents/Sq. Km. or,	12.9	Hectares per LSU Equivalent							
	100%	Initial Purchase of Breeding Co	105								
Calving Rates	100%	Heifers:	65%	Cows less than 7 Yrs:	65%	Cows more than 7 Yrs:	65%				
Bull Rate	100%	5.0%	Bull Replacement Rate:	20%							
Mortality Rates	100%	Calves:	5.0%	Cows:	3.0%	Steers:	3.0%	Heifers:	3.0%	Bulls	3.0%
Selected Prices:	100%	Capital Items	100%	Livestock	(Variations from Normal for Sensitivity Analysis)						
Capital Sources:	100%	Loan =	25%	Equity =	75%	and:	100%	Foreign	0%	Domestic	100%
Interest Rates:	100%	Rate for Capital Loans:	18%	Rate for Working Capital Loans:	27%						
Working Capital as Proportion of Annual Operating Costs	20%										
Marketing Fees	100%	BMC/Agents Fee as Percentage of Turnover	2.28%								
Land Rental and Resource Royalty (N\$):	100%	Rental:	0.06	per Ha.	100%	Royalty:	0%	of Turnover			
Manpower Needs:	100%	Managers	1	Skilled Labour	2	Unskilled Labour	4				
		Management:	Foreign	0%	Citizen	100%					
Shadow Wage Adjustment:	100%	Managers	1.00	Skilled Labour	1.00	100%	Unskilled Labour	0.50			
Foreign Exchange Premium:	100%	10%	Adjustment Factor =	1.10							
Tax Adjustments:	100%	General VAT/Sales Tax:	11%	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%									

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. Percentages in underlined shaded cells can be changed

## FINANCIAL/ECONOMIC MODEL - COMMERCIAL BEEF BREEDING AND REARING - NGAMILAND - BASE CASE

TABLE 1: CAPITAL REQUIREMENTS

ITEM	UNIT	QUANT.	PRICE PULA	FINAN. COST	LIFE Years	AMORT. + INT.	DEPREC- LATION	ECON. DEPR.	FOREX ADJ.	TAX ADJ.	ECON. COST	
<b>FIXED CAPITAL</b>												
<b>DOMESTIC ITEMS</b>												
Houses Manager		1	18750	18750	40	3503	469	417	1.00	0.89	16688	
Houses Labour		6	7500	45000	40	8407	1125	1001	1.00	0.89	45000	
Office/Storerooms		1	10000	10000	40	1868	250	223	1.00	0.89	8900	
Tourist/Hunter Lodges		0	20000	0	40	0	0	0	1.00	0.89	0	
Boreholes		2	42500	85000	40	15880	2125	1891	1.00	0.89	75650	
Plunge Dip		0	12000	0	40	0	0	0	1.00	0.89	0	
Reservoirs/Pipes/Troughs		2	11688	23375	40	4367	584	520	1.00	0.89	20804	
Firebreaks/Roads	(km)	60	1000	60000	40	11209	1500	1335	1.00	0.89	53400	
Power/Road to Site		1	25500	25500	40	4764	638	567	1.00	0.89	22695	
CONTINGENCIES @ 5%				13381	40	2500	335	298	1.00	0.89	11909	
<b>SUBTOTAL DOMESTIC ITEMS</b>				<b>281006</b>							<b>255046</b>	
<b>TRADABLE ITEMS</b>												
Pens, Boma		1	5600	5600	20	1046	280	274	1.10	0.89	5482	
Scale and Crush		1	6000	6000	15	1178	400	392	1.10	0.89	5874	
Pump/Windmill/Borehole Equipment		2	9450	18900	15	3712	1260	1234	1.10	0.89	18503	
Fencing Perimeter	(km)	45.00	4510	202950	15	39860	13530	13246	1.10	0.89	198688	
Fencing Internal	(km)	30.00	4100	123000	15	24158	8200	8028	1.10	0.89	120417	
CONTINGENCIES @ 5%				17823	15	3500	1188	1163	1.10	0.89	17448	
<b>SUBTOTAL TRADABLES</b>				<b>374273</b>							<b>366413</b>	
<b>SUBTOTAL- FIXED CAPITAL</b>				<b>655279</b>							<b>621458</b>	
<b>MOVABLE CAPITAL</b>												
<b>TRADABLE ITEMS</b>												
LDVs/Trucks		2	87500	175000	4	65054	43750	42831	1.10	0.89	171325	
Tools/Ranch Equipment		1	45000	45000	6	12866	7500	7343	1.10	0.89	44055	
Office/Other Equipment		1	19000	19000	6	5432	3167	3100	1.10	0.89	18601	
Feed/Salt Drums		1	3750	3750	6	1072	625	612	1.10	0.89	3671	
CONTINGENCIES @ 10%				24275	6	6940	4046	3961	1.10	0.89	23765	
<b>SUBTOTAL TRADABLES</b>				<b>267025</b>							<b>261417</b>	
<b>DOMESTIC ITEMS</b>												
Breeding Stock/Calves	(batch)	1	310923	310923	40	58087			1.00	0.89	276721	
Other Heifers, Steers	(batch)	1	195473	195473	40	36518			1.00	0.89	173971	
Bulls	(batch)	1	16700	16700	40	3120			1.00	0.89	14863	
Goats/Sheep	(batch)	1	9500	9500	40	1775			1.00	0.89	8455	
Game	(batch)	1	59450	59450	40	11106			2.00	0.89	105821	
Horses and Donkeys	(batch)	1	3000	3000	40	560			1.00	0.89	2670	
CONTINGENCIES @ 10%				59505	40	11117			1.00	0.89	52959	
<b>SUBTOTAL- DOMESTIC ITEMS</b>				<b>654551</b>							<b>635461</b>	
<b>SUBTOTAL- MOVABLE CAPITAL</b>				<b>921576</b>							<b>896878</b>	
<b>WORKING CAPITAL</b>												
				<b>LOAN</b>	<b>INTEREST</b>							
VARIABLE				30419	8213							
OVERHEAD				16785	4532					1.10	1.00	33461
<b>SUBTOTAL- WORKING CAPITAL</b>				<b>47204</b>	<b>12745</b>					1.10	1.00	<b>18464</b>
<b>TOTALS</b>				<b>1624059</b>	<b>12745</b>	<b>339600</b>	<b>90971</b>	<b>88435</b>			<b>1570261</b>	

FINANCIAL/ECONOMIC MODEL - COMMERCIAL BEEF BREEDING AND REARING - NGAMILAND - BASE CASE

TABLE 2: STOCK COMPOSITION BY SPECIES AT FULL PRODUCTION

ITEM	HEAD	OFF-TAKE (NO.)	LSU FACTOR	LSU
Breeding Cows	313	61	1.00	313
Breeding Heifers	88	18	0.70	62
Bulls	20	6	1.33	27
Surplus Heifers	0	22	1.00	0
Calves	249	0	0.31	77
1st Year Steers	120	0	0.71	86
1st Year Heifers	120	0	0.61	73
2 Year Steers	111	0	0.89	98
3 Year Steers	0	104	1.11	0
4 Year Oxen	0	0	1.18	0
5 Year Oxen	0	0	1.25	0
6 Year Oxen	0	0	1.25	0
7 Year Oxen	0	0	1.25	0
8 Year Oxen	0	0	1.25	0
9 Year Oxen	0	0	1.25	0
Goats/Sheep	50	15	0.14	7
Donkeys/Horses	5	0	0.63	3
Gemsbok	25	3	0.40	10
Kudu	25	3	0.45	11
Ostrich	20	3	0.26	5
<b>TOTAL</b>	<b>1147</b>	<b>235</b>		<b>773</b>
STOCK DENSITY:	7.73	LSU PER SQ.KM.:	10000	HECTARES

TABLE 3: SALES AT FULL PRODUCTION

ITEM	QUANTITY (HEAD)	FINANCIAL VALUE	FOREX ADJ.	TAX ADJ.	ECON. VALUE
Cull Cows	61	97612	1.10	1.00	62792
Cull Heifers	18	25448	1.10	1.00	16370
Heifers	22	27139	1.10	1.00	17458
Steers/Oxen	104	183551	1.10	1.00	118075
Weaners	0	0	1.10	1.00	0
Bulls	6	14446	1.10	1.00	9293
Goats/Sheep	15	2850	1.10	1.00	2445
Gemsbok	3	2118	1.10	1.00	1817
Kudu	3	2376	1.10	1.00	2039
Ostrich	3	3036	1.10	1.00	2605
Milk		8000	1.10	1.00	8800
<b>TOTALS</b>	<b>235</b>	<b>GROSS INCOME : 366576</b>			<b>241694</b>

## FINANCIAL/ECONOMIC MODEL - COMMERCIAL BEEF BREEDING AND REARING - NGAMILAND - BASE CASE

TABLE 4: VARIABLE EXPENDITURE AT FULL PRODUCTION

ITEM	FINANCIAL VALUES			FOREX ADJ.	TAX ADJ.	ECONOMIC VALUES		
	P/LSU	PS/HA.	VALUE			P/LSU	PS/HA.	VALUE
<b>TRADABLE ITEMS</b>								
Supplements	80.25	6.20	62039	1.10	0.89	104.75	8.10	80981
Dip Costs	0.00	0.00	0	1.10	0.89	0.00	0.00	0
Replacement Bulls	14.01	1.08	10834	1.10	0.89	18.69	1.44	14446
Ear Tags	1.43	0.11	1105	1.10	0.89	1.40	0.11	1082
Transport	14.37	1.11	11110	1.10	0.89	14.07	1.09	10877
Fuels, Oils	9.35	0.72	7228	1.10	0.89	9.15	0.71	7076
Live Game: Aerial Support	0.00	0.00	0	1.10	0.89	0.00	0.00	0
: Field Ops.	0.00	0.00	0	1.10	0.89	0.00	0.00	0
: Transport	0.00	0.00	0	1.10	0.89	0.00	0.00	0
Cropping: Ammunition	0.34	0.03	263	1.10	0.89	0.33	0.03	257
: Supplies and Packaging	0.14	0.01	105	1.10	0.89	0.13	0.01	103
: Transport	1.94	0.15	1500	1.10	0.89	1.90	0.15	1468
: Other	0.00	0.00	0	1.10	0.89	0.00	0.00	0
Miscellaneous Costs	11.00	0.85	8505	1.10	0.89	10.77	0.83	8326
<b>SUBTOTAL TRADABLES</b>	<b>132.83</b>	<b>10.27</b>	<b>102689</b>			<b>161.20</b>	<b>12.46</b>	<b>124617</b>
<b>DOMESTIC ITEMS</b>								
Veterinary and Medicine Costs	0.00	0.00	0	1.00	0.89	35.24	2.72	27243
BMC Marketing Fees	9.48	0.73	7332	1.00	1.00	0.00	0.00	0
Game Licence Fees	2.27	0.18	1752	1.00	1.00	0.00	0.00	0
VAT/Sales Tax	52.16	4.03	40323	1.00	1.00	0.00	0.00	0
<b>SUBTOTAL DOMESTIC ITEMS</b>	<b>63.91</b>	<b>4.94</b>	<b>49407</b>			<b>35.24</b>	<b>2.72</b>	<b>27243</b>
<b>TOTAL VARIABLE EXPENDITURE</b>	<b>196.74</b>	<b>15.21</b>	<b>152096</b>			<b>196.44</b>	<b>15.19</b>	<b>151860</b>

TABLE 5: OPERATING OVERHEAD EXPENDITURE AT FULL PRODUCTION

ITEM	FINANCIAL VALUES			FOREX ADJ.	TAX ADJ.	ECONOMIC VALUES		
	P/LSU	PS/HA.	VALUE			P/LSU	PS/HA.	VALUE
<b>DOMESTIC ITEMS</b>								
Salaries and Wages: Unskilled Labour	23.28	1.80	18000	1.00	1.00	23.28	1.80	9000
: Skilled Labour	34.93	2.70	27000	1.00	1.00	34.93	2.70	24030
: Managers	0.00	0.00	0	1.00	1.00	0.00	0.00	0
Administration	3.88	0.30	3000	1.00	0.89	3.88	0.30	2670
Maintenance and Repairs	29.20	2.26	22574	1.00	0.89	29.20	2.26	20091
Insurance	17.27	1.34	13351	1.00	0.89	17.27	1.34	11883
Miscellaneous Fixed Costs	0.00	0.00	0	1.00	0.89	0.00	0.00	0
<b>TOTAL OPERATING OVERHEAD EXPEND.</b>	<b>108.56</b>	<b>8.39</b>	<b>83926</b>			<b>108.56</b>	<b>8.39</b>	<b>67674</b>

FINANCIAL/ECONOMIC MODEL - COMMERCIAL BEEF BREEDING AND REARING - NGAMILAND - BASE CASE

TABLE 6: STATIC FINANCIAL MODEL (AT FULL PRODUCTION)

ITEM	UNITS		TOTAL
Ranch Extent	Hectares		10000
Ranch Stock	Large Stock Units (LSU)		773
Total Capital Requirement	PULA		1624059
	P/LSU	P/HECTARE	PULA
GROSS INCOME	474.18	36.66	366576
VARIABLE COSTS	196.74	15.21	152096
GROSS MARGIN	277.44	21.45	214480
OVERHEAD COSTS			
Overhead Operating Costs	108.56	8.39	83926
Loan Amortisation and Interest	109.82	8.49	84900
Provisions for Capital Replacement	88.26	6.82	68228
Interest on Variable Working Capital	10.62	0.82	8213
Interest on Overhead Working Capital	5.86	0.45	4532
Land Rental	0.78	0.06	600
Resource Royalty	0.00	0.00	0
TOTAL OVERHEAD COSTS	323.90	25.04	250399
NET CASH INCOME	-46.46	-3.59	-35919
NET CASH INCOME/P100 TOTAL CAPITAL INVESTMENT	-2.21		
"TOTAL BENEFITS"/P100 TOTAL CAPITAL INVESTMENT	3.64		
"TOTAL BENEFITS"/HECTARE	5.91		

\* "Total Benefits" = all of Net Cash Income, Salaries and Wages, Licences and Duties, Rental and Royalties.



## FINANCIAL/ECONOMIC MODEL - COMMERCIAL BEEF BREEDING AND REARING - NGAMILAND - BASE CASE

TABLE 7: STATIC ECONOMIC MODEL (AT FULL PRODUCTION)

ITEM	UNITS		TOTAL
Ranch Extent	Hectares		10000
Ranch Stock	Large Stock Units (LSU)		773
Total Capital Requirement	PULA		1570261
Economic Depreciation Cost	PULA		88435
Foreign Financing (Prorated)	PULA		0
Foreign Amortisation	PULA		0
Foreign Capital Replacement Provision	PULA		0
Foreign Interest Cost	PULA		0
Domestic Interest Cost	PULA		261375
<hr/>			
ECONOMIC BENEFITS	P/LSU	P/HECTARE	PULA
Gross Income	312.64	24.17	241694
Stock Appreciation	77.46	5.99	59882
TOTAL ECONOMIC BENEFITS	390.10	30.16	301576
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ECONOMIC COSTS			
DOMESTIC COMPONENT			
Shadow Unskilled Citizen Wages	11.64	0.90	9000
Other Citizen Wages	31.08	2.40	24030
Opportunity Cost of Capital	162.50	12.56	125621
Other Domestic Economic Costs	80.05	6.19	61887
SUBTOTAL DOMESTIC COMPONENT	285.28	22.05	220537
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TRADABLE COMPONENT			
Foreign Remuneration	0.00	0.00	0
Foreign Services	0.00	0.00	0
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	161.20	12.46	124617
SUBTOTAL TRADABLE COMPONENT	161.20	12.46	124617
TOTAL ECONOMIC COSTS	446.47	34.52	345154
<hr/>			
NET ECONOMIC BENEFIT (Gross Value Added)	-56.37	-4.36	-43579
NET VALUE ADDED (Excluding Depreciation)	-170.77	-13.20	-132014
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DOMESTIC RESOURCE COST RATIO =	4.12		
NET VALUE ADDED/P100 TOTAL CAPITAL COST =	-8.41		
CAPITAL COST/EMPLOYMENT OPPORTUNITY CREATED =	224323		
NUMBER OF EMPLOYMENT OPPORTUNITIES/1000 HA.	0.70		

FINANCIAL/ECONOMIC MODEL - COMMERCIAL BEEF BREEDING AND REARING - NGAMILAND - 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
<b>DEPRECIABLE ASSETS</b>												
"Forty Year" Items	40											
Total Expenditure	281006											
Phased Expenditure	168604	112403	0	0	0	0	0	0	0	0	0	0
Depreciation	4215	7025	7025	7025	7025	7025	7025	7025	7025	7025	7025	7025
Residual value	168604	276791	269766	262741	255716	248691	241665	234640	227615	220590	213565	
"Twenty Year" Items	20											
Total Expenditure	5600											
Phased Expenditure	5600	0	0	0	0	0	0	0	0	0	0	0
Depreciation	280	280	280	280	280	280	280	280	280	280	280	280
Residual value	5600	5320	5040	4760	4480	4200	3920	3640	3360	3080	2800	
"Fifteen Year" Items	15											
Total Expenditure	368673											
Phased Expenditure	221204	147469	0	0	0	0	0	0	0	0	0	0
Depreciation	14747	24578	24578	24578	24578	24578	24578	24578	24578	24578	24578	24578
Residual value	221204	353926	329347	304769	280191	255613	231035	206457	181878	157300	132722	
"Six Year" Items	6						6					
Total Expenditure	92025							92025				
Phased Expenditure	64418	27608	0	0	0	0	0	64418	27608	0	0	0
Depreciation	10756	15338	15338	15338	15338	15338	15338	15338	15338	15338	15338	15338
Residual value	64418	81289	65951	50614	35276	19939	69019	81289	65951	50614	35276	
"Four Year" Items	4											
Total Expenditure	175000					175000				175000		
Phased Expenditure	175000	0	0	0	175000	0	0	0	175000	0	0	0
Depreciation	43750	43750	43750	43750	43750	43750	43750	43750	43750	43750	43750	43750
Residual value	175000	131250	87500	43750	175000	131250	87500	43750	175000	131250	87500	
<b>NON DEPRECIABLE ASSETS</b>												
Stock	-											
Phased Fin. Expenditure	523096	6491	6491	8047	9220	10829	12842	13267	13612	14394	14446	
Phased Econ. Expenditure	523096	6491	6491	8047	9220	10829	12842	13267	13612	14394	14446	
Residual value	595046	650426	727389	830792	976076	1139359	1237387	1321076	1394147	1420779	1438768	
Working Capital	-											
Phased Expenditure	47204	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL PHASED CAPITAL EXPENDITURE</b>												
Domestic Component	691700	118894	6491	8047	9220	10829	12842	13267	13612	14394	14446	
Tradable Component	466221	175077	0	0	175000	0	64418	27608	175000	0	0	0
Total Financial Value	1157921	293970	6491	8047	184220	10829	77259	40874	188612	14394	14446	
Total Economic Value	1072043	277215	5777	7162	179531	9638	74494	38835	183440	12811	12857	
<b>TOTAL ASSET RESIDUAL VALUE</b>												
Domestic Component	763650	927217	997155	1093533	1231791	1388049	1479052	1555716	1621762	1641369	1652332	
Tradable Component	466221	571784	487839	403893	494947	411002	391474	335135	426190	342244	258298	
Financial Value	1229871	1499001	1484994	1497426	1726739	1799051	1870526	1890852	2047951	1983613	1910631	
Economic Value	1136079	1385000	1365062	1368656	1580848	1637735	1699609	1712685	1860608	1795875	1723450	

FINANCIAL/ECONOMIC MODEL - COMMERCIAL BEEF BREEDING AND REARING - NGAMILAND - BASE CASE

TABLE 9: STOCK PROJECTION

STOCK ON HAND (AUGUST)												
	Growth	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Breeding Cows		105	132	176	218	250	294	296	306	314	312	313
Breeding Heifers		31	49	49	40	53	65	75	75	89	92	88
Bulls		7	9	11	13	15	18	19	19	20	20	20
Surplus Heifers		0	0	0	0	0	0	0	0	0	0	0
Calves		104	84	112	139	159	187	222	229	235	248	249
1st Year Steers		51	50	41	54	67	77	91	107	111	114	120
1st Year Heifers		51	50	41	54	67	77	91	107	111	114	120
2 Year Steers		49	49	49	40	53	65	75	88	104	108	111
3 Year Steers		0	0	0	0	0	0	0	0	0	0	0
4 Year Oxen		0	0	0	0	0	0	0	0	0	0	0
5 Year Oxen		0	0	0	0	0	0	0	0	0	0	0
6 Year Oxen		0	0	0	0	0	0	0	0	0	0	0
7 Year Oxen		0	0	0	0	0	0	0	0	0	0	0
8 Year Oxen		0	0	0	0	0	0	0	0	0	0	0
9 Year Oxen		0	0	0	0	0	0	0	0	0	0	0
Goats/Sheep	0.3	50	50	50	50	50	50	50	50	50	50	50
Donkeys/Horses	0.0955	5	5	5	5	5	5	5	5	5	5	5
Gemsbok	0.12	25	25	25	25	25	25	25	25	25	25	25
Kudu	0.12	25	25	25	25	25	25	25	25	25	25	25
Ostrich	0.138	20	20	20	20	20	20	20	20	20	20	20
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TOTALS		523	550	604	683	789	908	992	1056	1109	1133	1147
PERCENT OF ORIGINAL NO.		100%	105%	115%	131%	151%	174%	190%	202%	212%	217%	219%
PERCENT OF FINAL NO.		46%	48%	53%	59%	69%	79%	86%	92%	97%	99%	100%
ANNUAL INCREASE (%)			5%	10%	13%	16%	15%	9%	6%	5%	2%	1%
<hr/>												
STOCK SALES (No.)												
		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Breeding Cows		0	0	0	0	0	0	43	43	44	61	61
Breeding Heifers		0	0	0	0	0	0	10	11	11	17	18
Bulls		0	2	3	3	4	5	5	6	6	6	6
Surplus Heifers		0	0	0	0	0	0	0	13	16	16	22
Calves		0	0	0	0	0	0	0	0	0	0	0
1st Year Steers		0	0	0	0	0	0	0	0	0	0	0
1st Year Heifers		0	0	0	0	0	0	0	0	0	0	0
2 Year Steers		0	0	0	0	0	0	0	0	0	0	0
3 Year Steers		0	48	48	47	38	51	63	73	85	101	104
4 Year Oxen		0	0	0	0	0	0	0	0	0	0	0
5 Year Oxen		0	0	0	0	0	0	0	0	0	0	0
6 Year Oxen		0	0	0	0	0	0	0	0	0	0	0
7 Year Oxen		0	0	0	0	0	0	0	0	0	0	0
8 Year Oxen		0	0	0	0	0	0	0	0	0	0	0
9 Year Oxen		0	0	0	0	0	0	0	0	0	0	0
Goats/Sheep		0	15	15	15	15	15	15	15	15	15	15
Donkeys/Horses		0	0	0	0	0	0	0	0	0	0	0
Gemsbok		0	3	3	3	3	3	3	3	3	3	3
Kudu		0	3	3	3	3	3	3	3	3	3	3
Ostrich		0	3	3	3	3	3	3	3	3	3	3
<hr/>												
TOTALS		0	50	51	51	42	56	121	145	162	201	211
PERCENT OFFTAKE RATE (N		0%	9%	8%	7%	5%	6%	12%	14%	15%	18%	18%
PERCENT OF FINAL SALES		0%	24%	24%	24%	20%	26%	57%	69%	77%	95%	100%

FINANCIAL/ECONOMIC MODEL - COMMERCIAL BEEF BREEDING AND REARING - NGAMILAND - BASE CASE

TABLE 9: STOCK PROJECTION (Continued)

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
Breeding Cows	105	0	0	0	0	0	0	0	0	0	0
Breeding Heifers	31	0	0	0	0	0	0	0	0	0	0
Bulls	7	2	3	3	4	5	5	6	6	6	6
Surplus Heifers	0	0	0	0	0	0	0	0	0	0	0
Calves	104	0	0	0	0	0	0	0	0	0	0
1st Year Steers	51	0	0	0	0	0	0	0	0	0	0
1st Year Heifers	51	0	0	0	0	0	0	0	0	0	0
2 Year Steers	49	0	0	0	0	0	0	0	0	0	0
3 Year Steers	0	0	0	0	0	0	0	0	0	0	0
4 Year Oxen	0	0	0	0	0	0	0	0	0	0	0
5 Year Oxen	0	0	0	0	0	0	0	0	0	0	0
6 Year Oxen	0	0	0	0	0	0	0	0	0	0	0
7 Year Oxen	0	0	0	0	0	0	0	0	0	0	0
8 Year Oxen	0	0	0	0	0	0	0	0	0	0	0
9 Year Oxen	0	0	0	0	0	0	0	0	0	0	0
Goats/Sheep	50	0	0	0	0	0	0	0	0	0	0
Donkeys/Horses	5	0	0	0	0	0	0	0	0	0	0
Gemsbok	25	0	0	0	0	0	0	0	0	0	0
Kudu	25	0	0	0	0	0	0	0	0	0	0
Ostrich	20	0	0	0	0	0	0	0	0	0	0
<b>TOTALS</b>	<b>398</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>5</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>6</b>

LSU ON HAND (AUGUST)

LSU /UNIT	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Breeding Cows	1.00	105	132	176	218	250	294	296	306	314	312	313
Breeding Heifers	0.70	22	35	34	28	37	46	52	52	62	64	62
Bulls	1.33	9	12	15	17	20	24	25	25	27	27	27
Surplus Heifers	1.00	0	0	0	0	0	0	0	0	0	0	0
Calves	0.31	32	26	35	43	49	58	69	71	73	77	77
1st Year Steers	0.71	36	36	29	39	48	55	64	76	79	81	86
1st Year Heifers	0.61	31	31	25	33	41	47	55	66	68	69	73
2 Year Steers	0.89	44	44	44	35	47	58	67	78	93	96	98
3 Year Steers	1.11	0	0	0	0	0	0	0	0	0	0	0
4 Year Oxen	1.18	0	0	0	0	0	0	0	0	0	0	0
5 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0	0
6 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0	0
7 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0	0
8 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0	0
9 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0	0
Goats/Sheep	0.14	7	7	7	7	7	7	7	7	7	7	7
Donkeys/Horses	0.63	3	3	3	3	3	3	3	3	3	3	3
Gemsbok	0.40	10	10	10	10	10	10	10	10	10	10	10
Kudu	0.45	11	11	11	11	11	11	11	11	11	11	11
Ostrich	0.26	5	5	5	5	5	5	5	5	5	5	5
<b>TOTAL STOCK LSU</b>		<b>279</b>	<b>315</b>	<b>357</b>	<b>413</b>	<b>492</b>	<b>581</b>	<b>628</b>	<b>674</b>	<b>715</b>	<b>726</b>	<b>736</b>
<b>PERCENT OF ORIGINAL LSU</b>		<b>100%</b>	<b>113%</b>	<b>128%</b>	<b>148%</b>	<b>176%</b>	<b>208%</b>	<b>225%</b>	<b>242%</b>	<b>256%</b>	<b>260%</b>	<b>264%</b>
<b>PERCENT OF FINAL LSU</b>		<b>38%</b>	<b>43%</b>	<b>48%</b>	<b>56%</b>	<b>67%</b>	<b>79%</b>	<b>85%</b>	<b>92%</b>	<b>97%</b>	<b>99%</b>	<b>100%</b>

FINANCIAL/ECONOMIC MODEL - COMMERCIAL BEEF BREEDING AND REARING - NGAMILAND - BASE CASE

TABLE 9: STOCK PROJECTION (Continued)

LSU SALES													
LSU /UNIT	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10		
Breeding Cows	1.00	0	0	0	0	0	43	43	44	61	61		
Breeding Heifers	0.70	0	0	0	0	0	7	8	8	12	12		
Bulls	1.33	0	3	4	4	5	6	7	8	8	8		
Surplus Heifers	1.00	0	0	0	0	0	0	13	16	16	22		
Calves	0.31	0	0	0	0	0	0	0	0	0	0		
1st Year Steers	0.71	0	0	0	0	0	0	0	0	0	0		
1st Year Heifers	0.61	0	0	0	0	0	0	0	0	0	0		
2 Year Steers	0.89	0	0	0	0	0	0	0	0	0	0		
3 Year Steers	1.11	0	53	53	53	43	57	70	81	95	112	116	
4 Year Oxen	1.18	0	0	0	0	0	0	0	0	0	0	0	
5 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0	0	
6 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0	0	
7 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0	0	
8 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0	0	
9 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0	0	
Goats/Sheep	0.14	0	2	2	2	2	2	2	2	2	2	2	
Donkeys/Horses	0.63	0	0	0	0	0	0	0	0	0	0	0	
Gemsbok	0.40	0	1	1	1	1	1	1	1	1	1	1	
Kudu	0.45	0	1	1	1	1	1	1	1	1	1	1	
Ostrich	0.26	0	1	1	1	1	1	1	1	1	1	1	
<b>TOTAL LSU SALES</b>		0	56	57	57	48	63	127	152	170	209	219	
<b>PERCENT OFFTAKE RATE (L</b>		0%	18%	16%	14%	10%	11%	20%	23%	24%	29%	30%	
<b>BEEF PRODUCTION (% LSU)</b>		0%	25%	26%	26%	22%	29%	58%	69%	78%	96%	100%	

LSU PURCHASES													
LSU /UNIT	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10		
Breeding Cows	1.00	105	0	0	0	0	0	0	0	0	0	0	
Breeding Heifers	0.70	22	0	0	0	0	0	0	0	0	0	0	
Bulls	1.33	9	3	4	4	5	6	7	7	8	8	8	
Surplus Heifers	1.00	0	0	0	0	0	0	0	0	0	0	0	
Calves	0.31	32	0	0	0	0	0	0	0	0	0	0	
1st Year Steers	0.71	36	0	0	0	0	0	0	0	0	0	0	
1st Year Heifers	0.61	31	0	0	0	0	0	0	0	0	0	0	
2 Year Steers	0.89	44	0	0	0	0	0	0	0	0	0	0	
3 Year Steers	1.11	0	0	0	0	0	0	0	0	0	0	0	
4 Year Oxen	1.18	0	0	0	0	0	0	0	0	0	0	0	
5 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0	0	
6 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0	0	
7 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0	0	
8 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0	0	
9 Year Oxen	1.25	0	0	0	0	0	0	0	0	0	0	0	
Goats/Sheep	0.14	7	0	0	0	0	0	0	0	0	0	0	
Donkeys/Horses	0.63	3	0	0	0	0	0	0	0	0	0	0	
Gemsbok	0.40	10	0	0	0	0	0	0	0	0	0	0	
Kudu	0.45	11	0	0	0	0	0	0	0	0	0	0	
Ostrich	0.26	5	0	0	0	0	0	0	0	0	0	0	
<b>TOTAL LSU PURCHASES</b>		279	3	4	4	5	6	7	7	8	8	8	

FINANCIAL/ECONOMIC MODEL - COMMERCIAL BEEF BREEDING AND REARING - NGAMILAND - BASE CASE

TABLE 9: STOCK PROJECTION (Continued)

VALUE OF STOCK ON HAND (AUGUST) (PULA)												
Value (Pula)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Breeding Cows	1612.00	169260	212655	283629	351624	402852	473161	476947	492718	505557	503156	504958
Breeding Heifers	1433.00	44423	70891	70112	56616	75511	93613	107252	107075	126978	131177	126678
Bulls	2385.76	16700	21638	26825	30733	36097	42807	44222	45374	47981	48153	47912
Surplus Heifers	1228.00	0	0	0	0	0	0	0	0	0	0	0
Calves	935.00	97240	78521	104728	129834	148750	174711	207187	214038	219616	232233	233065
1st Year Steers	1228.00	62628	61940	50017	66710	82702	94751	111288	131975	136339	139892	147929
1st Year Heifers	1228.00	62628	61940	50017	66710	82702	94751	111288	131975	136339	139892	147929
2 Year Steers	1433.00	70217	70891	70112	56616	75511	93613	107252	125971	149386	154326	158347
3 Year Steers	1757.08	0	0	0	0	0	0	0	0	0	0	0
4 Year Oxen	1757.00	0	0	0	0	0	0	0	0	0	0	0
5 Year Oxen	1713.08	0	0	0	0	0	0	0	0	0	0	0
6 Year Oxen	1669.15	0	0	0	0	0	0	0	0	0	0	0
7 Year Oxen	1581.30	0	0	0	0	0	0	0	0	0	0	0
8 Year Oxen	1493.45	0	0	0	0	0	0	0	0	0	0	0
9 Year Oxen	1405.60	0	0	0	0	0	0	0	0	0	0	0
Goats/Sheep	190.00	9500	9500	9500	9500	9500	9500	9500	9500	9500	9500	9500
Donkeys/Horses	600.00	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
Gemsbok	706.00	17650	17650	17650	17650	17650	17650	17650	17650	17650	17650	17650
Kudu	792.00	19800	19800	19800	19800	19800	19800	19800	19800	19800	19800	19800
Ostrich	1100.00	22000	22000	22000	22000	22000	22000	22000	22000	22000	22000	22000
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TOTALS		595046	650426	727389	830792	976076	1139359	1237387	1321076	1394147	1420779	1438768
PERCENT OF ORIGINAL AMT		100%	109%	122%	140%	164%	191%	208%	222%	234%	239%	242%
PERCENT OF FINAL AMT.		41%	45%	51%	58%	68%	79%	86%	92%	97%	99%	100%
ANNUAL VALUE INCREASE			55379	76964	103403	145284	163283	98028	83689	73070	26632	17989
<hr/>												
VALUE OF SALES (PULA)												
Value (Pula)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
Breeding Cows	1612.00	0	0	0	0	0	68845	69396	71690	98078	97612	
Breeding Heifers	1433.00	0	0	0	0	0	13621	15605	15579	24634	25448	
Bulls	2385.76	0	5010	6491	8047	9220	10829	12842	13267	13612	14394	14446
Surplus Heifers	1228.00	0	0	0	0	0	0	16192	19202	19837	27139	
Calves	935.00	0	0	0	0	0	0	0	0	0	0	
1st Year Steers	1228.00	0	0	0	0	0	0	0	0	0	0	
1st Year Heifers	1228.00	0	0	0	0	0	0	0	0	0	0	
2 Year Steers	1433.00	0	0	0	0	0	0	0	0	0	0	
3 Year Steers	1757.08	0	83514	84315	83389	67337	89810	111341	127562	149826	177676	183551
4 Year Oxen	1757.00	0	0	0	0	0	0	0	0	0	0	0
5 Year Oxen	1713.08	0	0	0	0	0	0	0	0	0	0	0
6 Year Oxen	1669.15	0	0	0	0	0	0	0	0	0	0	0
7 Year Oxen	1581.30	0	0	0	0	0	0	0	0	0	0	0
8 Year Oxen	1493.45	0	0	0	0	0	0	0	0	0	0	0
9 Year Oxen	1405.60	0	0	0	0	0	0	0	0	0	0	0
Goats/Sheep	190.00	0	2850	2850	2850	2850	2850	2850	2850	2850	2850	2850
Donkeys/Horses	600.00	0	287	287	287	287	287	287	287	287	287	287
Gemsbok	706.00	0	2118	2118	2118	2118	2118	2118	2118	2118	2118	2118
Kudu	792.00	0	2376	2376	2376	2376	2376	2376	2376	2376	2376	2376
Ostrich	1100.00	0	3036	3036	3036	3036	3036	3036	3036	3036	3036	3036
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TOTALS		0	88524	90806	91437	76557	100640	206649	242022	269910	334619	348196
PERCENT OF FINAL VALUE		0%	25%	26%	26%	22%	29%	59%	70%	78%	96%	100%

FINANCIAL/ECONOMIC MODEL - COMMERCIAL BEEF BREEDING AND REARING - NGAMILAND - BASE CASE

TABLE 9: STOCK PROJECTION (Continued)

FINANCIAL VALUE OF PURCHASES (PULA)

	Value (Pula)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Breeding Cows	1612.00	169260	0	0	0	0	0	0	0	0	0	0
Breeding Heifers	1433.00	44423	0	0	0	0	0	0	0	0	0	0
Bulls	2385.76	16700	5010	6491	8047	9220	10829	12842	13267	13612	14394	14446
Surplus Heifers	1228.00	0	0	0	0	0	0	0	0	0	0	0
Calves	935.00	97240	0	0	0	0	0	0	0	0	0	0
1st Year Steers	1228.00	62628	0	0	0	0	0	0	0	0	0	0
1st Year Heifers	1228.00	62628	0	0	0	0	0	0	0	0	0	0
2 Year Steers	1433.00	70217	0	0	0	0	0	0	0	0	0	0
3 Year Steers	1757.08	0	0	0	0	0	0	0	0	0	0	0
4 Year Oxen	1757.00	0	0	0	0	0	0	0	0	0	0	0
5 Year Oxen	1713.08	0	0	0	0	0	0	0	0	0	0	0
6 Year Oxen	1669.15	0	0	0	0	0	0	0	0	0	0	0
7 Year Oxen	1581.30	0	0	0	0	0	0	0	0	0	0	0
8 Year Oxen	1493.45	0	0	0	0	0	0	0	0	0	0	0
9 Year Oxen	1405.60	0	0	0	0	0	0	0	0	0	0	0
Goats/Sheep	190.00	9500	0	0	0	0	0	0	0	0	0	0
Donkeys/Horses	600.00	3000	0	0	0	0	0	0	0	0	0	0
Gemsbok	706.00	17650	0	0	0	0	0	0	0	0	0	0
Kudu	792.00	19800	0	0	0	0	0	0	0	0	0	0
Ostrich	1100.00	22000	0	0	0	0	0	0	0	0	0	0
<b>TOTALS</b>		<b>523096</b>	<b>6491</b>	<b>6491</b>	<b>8047</b>	<b>9220</b>	<b>10829</b>	<b>12842</b>	<b>13267</b>	<b>13612</b>	<b>14394</b>	<b>14446</b>

ECONOMIC VALUE OF PURCHASES (PULA)

	Value (Pula)	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Breeding Cows	1612.00	169260	0	0	0	0	0	0	0	0	0	0
Breeding Heifers	1433.00	44423	0	0	0	0	0	0	0	0	0	0
Bulls	2385.76	16700	5010	6491	8047	9220	10829	12842	13267	13612	14394	14446
Surplus Heifers	1228.00	0	0	0	0	0	0	0	0	0	0	0
Calves	935.00	97240	0	0	0	0	0	0	0	0	0	0
1st Year Steers	1228.00	62628	0	0	0	0	0	0	0	0	0	0
1st Year Heifers	1228.00	62628	0	0	0	0	0	0	0	0	0	0
2 Year Steers	1433.00	70217	0	0	0	0	0	0	0	0	0	0
3 Year Steers	1757.08	0	0	0	0	0	0	0	0	0	0	0
4 Year Oxen	1757.00	0	0	0	0	0	0	0	0	0	0	0
5 Year Oxen	1713.08	0	0	0	0	0	0	0	0	0	0	0
6 Year Oxen	1669.15	0	0	0	0	0	0	0	0	0	0	0
7 Year Oxen	1581.30	0	0	0	0	0	0	0	0	0	0	0
8 Year Oxen	1493.45	0	0	0	0	0	0	0	0	0	0	0
9 Year Oxen	1405.60	0	0	0	0	0	0	0	0	0	0	0
Goats/Sheep	190.00	9500	0	0	0	0	0	0	0	0	0	0
Donkeys/Horses	600.00	3000	0	0	0	0	0	0	0	0	0	0
Gemsbok	706.00	17650	0	0	0	0	0	0	0	0	0	0
Kudu	792.00	19800	0	0	0	0	0	0	0	0	0	0
Ostrich	1100.00	22000	0	0	0	0	0	0	0	0	0	0
<b>TOTALS</b>		<b>523096</b>	<b>6491</b>	<b>6491</b>	<b>8047</b>	<b>9220</b>	<b>10829</b>	<b>12842</b>	<b>13267</b>	<b>13612</b>	<b>14394</b>	<b>14446</b>





## FINANCIAL/ECONOMIC MODEL - COMMERCIAL BEEF BREEDING AND REARING - NGAMILAND - 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
<b>LONG TERM LOANS</b>													
<b>TWENTY YEAR LOAN</b>	<b>20</b>												
Total Expenditure		235289											
Loan Disbursements		141174	94116	0	0	0	0	0	0	0	0	0	0
Loan Payments		26374	43957	43957	43957	43957	43957	43957	43957	43957	43957	43957	43957
Amortisation		7059	11764	11764	11764	11764	11764	11764	11764	11764	11764	11764	11764
Interest Payments		19315	32192	32192	32192	32192	32192	32192	32192	32192	32192	32192	32192
Loans Outstanding		141174	228231	216466	204702	192937	181173	169408	157644	145879	134115	122350	
<b>FIFTEEN YEAR LOAN</b>	<b>15</b>												
Total Expenditure		92168											
Loan Disbursements		69126	23042	0	0	0	0	0	0	0	0	0	0
Loan Payments		13577	18102	18102	18102	18102	18102	18102	18102	18102	18102	18102	18102
Amortisation		4608	6145	6145	6145	6145	6145	6145	6145	6145	6145	6145	6145
Interest Payments		8968	11958	11958	11958	11958	11958	11958	11958	11958	11958	11958	11958
Loans Outstanding		69126	87560	81415	75271	69126	62982	56837	50692	44548	38403	32259	
<b>SIX YEAR LOAN</b>	<b>6</b>												
Total Expenditure		23006							23006				
Loan Disbursements		16104	6902	0	0	0	0	16104	6902	0	0	0	0
Loan Payments		4604	6578	6578	6578	6578	6578	6578	6578	6578	6578	6578	6578
Amortisation		2684	3834	3834	3834	3834	3834	3834	3834	3834	3834	3834	3834
Interest Payments		1920	2743	2743	2743	2743	2743	2743	2743	2743	2743	2743	2743
Loans Outstanding		16104	20322	16488	12653	8819	4985	17255	20322	16488	12653	8819	
<b>FOUR YEAR LOAN</b>	<b>4</b>												
Total Expenditure		43750					43750				43750		
Loan Disbursements		43750	0	0	0	43750	0	0	0	43750	0	0	0
Loan Payments		16264	16264	16264	16264	16264	16264	16264	16264	16264	16264	16264	16264
Amortisation		10938	10938	10938	10938	10938	10938	10938	10938	10938	10938	10938	10938
Interest Payments		5326	5326	5326	5326	5326	5326	5326	5326	5326	5326	5326	5326
Loans Outstanding		43750	32813	21875	10938	43750	32813	21875	10938	43750	32813	21875	
<b>SHORT TERM LOANS</b>													
Working Capital	<b>1</b>												
Overdraft		47204	47204	47204	47204	47204	47204	47204	47204	47204	47204	47204	47204
Interest Payments		12745	12745	12745	12745	12745	12745	12745	12745	12745	12745	12745	12745
<b>TOTAL LONG TERM LOAN DISBURSMENTS</b>													
Domestic Component		270154	124060	0	0	43750	0	16104	6902	43750	0	0	0
Foreign Component *		0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL LONG TERM LOAN AMORTISATION</b>													
Domestic Component		25289	32681	32681	32681	32681	32681	32681	32681	32681	32681	32681	32681
Foreign Component *		0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL INTEREST PAYMENTS</b>													
Domestic Component		48275	64964	64964	64964	64964	64964	64964	64964	64964	64964	64964	64964
Foreign Component *		0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL LOANS OUTSTANDING</b>													
Domestic Component		270154	368925	336244	303563	314632	281952	265375	239596	250665	217984	185303	
Foreign Component *		0	0	0	0	0	0	0	0	0	0	0	0

\* Economic Values

FINANCIAL/ECONOMIC MODEL - COMMERCIAL BEEF BREEDING AND REARING - NGAMILAND - BASE CASE

TABLE 11: PROJECT FINANCIAL ANALYSIS - 5 YEARS (PULA, 1994)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
<b>EXPENDITURE</b>						
Capital Expenditure	1157921	293970	6491	8047	184220	10829
Variable Expenditure	15210	91258	152096	152096	152096	152096
Overhead Expenditure	84526	84526	84526	84526	84526	84526
TOTAL EXPENDITURE	1257656	469753	243113	244669	420842	247451
<b>INCOME</b>						
Gross Income	151609	165719	185328	211673	248689	290292
Asset Residual Value	0	0	0	0	0	1799051
TOTAL INCOME	151609	165719	185328	211673	248689	2089343
NET BENEFIT/COST	-1106047	-304035	-57785	-32996	-172152	1841892

PROJ. FINANCIAL RATE OF RETURN (FRR) OVER 5 YEARS = 2.26%  
 PROJ. NET PRESENT VALUE (NPV) @ 8.00% = -311363 Per Hectare = -31.14

TABLE 12: PROJECT FINANCIAL ANALYSIS - 7 YEARS (PULA, 1994)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
<b>EXPENDITURE</b>								
Capital Expenditure	1157921	293970	6491	8047	184220	10829	77259	40874
Variable Expenditure	15210	91258	152096	152096	152096	152096	152096	152096
Overhead Expenditure	84526	84526	84526	84526	84526	84526	84526	84526
TOTAL EXPENDITURE	1257656	469753	243113	244669	420842	247451	313881	277496
<b>INCOME</b>								
Gross Income	151609	165719	185328	211673	248689	290292	315268	336590
Asset Residual Value	0	0	0	0	0	0	0	1890852
TOTAL INCOME	151609	165719	185328	211673	248689	290292	315268	2227442
NET BENEFIT/COST	-1106047	-304035	-57785	-32996	-172152	42841	1386	1949946

PROJ. FINANCIAL RATE OF RETURN (FRR) OVER 7 YEARS = 2.85%  
 PROJ. NET PRESENT VALUE (NPV) @ 8.00% = -390766 Per Hectare = -39.08

TABLE 13: PROJECT FINANCIAL ANALYSIS - 10 YEARS (PULA, 1994)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<b>EXPENDITURE</b>											
Capital Expenditure	1157921	293970	6491	8047	184220	10829	77259	40874	188612	14394	14446
Variable Expenditure	15210	91258	152096	152096	152096	152096	152096	152096	152096	152096	152096
Overhead Expenditure	84526	84526	84526	84526	84526	84526	84526	84526	84526	84526	84526
TOTAL EXPENDITURE	1257656	469753	243113	244669	420842	247451	313881	277496	425234	251016	251068
<b>INCOME</b>											
Gross Income	151609	165719	185328	211673	248689	290292	315268	336590	355208	361993	366576
Asset Residual Value	0	0	0	0	0	0	0	0	0	0	1910631
TOTAL INCOME	151609	165719	185328	211673	248689	290292	315268	336590	355208	361993	2277207
NET BENEFIT/COST	-1106047	-304035	-57785	-32996	-172152	42841	1386	59095	-70026	110977	2026140

PROJ. FINANCIAL RATE OF RETURN (FRR) OVER 10 YEARS = 2.89%  
 PROJ. NET PRESENT VALUE (NPV) @ 8.00% = -526984 Per Hectare = -52.70

## FINANCIAL/ECONOMIC MODEL - COMMERCIAL BEEF BREEDING AND REARING - NGAMILAND - BASE CASE

TABLE 14: ECONOMIC ANALYSIS - 5 YEARS (PULA,1994)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
<b>ECONOMIC COSTS</b>						
Capital Expenditure	1072043	277215	5777	7162	179531	9638
Unskilled Wages	9000	9000	9000	9000	9000	9000
Other Domestic Costs	34367	51550	68733	85917	85917	85917
Tradable Costs	12462	49847	99694	124617	124617	124617
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
<b>TOTAL COSTS</b>	<b>1127872</b>	<b>387612</b>	<b>183204</b>	<b>226696</b>	<b>399064</b>	<b>229171</b>
<b>ECONOMIC BENEFITS</b>						
Gross Income	99960	109263	122192	139562	163968	191397
Asset Residual Value	0	0	0	0	0	1637735
Foreign Financing	0	0	0	0	0	0
<b>TOTAL BENEFITS</b>	<b>99960</b>	<b>109263</b>	<b>122192</b>	<b>139562</b>	<b>163968</b>	<b>1829132</b>
<b>NET BENEFIT/COST</b>	<b>-1027912</b>	<b>-278349</b>	<b>-61012</b>	<b>-87134</b>	<b>-235097</b>	<b>1599960</b>
<b>ECONOMIC RATE OF RETURN (ERR) OVER 5 YEARS = -1.34%</b>						
<b>NET PRESENT VALUE (NPV) @ 8.00% = -454646</b>					<b>Per Hectare =</b>	<b>-45.46</b>

TABLE 15: ECONOMIC ANALYSIS - 10 YEARS (PULA, 1994)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	
<b>ECONOMIC COSTS</b>												
Capital Expenditure	1072043	277215	5777	7162	179531	9638	74494	38835	183440	12811	12857	
Unskilled Wages	9000	9000	9000	9000	9000	9000	9000	9000	9000	9000	9000	
Other Domestic Costs	34367	51550	68733	85917	85917	85917	85917	85917	85917	85917	85917	
Tradable Costs	12462	49847	99694	124617	124617	124617	124617	124617	124617	124617	124617	
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	
<b>TOTAL COSTS</b>	<b>1127872</b>	<b>387612</b>	<b>183204</b>	<b>226696</b>	<b>399064</b>	<b>229171</b>	<b>294028</b>	<b>258369</b>	<b>402974</b>	<b>232345</b>	<b>232390</b>	
<b>ECONOMIC BENEFITS</b>												
Gross Income	99960	109263	122192	139562	163968	191397	207865	221923	234198	238672	241694	
Asset Residual Value	0	0	0	0	0	0	0	0	0	0	1723450	
Foreign Financing	0	0	0	0	0	0	0	0	0	0	0	
<b>TOTAL BENEFITS</b>	<b>99960</b>	<b>109263</b>	<b>122192</b>	<b>139562</b>	<b>163968</b>	<b>191397</b>	<b>207865</b>	<b>221923</b>	<b>234198</b>	<b>238672</b>	<b>1965144</b>	
<b>NET BENEFIT/COST</b>	<b>-1027912</b>	<b>-278349</b>	<b>-61012</b>	<b>-87134</b>	<b>-235097</b>	<b>-37774</b>	<b>-86163</b>	<b>-36445</b>	<b>-168775</b>	<b>6327</b>	<b>1732753</b>	
<b>ECONOMIC RATE OF RETURN (ERR) OVER 10 YEARS = #DIV/0!</b>												
<b>NET PRESENT VALUE (NPV) @ 8.00% = -895013</b>							<b>Per Hectare =</b>					<b>-89.50</b>

FINANCIAL/ECONOMIC MODEL - COMMERCIAL BEEF BREEDING AND REARING - NGAMILAND - BASE CASE

TABLE 16: SUMMARY OF RESULTS

ITEM	UNITS			TOTAL
Ranch Extent	Hectares			10000
Stock	Large Stock Units (LSU)			773
ITEM	% of TCI	P/LSU	P/HECTARE	PULA
Total Financial Capital (TCI)	-	2100.79	162.41	1624059
Financial Gross Income	22.57%	474.18	36.66	366576
Variable Financial Costs	-	196.74	15.21	152096
Fixed Financial Costs	-	323.90	25.04	250399
Net Cash Income	-2.21%	-46.46	-3.59	-35919
Local Community Cash Income	2.77%	58.21	4.50	45000
Land Rental	-	0.78	0.06	600
Resource Royalty	-	0.00	0.00	0
FRR (@ 10 Years)	-	-	-	2.89%
FNPV (@ 8%, @ 10 Years)	-	-	-52.70	-526984
Total Economic Capital	-	2031.20	157.03	1570261
Economic Gross Income	19.21%	390.10	30.16	301576
Economic Costs	21.98%	446.47	34.52	345154
Net Economic Benefit	-2.78%	-56.37	-4.36	-43579
Net Value Added	-8.41%	-170.77	-13.20	-132014
ERR (@ 10 Years)	-	-	-	#DIV/0!
ENPV (@ 8%, @ 10 Years)	-	-	-89.50	-895013
Economic Capital Cost/Job	-	-	-	224323
Domestic Resource Cost Ratio	-	-	-	4.12
Policy Analysis Matrix	: Effects of Policy / Market Imperfections	: on Output		65001
		: on Tradable Inputs		21928
		: on Domestic Factors		9167
	: Net Effects of Policy / Market Imperfections	: on Annual Net Income		96095
		: on Net Present Value (10 Years)		368029



**Appendix 5: Wildlife viewing tourism financial/economic model**



APPENDIX 5  
 FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA TOURISM - NGAMILAND 2000 - 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%	3.32	LSU Equivalents/Sq. Km. or,		30	Hectares per LSU Equivalent					
Carrying Capacity:	100%	0.125	Tourist Beds/Sq. Km. or,		800	Ha. per Tourist Bed					
Concession Size:	14400	Hectares or,		144	Square Kilometres						
Tourist Category:	Overseas	55%	Regional	20%	Resident	5%	Citizen	20%			
	Adults	90%	Children	10%							
Occupancy Rate:	100%	50.0%	Average Length of Stay:		4 Days						
Daily Tariffs (P):	100%	Overseas	730	Regional	730	Resident	730	Citizen	730		
		Children	75%	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:		18%	Rate for Working Capital Loans:		27%				
Working Capital as Proportion of Annual Operating Costs:	30%										
Park Entry Fees:	100%	Fee per Tourist Night/Day:		P 30.00							
Land Rental and Resource Royalty (P):	100%	Rental:	5.00	per Ha.	100%	Royalty:	12%	of Turnover			
Manpower Needs:	100%	Managers	3	Skilled Labour	3	Unskilled Labour	15				
	100%	Management:	Foreign	20%	Citizen	80%					
Shadow Wage Adjustment:	100%	Managers	1.00	Skilled Labour	1.00	100%	Unskilled Labour	0.50			
Foreign Exchange Premium:	100%	10%	Adjustment Factor =		1.10						
Tax Adjustments:	100%	General Sales Tax:	11%	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%									

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 - HIGH QUALITY AREA TOURISM - NGAMILAND 2000 - BASE CASE

TABLE 1: CAPITAL REQUIREMENTS

ITEM	QUANT.	PRICE PULA	FINAN. COST	LIFE Years	AMORT. + INT.	DEPREC- LATION	ECON. DEPR.	FOREX ADJ.	TAX ADJ.	ECON. COST
<b>FIXED CAPITAL</b>										
<b>DOMESTIC ITEMS</b>										
Houses Manager	3	16218	48654	40	9090	1216	1083	1.00	0.89	43302
Houses Labour	18	2439	43898	40	8201	1097	977	1.00	0.89	43898
Storerooms	1	24388	24388	40	4556	610	543	1.00	0.89	21705
Tourist Lodges	1	318263	318263	40	59458	7957	7081	1.00	0.89	283254
Borehole	0	30485	0	40	0	0	0	1.00	0.89	0
Reservoir (Whole Water System)	1	79261	79261	40	14808	1982	1764	1.00	0.89	70542
Reticulation/Pans	0	546	0	40	0	0	0	1.00	0.89	0
Firebreaks	0.00	746	0	40	0	0	0	1.00	0.89	0
Hiking Trails	0.00	109	0	40	0	0	0	1.00	0.89	0
Power/Road to Site	1	6097	6097	40	1139	152	136	1.00	0.89	5426
CONTINGENCIES @ 5%			26028	40	4863	651	579	1.00	0.89	23165
<b>SUBTOTAL DOMESTIC ITEMS</b>			<b>546590</b>							<b>491294</b>
<b>TRADABLE ITEMS</b>										
Boma	0	4914	0	20	0	0	0	1.10	0.89	0
Hiker Camps	0	0	0	15	0	0	0	1.10	0.89	0
Pump/Windmill	1	9100	9100	15	1787	607	594	1.10	0.89	8909
Fencing Perimeter	0.00	8208	0	15	0	0	0	1.10	0.89	0
Fencing Internal	0.00	7462	0	15	0	0	0	1.10	0.89	0
CONTINGENCIES @ 5%			455	15	89	30	30	1.10	0.89	445
<b>SUBTOTAL TRADABLES</b>			<b>9555</b>							<b>9354</b>
<b>SUBTOTAL- FIXED CAPITAL</b>			<b>556145</b>							<b>500648</b>
<b>MOVABLE CAPITAL</b>										
<b>TRADABLE ITEMS</b>										
Land Cruisers/Trucks/Vans	4	81682	326726	4	121457	81682	79966	1.10	0.89	319865
Tools/Office Equipment	1	180180	180180	6	51515	30030	29399	1.10	0.89	176396
Lodge Equipment	1	284684	284684	6	81394	47447	46451	1.10	0.89	278706
Boats	3	48048	144144	6	41212	24024	23519	1.10	0.89	141117
CONTINGENCIES @ 10%			93573	6	26754	15596	15268	1.10	0.89	91608
<b>SUBTOTAL TRADABLES</b>			<b>1029308</b>							<b>1007693</b>
<b>DOMESTIC ITEMS</b>										
Capture: Small Antelope	0	0	0	40	0			1.00	0.89	0
: Large Antelope	0	0	0	40	0			1.00	0.89	0
: Ostrich	0	0	0	40	0			1.00	0.89	0
: Other Animals	0	0	0	40	0			1.00	0.89	0
Horses and Donkeys	0	0	0	40	0			1.00	0.89	0
CONTINGENCIES @ 10%			0	40	0			1.00	0.89	0
<b>SUBTOTAL- DOMESTIC ITEMS</b>			<b>0</b>							<b>0</b>
<b>SUBTOTAL- MOVABLE CAPITAL</b>			<b>1029308</b>							<b>1007693</b>
<b>WORKING CAPITAL</b>										
			<b>LOAN</b>	<b>INTEREST</b>						
VARIABLE			267905	72334				1.10	1.00	294695
OVERHEAD			153244	41376				1.10	1.00	168568
<b>SUBTOTAL- WORKING CAPITAL</b>			<b>421149</b>	<b>113710</b>						<b>463263</b>
<b>TOTALS</b>			<b>2006602</b>	<b>113710</b>	<b>426323</b>	<b>213080</b>	<b>207389</b>			<b>1971605</b>

FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA TOURISM - NGAMILAND 2000 - BASE CASE

TABLE 2: STOCK COMPOSITION BY SPECIES AT FULL PRODUCTION

ITEM	HEAD	LSU FACTOR	LSU
Baboon	3	0.00	0
Black Rhinoceros	0	1.50	0
Buffalo	24	1.00	24
Burchells Zebra	6	0.63	4
Bushbuck	3	0.14	0
Bushpig	6	0.20	1
Cheetah	1	0.00	0
Crocodile	2	0.00	0
Duiker	4	0.07	0
Eland	4	1.00	4
Elephant	120	3.33	400
Giraffe	5	1.43	7
Hippo	12	1.50	18
Impala	20	0.14	3
Kudu	16	0.40	6
Lechwe	3	0.16	1
Leopard	2	0.00	0
Lion	1	0.00	0
Oribi	1	0.08	0
Ostrich	4	0.26	1
Reedbuck	4	0.14	1
Roan	2	0.65	1
Sable	6	0.40	3
Sitatunga	3	0.16	1
Spotted Hyaena	2	0.00	0
Steenbok	4	0.06	0
Tsessebe	2	0.26	1
Warthog	12	0.20	2
Waterbuck	0	0.37	0
Wildebeest	2	0.40	1
TOTAL	280		478
GAME DENSITY:	3.32	LSU PER SQ.KM.; CONCESSION SIZE:	14400 HECTARES

TABLE 3: SALES AT FULL PRODUCTION

ITEM	VISITOR DAYS	@	RATE P/Day	FINANCIAL VALUE	FOREX ADJ.	TAX ADJ.	ECON. VALUE
Overseas Adults	1626	@	730	1187035	1.10	1.00	1305738
Regional Adults	591	@	730	431649	1.10	1.00	474814
Resident Adults	148	@	730	107912	1.10	1.00	118703
Citizen Adults	591	@	730	431649	1.00	1.00	431649
Overseas Children	181	@	548	98920	1.10	1.00	108812
Regional Children	66	@	548	35971	1.10	1.00	39568
Resident Children	16	@	548	8993	1.10	1.00	9892
Citizen Children	66	@	548	35971	1.00	1.00	35971
Optional Excursions				0	1.10	1.00	0
Bar				0	1.10	1.00	0
Crafts/Curios				49275	1.10	1.00	54203
TOTALS	3285		GROSS INCOME	2387374			2579349

## FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA TOURISM - NGAMILAND 2000 - 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								
Marketing Costs: Advertising	99.81	3.32	47747	1.10	0.89	97.71	3.25	46745
: Agents Fees	349.32	11.61	167116	1.10	0.89	384.25	12.77	183828
Lodge Running Costs : Accommodation	249.94	8.30	119574	1.10	0.89	244.70	8.13	117063
: Transport	68.98	2.29	33002	1.10	0.89	67.54	2.24	32309
: Optional Activ.	0.00	0.00	0	1.10	0.89	0.00	0.00	0
: Bar	174.96	5.81	83702	1.10	0.89	171.29	5.69	81944
: Crafts/Curios	103.73	3.45	49623	1.10	0.89	101.55	3.37	48581
Fodder and Supplements	0.00	0.00	0	1.10	0.89	0.00	0.00	0
Offtake Costs: Ammunition	0.00	0.00	0	1.10	0.89	0.00	0.00	0
: Supplies and Packaging	0.00	0.00	0	1.10	0.89	0.00	0.00	0
: Transport	0.00	0.00	0	1.10	0.89	0.00	0.00	0
: Live Game Distribution	0.00	0.00	0	1.10	0.89	0.00	0.00	0
: Biltong Distribution	0.00	0.00	0	1.10	0.89	0.00	0.00	0
Fuels, Oils and Miscellaneous Costs	64.99	2.16	31089	1.10	0.89	63.62	2.11	30436
SUBTOTAL TRADABLES	1111.73	36.93	531854			1130.65	37.56	540906
DOMESTIC ITEMS								
Veterinary and Medicine Costs	0.00	0.00	0	1.00	0.89	0.00	0.00	0
Licence Fees: Park Entrance Fees	206.00	6.84	98550	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	548.93	18.24	262611	1.00	1.00	0.00	0.00	0
SUBTOTAL DOMESTIC ITEMS	754.93	25.08	361161			0.00	0.00	0
TOTAL VARIABLE EXPENDITURE	1866.66	62.01	893015			1130.65	37.56	540906

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								
Salaries and Wages: Unskilled Labour	308.15	10.24	147420	1.00	1.00	308.15	10.24	73710
: Skilled Labour	123.26	4.10	58968	1.00	1.00	123.26	4.10	52482
: Managers	376.63	12.51	180180	1.00	1.00	376.63	12.51	180180
Administration	11.41	0.38	5460	1.00	0.89	11.41	0.38	4859
Maintenance and Repairs	140.72	4.67	67320	1.00	0.89	140.72	4.67	59915
Insurance	107.58	3.57	51465	1.00	0.89	107.58	3.57	45804
Travelling	0.00	0.00	0	1.00	0.89	0.00	0.00	0
TOTAL OPERATING OVERHEAD EXPEND.	1067.75	35.47	510813			1067.75	35.47	416950

FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA TOURISM - NGAMILAND 2000 - BASE CASE

TABLE 6: STATIC FINANCIAL MODEL (AT FULL PRODUCTION)

ITEM	UNITS		TOTAL
Concession Extent	Hectares		14400
Concession Stock	Large Stock Units (LSU)		478
Total Capital Requirement	PULA		2006602
	P/LSU	P/HECTARE	PULA
GROSS INCOME	4990.30	165.79	2387374
VARIABLE COSTS	1866.66	62.01	893015
GROSS MARGIN	3123.64	103.77	1494358
OVERHEAD COSTS			
Overhead Operating Costs	1067.75	35.47	510813
Loan Amortisation and Interest	222.78	7.40	106581
Provisions for Capital Replacement	334.05	11.10	159810
Interest on Variable Working Capital	151.20	5.02	72334
Interest on Overhead Working Capital	86.49	2.87	41376
Land Rental	150.50	5.00	72001
Resource Royalty	598.84	19.89	286485
TOTAL OVERHEAD COSTS	2611.61	86.76	1249401
NET CASH INCOME	512.03	17.01	244958
NET CASH INCOME/P100 TOTAL CAPITAL INVESTMENT	12.21		
*TOTAL BENEFITS**/P100 TOTAL CAPITAL INVESTMENT	67.34		
*TOTAL BENEFITS**/HECTARE	93.83		

\* "Total Benefits" = all of Net Cash Income, Salaries and Wages, Licences and Duties, Rental and Royalties.

FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA TOURISM - NGAMILAND 2000 - BASE CASE

TABLE 7: STATIC ECONOMIC MODEL (AT FULL PRODUCTION)

ITEM	UNITS		TOTAL
Concession Extent	Hectares		14400
Concession Stock	Large Stock Units (LSU)		478
Total Capital Requirement	PULA		1971605
Economic Depreciation Cost	PULA		207389
Foreign Financing (Prorated)	PULA		58597
Foreign Amortisation	PULA		14649
Foreign Capital Replacement Provision	PULA		43948
Foreign Interest Cost	PULA		89912
Domestic Interest Cost	PULA		269736
<hr/>			
ECONOMIC BENEFITS	P/LSU	P/HECTARE	PULA
Gross Income	5391.58	179.12	2579349
ECONOMIC COSTS			
DOMESTIC COMPONENT			
Shadow Unskilled Citizen Wages	154.08	5.12	73710
Other Citizen Wages	411.00	13.65	196626
Opportunity Cost of Capital	329.70	10.95	157728
Other Domestic Economic Costs	231.14	7.68	110578
SUBTOTAL DOMESTIC COMPONENT	1125.92	37.41	538642
TRADABLE COMPONENT			
Foreign Remuneration	75.33	2.50	36036
Foreign Services	265.08	8.81	126815
Foreign Interest	187.94	6.24	89912
Foreign Lease Payments	0.00	0.00	0
Foreign Rentals	0.00	0.00	0
Foreign Net Income	140.81	4.68	67363
Other Tradable Economic Costs	865.57	28.76	414092
SUBTOTAL TRADABLE COMPONENT	1534.73	50.99	734218
TOTAL ECONOMIC COSTS	2660.64	88.39	1272860
<hr/>			
NET ECONOMIC BENEFIT (Gross Value Added)	2730.94	90.73	1306489
NET VALUE ADDED (Excluding Depreciation)	2297.43	76.33	1099100
<hr/>			
DOMESTIC RESOURCE COST RATIO =	0.44		
NET VALUE ADDED/P100 TOTAL CAPITAL COST =	55.75		
CAPITAL COST/EMPLOYMENT OPPORTUNITY CREATED =	93886		
NUMBER OF EMPLOYMENT OPPORTUNITIES/1000 HA.	1.46		

## FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA TOURISM - NGAMILAND 2000 - BASE CASE

TABLE 3: 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
<b>DEPRECIABLE ASSETS</b>												
"Forty Year" Items	40											
Total Expenditure		546590										
Phased Expenditure		327954	218636	0	0	0	0	0	0	0	0	0
Depreciation		8199	13665	13665	13665	13665	13665	13665	13665	13665	13665	13665
Residual value		327954	538391	524726	511062	497397	483732	470067	456403	442738	429073	415408
"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		9555										
Phased Expenditure		5733	3822	0	0	0	0	0	0	0	0	0
Depreciation		382	637	637	637	637	637	637	637	637	637	637
Residual value		5733	9173	8536	7899	7262	6625	5988	5351	4714	4077	3440
"Six Year" Items	6											
Total Expenditure		702582						702582				
Phased Expenditure		491807	210775	0	0	0	0	491807	210775	0	0	0
Depreciation		81968	117097	117097	117097	117097	117097	117097	117097	117097	117097	117097
Residual value		491807	620614	503517	386420	269323	152226	526936	620614	503517	386420	269323
"Four Year" Items	4											
Total Expenditure		326726				326726				326726		
Phased Expenditure		326726	0	0	0	326726	0	0	0	326726	0	0
Depreciation		81682	81682	81682	81682	81682	81682	81682	81682	81682	81682	81682
Residual value		326726	245045	163363	81682	326726	245045	163363	81682	326726	245045	163363
<b>NON DEPRECIABLE ASSETS</b>												
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		421149	0	0	0	0	0	0	0	0	0	0
<b>TOTAL PHASED CAPITAL EXPENDITURE</b>												
Domestic Component		327954	218636	0	0	0	0	0	0	0	0	0
Tradable Component		824267	214597	0	0	326726	0	491807	210775	326726	0	0
Total Financial Value		1152221	433233	0	0	326726	0	491807	210775	326726	0	0
Total Economic Value		1098836	404676	0	0	319865	0	481479	206348	319865	0	0
<b>TOTAL ASSET RESIDUAL VALUE</b>												
Domestic Component		327954	538391	524726	511062	497397	483732	470067	456403	442738	429073	415408
Tradable Component		824267	874832	675416	476000	603311	403896	696287	707646	834957	635542	436126
Financial Value		1152221	1413223	1200142	987062	1100708	887628	1166355	1164049	1277695	1064615	851534
Economic Value		1098836	1335628	1128239	920849	1033325	825935	1100025	1098984	1211460	1004070	796681

## FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA TOURISM - NGAMILAND 2000 - BASE CASE

TABLE 9: LOAN FINANCING SCHEDULE (PULA)

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
<b>LONG TERM LOANS</b>													
<b>TWENTY YEAR LOAN 20</b>													
Total Expenditure			136647										
Loan Disbursements			81988	54659	0	0	0	0	0	0	0	0	0
Loan Payments			15317	25528	25528	25528	25528	25528	25528	25528	25528	25528	25528
Amortisation			4099	6832	6832	6832	6832	6832	6832	6832	6832	6832	6832
Interest Payments			11218	18696	18696	18696	18696	18696	18696	18696	18696	18696	18696
Loans Outstanding			81988	132548	125716	118883	112051	105219	98386	91554	84721	77889	71057
<b>FIFTEEN YEAR LOAN 15</b>													
Total Expenditure			2389										
Loan Disbursements			1792	597	0	0	0	0	0	0	0	0	0
Loan Payments			352	469	469	469	469	469	469	469	469	469	469
Amortisation			119	159	159	159	159	159	159	159	159	159	159
Interest Payments			232	310	310	310	310	310	310	310	310	310	310
Loans Outstanding			1792	2269	2110	1951	1792	1632	1473	1314	1155	995	836
<b>SIX YEAR LOAN 6</b>													
Total Expenditure			175645						175645				
Loan Disbursements			122952	52694	0	0	0	0	122952	52694	0	0	0
Loan Payments			35153	50219	50219	50219	50219	50219	50219	50219	50219	50219	50219
Amortisation			20492	29274	29274	29274	29274	29274	29274	29274	29274	29274	29274
Interest Payments			14661	20945	20945	20945	20945	20945	20945	20945	20945	20945	20945
Loans Outstanding			122952	155153	125879	96605	67331	38657	131734	155153	125879	96605	67331
<b>FOUR YEAR LOAN 4</b>													
Total Expenditure			81682				81682				81682		
Loan Disbursements			81682	0	0	0	81682	0	0	0	81682	0	0
Loan Payments			30364	30364	30364	30364	30364	30364	30364	30364	30364	30364	30364
Amortisation			20420	20420	20420	20420	20420	20420	20420	20420	20420	20420	20420
Interest Payments			9944	9944	9944	9944	9944	9944	9944	9944	9944	9944	9944
Loans Outstanding			81682	61261	40841	20420	81682	61261	40841	20420	81682	61261	40841
<b>SHORT TERM LOANS</b>													
<b>Working Capital 1</b>													
Overdraft			421149	421149	421149	421149	421149	421149	421149	421149	421149	421149	421149
Interest Payments			113710	113710	113710	113710	113710	113710	113710	113710	113710	113710	113710
<b>TOTAL LONG TERM LOAN DISBURSEMENTS</b>													
Domestic Component			216310	80962	0	0	61261	0	92214	39520	61261	0	0
Foreign Component *			79314	29686	0	0	22462	0	33812	14491	22462	0	0
<b>TOTAL LONG TERM LOAN AMORTISATION</b>													
Domestic Component			33848	42515	42515	42515	42515	42515	42515	42515	42515	42515	42515
Foreign Component *			12411	15589	15589	15589	15589	15589	15589	15589	15589	15589	15589
<b>TOTAL INTEREST PAYMENTS</b>													
Domestic Component			112324	122703	122703	122703	122703	122703	122703	122703	122703	122703	122703
Foreign Component *			41185	44991	44991	44991	44991	44991	44991	44991	44991	44991	44991
<b>TOTAL LOANS OUTSTANDING</b>													
Domestic Component			216310	263424	220909	178395	197141	154626	204326	201331	220078	177563	135048
Foreign Component *			79314	96589	81000	65411	72285	56696	74919	73821	80695	65106	49518

\* 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			
<b>EXPENDITURE</b>									
Capital Expenditure	1152221	433233	0	0	326726	0			
Variable Expenditure	89302	535809	893015	893015	893015	893015			
Overhead Expenditure	869300	869300	869300	869300	869300	869300			
<b>TOTAL EXPENDITURE</b>	<b>2110822</b>	<b>1838341</b>	<b>1762315</b>	<b>1762315</b>	<b>2089041</b>	<b>1762315</b>			
<b>INCOME</b>									
Gross Income	0	1193687	2148636	2387374	2387374	2387374			
Asset Residual Value	0	0	0	0	0	887628			
<b>TOTAL INCOME</b>	<b>0</b>	<b>1193687</b>	<b>2148636</b>	<b>2387374</b>	<b>2387374</b>	<b>3275002</b>			
<b>NET BENEFIT/COST</b>	<b>-2110822</b>	<b>-644655</b>	<b>386321</b>	<b>625059</b>	<b>298332</b>	<b>1512686</b>			
<b>FINANCIAL RATE OF RETURN (FRR) OVER 5 YEARS = 0.63%</b>									
<b>NET PRESENT VALUE (NPV) @ 8.00%</b>					<b>-584752</b>		<b>Per Hectare =</b>	<b>-40.61</b>	

TABLE 11: FINANCIAL ANALYSIS - 7 YEARS (PULA)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
<b>EXPENDITURE</b>								
Capital Expenditure	1152221	433233	0	0	326726	0	491807	210775
Variable Expenditure	89302	535809	893015	893015	893015	893015	893015	893015
Overhead Expenditure	869300	869300	869300	869300	869300	869300	869300	869300
<b>TOTAL EXPENDITURE</b>	<b>2110822</b>	<b>1838341</b>	<b>1762315</b>	<b>1762315</b>	<b>2089041</b>	<b>1762315</b>	<b>2254122</b>	<b>1973090</b>
<b>INCOME</b>								
Gross Income	0	1193687	2148636	2387374	2387374	2387374	2387374	2387374
Asset Residual Value	0	0	0	0	0	0	0	1164049
<b>TOTAL INCOME</b>	<b>0</b>	<b>1193687</b>	<b>2148636</b>	<b>2387374</b>	<b>2387374</b>	<b>2387374</b>	<b>2387374</b>	<b>3551423</b>
<b>NET BENEFIT/COST</b>	<b>-2110822</b>	<b>-644655</b>	<b>386321</b>	<b>625059</b>	<b>298332</b>	<b>625059</b>	<b>133251</b>	<b>1578333</b>
<b>FINANCIAL RATE OF RETURN (FRR) OVER 7 YEARS = 5.97%</b>								
<b>NET PRESENT VALUE (NPV) @ 8.00%</b>					<b>-213633</b>		<b>Per Hectare =</b>	<b>-14.84</b>

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
<b>EXPENDITURE</b>											
Capital Expenditure	1152221	433233	0	0	326726	0	491807	210775	326726	0	0
Variable Expenditure	89302	535809	893015	893015	893015	893015	893015	893015	893015	893015	893015
Overhead Expenditure	869300	869300	869300	869300	869300	869300	869300	869300	869300	869300	869300
<b>TOTAL EXPENDITURE</b>	<b>2110822</b>	<b>1838341</b>	<b>1762315</b>	<b>1762315</b>	<b>2089041</b>	<b>1762315</b>	<b>2254122</b>	<b>1973090</b>	<b>2089041</b>	<b>1762315</b>	<b>1762315</b>
<b>INCOME</b>											
Gross Income	0	1193687	2148636	2387374	2387374	2387374	2387374	2387374	2387374	2387374	2387374
Asset Residual Value	0	0	0	0	0	0	0	0	0	0	851534
<b>TOTAL INCOME</b>	<b>0</b>	<b>1193687</b>	<b>2148636</b>	<b>2387374</b>	<b>2387374</b>	<b>2387374</b>	<b>2387374</b>	<b>2387374</b>	<b>2387374</b>	<b>2387374</b>	<b>3238908</b>
<b>NET BENEFIT/COST</b>	<b>-2110822</b>	<b>-644655</b>	<b>386321</b>	<b>625059</b>	<b>298332</b>	<b>625059</b>	<b>133251</b>	<b>414284</b>	<b>298332</b>	<b>625059</b>	<b>1476593</b>
<b>FINANCIAL RATE OF RETURN (FRR) OVER 10 YEARS = 9.61%</b>											
<b>NET PRESENT VALUE (NPV) @ 8.00%</b>					<b>229517</b>		<b>Per Hectare =</b>	<b>15.94</b>			



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TABLE 13: ECONOMIC ANALYSIS - 5 YEARS (PULA)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
<b>ECONOMIC COSTS</b>						
Capital Expenditure	1098836	404676	0	0	319865	0
Unskilled Wages	73710	73710	73710	73710	73710	73710
Other Domestic Costs	245763	307204	307204	307204	307204	307204
Tradable Costs	56229	337376	562293	562293	562293	562293
Foreign Amortisation	12411	15589	15589	15589	15589	15589
Foreign Profits	0	4715	53891	67363	67363	67363
Foreign Loans Outst.	0	0	0	0	0	56696
<b>TOTAL COSTS</b>	<b>1486950</b>	<b>1143270</b>	<b>1012686</b>	<b>1026159</b>	<b>1346024</b>	<b>1082855</b>
<b>ECONOMIC BENEFITS</b>						
Gross Income	0	1289675	2321414	2579349	2579349	2579349
Asset Residual Value	0	0	0	0	0	825935
Foreign Financing	79314	29686	0	0	22462	0
<b>TOTAL BENEFITS</b>	<b>79314</b>	<b>1319361</b>	<b>2321414</b>	<b>2579349</b>	<b>2601812</b>	<b>3405285</b>
<b>NET BENEFIT/COST</b>	<b>-1407636</b>	<b>176091</b>	<b>1308728</b>	<b>1553190</b>	<b>1255787</b>	<b>2322429</b>
<b>ECONOMIC RATE OF RETURN (ERR) OVER 5 YEARS</b>				=	<b>60.23%</b>	
<b>NET PRESENT VALUE (NPV) @</b>		<b>8.00%</b>		=	<b>3346346</b>	<b>Per Hectare = 232.39</b>

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
<b>ECONOMIC COSTS</b>											
Capital Expenditure	1098836	404676	0	0	319865	0	481479	206348	319865	0	0
Unskilled Wages	73710	73710	73710	73710	73710	73710	73710	73710	73710	73710	73710
Other Domestic Costs	245763	307204	307204	307204	307204	307204	307204	307204	307204	307204	307204
Tradable Costs	56229	337376	562293	562293	562293	562293	562293	562293	562293	562293	562293
Foreign Amortisation	12411	15589	15589	15589	15589	15589	15589	15589	15589	15589	15589
Foreign Profits	0	4715	53891	67363	67363	67363	67363	67363	67363	67363	67363
Foreign Loans Outst.	0	0	0	0	0	0	0	0	0	0	49518
<b>TOTAL COSTS</b>	<b>1486950</b>	<b>1143270</b>	<b>1012686</b>	<b>1026159</b>	<b>1346024</b>	<b>1026159</b>	<b>1507638</b>	<b>1232507</b>	<b>1346024</b>	<b>1026159</b>	<b>1075677</b>
<b>ECONOMIC BENEFITS</b>											
Gross Income	0	1289675	2321414	2579349	2579349	2579349	2579349	2579349	2579349	2579349	2579349
Asset Residual Value	0	0	0	0	0	0	0	0	0	0	796681
Foreign Financing	79314	29686	0	0	22462	0	33812	14491	22462	0	0
<b>TOTAL BENEFITS</b>	<b>79314</b>	<b>1319361</b>	<b>2321414</b>	<b>2579349</b>	<b>2601812</b>	<b>2579349</b>	<b>2613161</b>	<b>2593840</b>	<b>2601812</b>	<b>2579349</b>	<b>3376030</b>
<b>NET BENEFIT/COST</b>	<b>-1407636</b>	<b>176091</b>	<b>1308728</b>	<b>1553190</b>	<b>1255787</b>	<b>1553190</b>	<b>1105522</b>	<b>1361332</b>	<b>1255787</b>	<b>1553190</b>	<b>2300353</b>
<b>ECONOMIC RATE OF RETURN (ERR) OVER 10 YEARS</b>				=	<b>64.03%</b>						
<b>NET PRESENT VALUE (NPV) @</b>		<b>8.00%</b>		=	<b>6576358</b>	<b>Per Hectare = 456.69</b>					

## FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA TOURISM - NGAMILAND 2000 - BASE CASE

TABLE 15: SUMMARY OF RESULTS

ITEM	UNITS				TOTAL
Concession Extent	Hectares				14400
Concession Stock	Large Stock Units (LSU)				478
Annual Visitor Days (VD)	Number				3285

  

ITEM	% of TCI	P/VISITOR DAY	P/LSU	P/HECTARE	PULA
Total Financial Capital (TCI)	-	610.84	4194.37	139.35	2006602
Financial Gross Income	118.98%	726.75	4990.30	165.79	2387374
Variable Financial Costs	-	271.85	1866.66	62.01	893015
Fixed Financial Costs	-	380.34	2611.61	86.76	1249401
Net Cash Income	12.21%	74.57	512.03	17.01	244958
Local Community Cash Income	24.56%	150.04	1030.25	34.23	492873
Land Rental	-	21.92	150.50	5.00	72001
Resource Royalty	-	87.21	598.84	19.89	286485
FRR (@ 10 Years)	-	-	-	-	9.61%
FNPV (@ 8%, @ 10 Years)	-	-	-	15.94	229517
Total Economic Capital	-	600.18	4121.22	136.92	1971605
Economic Gross Income	130.82%	785.19	5391.58	179.12	2579349
Economic Costs	64.56%	387.48	2660.64	88.39	1272860
Net Economic Benefit	66.27%	397.71	2730.94	90.73	1306489
Net Value Added	55.75%	334.58	2297.43	76.33	1099100
ERR (@ 10 Years)	-	-	-	-	64.03%
ENPV (@ 8%, @ 10 Years)	-	-	-	456.69	6576358
Economic Capital Cost/Job	-	-	-	-	93886
Domestic Resource Cost Ratio	-	-	-	-	0.44
Policy Analysis Matrix	: Effects of Policy / Market Imperfections		: on Output		-191975
			: on Tradable Inputs		202363
			: on Domestic Factors		-864530
	: Net Effects of Policy / Market Imperfections		: on Annual Net Income		-854142
			: on Net Present Value (10 Years)		-6346842



**Appendix 6: Community wildlife use (delta) financial/economic model**



APPENDIX 6  
 FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA COMMUNITY WILDLIFE USE - NGAMILAND 2000 - BASE CASE  
 N\$ 2000

ASSUMPTIONS\*

Production System:	32	beds. Wildlife conservancy producing trophies, live game and wildlife viewing.									
Site:	Community use area in mopane/riparian floodplain mosaic in flat Okavango delta terrain with diverse wildlife populations in core area and game, livestock in most of area, game mostly in core area										
Game Density:	<u>100%</u>	1.87	LSU Equivalents/Sq. Km. or,		54	Hectares per LSU Equivalent					
Carrying Capacity:	<u>100%</u>	0.040	Tourist Beds/Sq. Km. or,		2503	Ha. per Tourist Bed					
Land Extent	\$0100	Hectares or,		801	Square Kilometres		Core Wildlife Area Si	49942			
Tourist Category:	Overseas	35%	Regional	35%	Resident	5%	Citizen	25%			
	Adults	100%	Children	0%							
Occupancy Rate:	<u>100%</u>	50.0%		Average Length of Stay:		10 Days					
Daily Tariffs (P):	<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 =	25%	Equity =	75%	and:	<u>100%</u>	Foreign	0%	Domestic	100%
Interest Rates:	<u>100%</u>	Rate for Capital Loans:		18%	Rate for Working Capital Loans:		27%				
Working Capital as Proportion of Annual Operating Costs:		30%									
Park Entry Fees:	<u>100%</u>	Fee per Tourist Night/Day (Average		P	30.00						
Household Dividends:	700	Households @		P	294						
Land Rental and Resource Royalty (P):	<u>100%</u>	Rental:	0.04	per Ha.	<u>100%</u>	Royalty:	22%	of Turnover			
Manpower Needs:	<u>100%</u>	Managers	1	Skilled Labour	1	Unskilled Labour	15				
	<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>	10%		Adjustment Factor =		1.10					
Tax Adjustments:	<u>100%</u>	General Sales Tax:		11%	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.

\* Shaded cells indicate degree of conformity with base case values. Underlined shaded cells can be changed

FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA COMMUNITY WILDLIFE USE - NGAMILAND 2000 - BASE CASE  
TABLE 1: CAPITAL REQUIREMENTS

ITEM	QUANT.	PRICE (PULA)	FINAN. COST	LIFE Years	AMORT. + INT.	DEPREC- LATION	ECON. DEPR.	FOREX ADJ.	TAX ADJ.	ECON. COST
<b>FIXED CAPITAL</b>										
<b>DOMESTIC ITEMS</b>										
Houses Manager	1	21675	21675	40	1084	542	482	1.00	0.89	19291
Houses Labour	16	6375	102000	40	5100	2550	2270	1.00	0.89	0
Office/Storerooms	1	4250	4250	40	213	106	95	1.00	0.89	3783
Tourist/Hunter Lodges/Campsites	0	63750	0	40	0	0	0	1.00	0.89	0
Boreholes	2	25000	50000	40	2500	1250	1113	1.00	0.89	44500
Reservoirs	0	1000	0	40	0	0	0	1.00	0.89	0
Waterpoint Development	1	64213	64213	40	3211	1605	1429	1.00	0.89	57150
Firebreaks/Roads (km)	30	850	25500	40	1275	638	567	1.00	0.89	22695
Hiking Trails (km)	2	100	200	40	10	5	4	1.00	0.89	178
Transaction Costs	3	55250	165750	40	8288	4144	3688	1.00	0.89	147518
CONTINGENCIES @ 5%			21679	40	1084	542	482	1.00	0.89	19295
<b>SUBTOTAL DOMESTIC ITEMS</b>			<b>455268</b>							<b>314408</b>
<b>TRADABLE ITEMS</b>										
Boms/Pens	0	211650	0	20	0	0	0	1.10	0.89	0
Campsite	2	50000	100000	15	19640	6667	6527	1.10	0.89	97900
Pump/Windmill	2	15000	30000	15	5892	2000	1958	1.10	0.89	29370
Fencing Perimeter (km)	15	4510	67650	15	13287	4510	4415	1.10	0.89	66229
Other Items	0	2050	0	15	0	0	0	1.10	0.89	0
CONTINGENCIES @ 5%			9883	15	1941	659	645	1.10	0.89	9675
<b>SUBTOTAL TRADABLES</b>			<b>207533</b>							<b>203174</b>
<b>SUBTOTAL- FIXED CAPITAL</b>			<b>662800</b>							<b>517583</b>
<b>MOVABLE CAPITAL</b>										
<b>TRADABLE ITEMS</b>										
LDVs/Trucks	1	111350	111350	4	41393	27838	27253	1.10	0.89	109012
Tools/Office Equipment	1	60775	60775	6	17376	10129	9916	1.10	0.89	59499
Other Equipment	1	52020	52020	6	14873	8670	8488	1.10	0.89	50928
Generator/Computers	1	50990	50990	6	14578	8498	8320	1.10	0.89	49919
CONTINGENCIES @ 10%			27513	6	7866	4586	4489	1.10	0.89	26936
<b>SUBTOTAL TRADABLES</b>			<b>302648</b>							<b>296292</b>
<b>DOMESTIC ITEMS</b>										
Stock : Small Game	Batch	0	0	40	0			1.00	0.89	0
: Large Game	Batch	0	0	40	0			1.00	0.89	0
: Big Five		0	0	40	0			1.00	0.89	0
: Cattle		0	0	40	0			1.00	0.89	0
Horses and Donkeys		0	0	40	0			1.00	0.89	0
CONTINGENCIES @ 10%			0	40	0			1.00	0.89	0
<b>SUBTOTAL- DOMESTIC ITEMS</b>			<b>0</b>							<b>0</b>
<b>SUBTOTAL- MOVABLE CAPITAL</b>			<b>302648</b>							<b>296292</b>
<b>WORKING CAPITAL</b>										
			<b>LOAN</b>	<b>INTEREST</b>						
VARIABLE			99637	26902				1.10	1.00	109601
OVERHEAD			56320	15206				1.10	1.00	61952
<b>SUBTOTAL- WORKING CAPITAL</b>			<b>155957</b>	<b>42108</b>						<b>171553</b>
<b>TOTALS</b>			<b>1121406</b>	<b>42108</b>	<b>159610</b>	<b>84938</b>	<b>82141</b>			<b>985428</b>

FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA COMMUNITY WILDLIFE USE - NGAMILAND 2000 - BASE CASE

TABLE 2: STOCK COMPOSITION BY SPECIES AT FULL PRODUCTION

ITEM	HEAD	POT. OFF-TAK (%)	OFF-TAK (NO.)	OFF-TAKE (%)	PROF. TROPH	LSU FACTOR	LSU
Buffalo	53	6.60%	4	1.00%	1	1.00	53
Duiker	897	22.60%	203	3.00%	27	0.07	63
Eland	0	6.70%	0	3.00%	0	1.00	0
Elephant	171	3.10%	5	0.70%	1	3.33	570
Giraffe	75	6.20%	5	0.00%	0	1.43	108
Impala	1078	15.20%	164	3.00%	32	0.14	151
Kudu	175	9.90%	17	3.00%	5	0.45	79
Leopard	24	15.00%	4	5.00%	1	0.00	0
Lion	34	12.00%	4	5.00%	2	0.00	0
Oryx	0	9.40%	0	6.00%	0	0.40	0
Ostrich	39	10.00%	4	3.00%	1	0.26	10
Sable	62	9.90%	6	3.00%	2	0.40	25
Steenbok	5285	27.70%	1464	3.00%	159	0.06	317
Warthog	290	14.40%	42	3.00%	9	0.18	52
Wild dog	37	15.00%	6	0.00%	0	0.00	0
Wildebeest	93	9.60%	9	3.00%	3	0.40	37
Zebra	47	8.40%	4	6.00%	3	0.63	30
Cattle	0	9.00%	0	0.00%	0	1.00	0
Goats	0	20.00%	0	0.00%	0	0.11	0
Donkeys/horses	0	10.00%	0	0.00%	0	0.63	0
<b>TOTAL</b>	<b>8363</b>		<b>1940</b>		<b>245</b>	<b>75</b>	<b>1495</b>
<b>STOCK DENSITY:</b>	<b>1.87</b>	<b>LSU PER SQ.KM.</b>	<b>LAND EXTENT:</b>	<b>80100</b>	<b>HECTARES</b>		

TABLE 3: SALES AT FULL PRODUCTION

ITEM	QUANTITY	@	VALUE (PULA)	FINANCIAL VALUE	FOREX ADJ.	TAX ADJ.	ECON. VALUE
Safari Hunting Rental	1 camp	@	205913	205913	1.10	1.00	226504
Safari Hunting: Royalty	0	@	67500	0	1.10	1.00	0
Safari Hunting: Meat	75 animals	@	278	20957	1.10	1.00	23052
Tourism Rentals - Lodges	2 lodge	@	229224	458448	1.10	1.00	504292
Campsite - Net Income	2 site	@	18921	37842	1.10	1.00	41626
Tourism Rentals - Other	0 site	@	148750	0	1.10	1.00	0
Live Game Sales	0 animals	@	0	0	1.10	1.00	0
Verison: Biltong	170 animals	@	278	47130	1.10	1.00	51843
Livestock sales	0 animals	@	400	0	1.10	1.00	0
Crafts	1 outlet	@	73411	73411	1.10	1.00	80752
Gathering	1 h'holds	@	46350	46350	1.00	1.00	46350
Grapple	1 h'holds	@	45900	45900	1.00	1.00	45900
<b>TOTALS</b>			<b>GROSS INCOME:</b>	<b>935949</b>			<b>1020319</b>



## FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA COMMUNITY WILDLIFE USE - NGAMILAND 2000 - 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
<b>TRADABLE ITEMS</b>								
Marketing Costs: Advertising	0.00	0.00	0	1.10	0.89	0.00	0.00	0
: Agents Fees	0.00	0.00	0	1.10	0.89	0.00	0.00	0
Other Running Costs : Accomodation	0.00	0.00	0	1.10	0.89	0.00	0.00	0
: Transport	0.00	0.00	0	1.10	0.89	0.00	0.00	0
: Communications	6.14	0.11	9172	1.10	0.89	6.01	0.11	8980
: Agricultural Inputs	0.00	0.00	0	1.10	0.89	0.00	0.00	0
: Crafts	0.00	0.00	0	1.10	0.89	0.00	0.00	0
Fodder and Supplements	0.00	0.00	0	1.10	0.89	0.00	0.00	0
Other Costs : Office Supplies	3.59	0.16	12842	1.10	0.89	3.41	0.16	12572
: Capture Team	0.00	0.00	0	1.10	0.89	0.00	0.00	0
: Biltong Distribution	8.97	0.17	13406	1.10	0.89	8.78	0.16	13125
: Live Game Distribution	0.00	0.00	0	1.10	0.89	0.00	0.00	0
Consultancies, Travel and Training	17.06	0.32	25500	1.10	0.89	16.70	0.31	24965
General Vehicle Running Costs	61.36	1.15	91727	1.10	0.89	60.07	1.12	89801
<b>SUBTOTAL TRADABLES</b>	<b>102.12</b>	<b>1.91</b>	<b>152647</b>			<b>99.97</b>	<b>1.87</b>	<b>149442</b>
<b>DOMESTIC ITEMS</b>								
Veterinary and Medicine Costs	51.19	0.96	76521	1.00	0.89	45.56	0.85	68104
BMC Marketing Fees	0.00	0.00	0	1.00	1.00	0.00	0.00	0
Bank Fees	0.00	0.00	0	1.00	1.00	0.00	0.00	0
Sales Tax	68.87	1.29	102954	1.00	1.00	0.00	0.00	0
<b>SUBTOTAL DOMESTIC ITEMS</b>	<b>120.06</b>	<b>2.24</b>	<b>179476</b>			<b>45.56</b>	<b>0.85</b>	<b>68104</b>
<b>TOTAL VARIABLE EXPENDITURE</b>	<b>222.18</b>	<b>4.15</b>	<b>332123</b>			<b>145.53</b>	<b>2.72</b>	<b>217546</b>

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
<b>DOMESTIC ITEMS</b>								
Salaries and Wages: Unskilled Labour	54.19	1.01	81000	1.00	1.00	54.19	1.01	40500
: Skilled Labour	7.22	0.13	10800	1.00	1.00	7.22	0.13	9612
: Managers	14.22	0.27	21250	1.00	1.00	14.22	0.27	21250
Administration	11.37	0.21	17000	1.00	0.89	11.37	0.21	15130
Maintenance and Repairs	16.58	0.31	24787	1.00	0.89	16.58	0.31	22060
Insurance	10.12	0.19	15132	1.00	0.89	10.12	0.19	13468
Miscellaneous Fixed Costs	11.88	0.22	17765	1.00	0.89	11.88	0.22	15811
<b>TOTAL OPERATING OVERHEAD EXPEN</b>	<b>125.59</b>	<b>2.34</b>	<b>187734</b>			<b>125.59</b>	<b>2.34</b>	<b>137831</b>

FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA COMMUNITY WILDLIFE USE - NGAMILAND 2000 - BASE CASE

TABLE 6: STATIC FINANCIAL MODEL (AT FULL PRODUCTION)

ITEM	UNITS		TOTAL
Land Extent	Hectares		80100
Stock on Land	Large Stock Units (LSU)		1495
Total Capital Requirement	PULA		1121406
	P/LSU	P/HECTARE	PULA
GROSS INCOME	626.12	11.68	935949
VARIABLE COSTS	222.18	4.15	332123
GROSS MARGIN	403.94	7.54	603826
OVERHEAD COSTS			
Overhead Operating Costs	125.59	2.34	187734
Loan Amortisation and Interest	26.69	0.50	39903
Provisions for Capital Replacement	42.62	0.80	63703
Interest on Variable Working Capital	18.00	0.34	26902
Interest on Overhead Working Capital	10.17	0.19	15206
Land Rental	2.14	0.04	3204
Resource Royalty	137.75	2.57	205909
TOTAL OVERHEAD COSTS	362.95	6.77	542561
NET CASH INCOME	40.98	0.76	61265
NET CASH INCOME/NS100 TOTAL CAPITAL INVESTMENT	5.46		
*TOTAL BENEFITS**/NS100 TOTAL CAPITAL INVESTMENT	43.37		
*TOTAL BENEFITS**/HECTARE	6.07		

\* \*Total Benefits\* = all of Net Cash Income, Salaries and Wages, Licences and Duties, Rental and Royalties.

FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA COMMUNITY WILDLIFE USE - NGAMILAND 2000 - BASE CASE

TABLE 7: STATIC ECONOMIC MODEL (AT FULL PRODUCTION)

ITEM	UNITS		TOTAL
Land Extent	Hectares		80100
Stock on Land	Large Stock Units (LSU)		1495
Total Initial Capital Requirement	PULA		985428
Economic Depreciation Cost	PULA		82141
Foreign Financing (Prorated)	PULA		0
Foreign Amortisation	PULA		0
Foreign Capital Replacement Provision	PULA		0
Foreign Interest Cost	PULA		0
Domestic Interest Cost	PULA		128459
<hr/>			
ECONOMIC BENEFITS	P/LSU	P/HECTARE	PULA
Gross Income	682.56	12.74	1020319
Stock Appreciation	182.77	3.41	273209
TOTAL ECONOMIC BENEFITS	865.33	16.15	1293528
<hr/>			
ECONOMIC COSTS			
DOMESTIC COMPONENT			
Shadow Unskilled Citizen Wages	27.09	0.51	40500
Other Citizen Wages	20.65	0.39	30862
Opportunity Cost of Capital	52.74	0.98	78634
Other Domestic Economic Costs	90.02	1.68	134573
SUBTOTAL DOMESTIC COMPONENT	190.50	3.56	284769
<hr/>			
TRADABLE COMPONENT			
Foreign Remuneration	0.00	0.00	0
Foreign Services	0.00	0.00	0
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	99.97	1.87	149442
SUBTOTAL TRADABLE COMPONENT	99.97	1.87	149442
TOTAL ECONOMIC COSTS	290.47	5.42	434211
<hr/>			
NET ECONOMIC BENEFIT (Gross Value Added)	574.85	10.73	859317
NET VALUE ADDED (Excluding Depreciation)	519.90	9.70	777176
<hr/>			
DOMESTIC RESOURCE COST RATIO =	0.47		
NET VALUE ADDED/P100 TOTAL CAPITAL COST =	78.87		
CAPITAL COST/EMPLOYMENT OPPORTUNITY CREATED =	57966		
NUMBER OF EMPLOYMENT OPPORTUNITIES/1000 HA.	0.21		

FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA COMMUNITY WILDLIFE USE - NGAMILAND 2000 - 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
<b>DEPRECIABLE ASSETS</b>												
"Forty Year" Items	40											
Total Expenditure		455268										
Phased Expenditure		273161	182107	0	0	0	0	0	0	0	0	0
Depreciation		6829	11382	11382	11382	11382	11382	11382	11382	11382	11382	11382
Residual value		273161	448439	437057	425675	414294	402912	391530	380149	368767	357385	346004
"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		207533										
Phased Expenditure		124520	83013	0	0	0	0	0	0	0	0	0
Depreciation		8301	13836	13836	13836	13836	13836	13836	13836	13836	13836	13836
Residual value		124520	199231	185396	171560	157725	143889	130054	116218	102383	88547	74712
"Six Year" Items	6											
Total Expenditure		191298						191298				
Phased Expenditure		133909	57389	0	0	0	0	133909	57389	0	0	0
Depreciation		22318	31883	31883	31883	31883	31883	31883	31883	31883	31883	31883
Residual value		133909	168980	137097	105214	73331	41448	143473	168980	137097	105214	73331
"Four Year" Items	4											
Total Expenditure		111350				111350				111350		
Phased Expenditure		111350	0	0	0	111350	0	0	0	111350	0	0
Depreciation		27838	27838	27838	27838	27838	27838	27838	27838	27838	27838	27838
Residual value		111350	83513	55675	27838	111350	83513	55675	27838	111350	83513	55675
<b>NON DEPRECIABLE ASSETS</b>												
Stock	-											
Phased Fin. Expenditure		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
Residual value		1565972	1681593	1810399	1954421	2116072	2298229	2504329	2738494	3005682	3311867	3664271
Working Capital	-											
Phased Expenditure		155957	0	0	0	0	0	0	0	0	0	0
<b>TOTAL PHASED CAPITAL EXPENDITURE</b>												
Domestic Component		273161	182107	0	0	0	0	0	0	0	0	0
Tradable Component		369778	140402	0	0	111350	0	133909	57389	111350	0	0
Total Financial Value		642939	322510	0	0	111350	0	133909	57389	111350	0	0
Total Economic Value		605126	299529	0	0	109012	0	131097	56184	109012	0	0
<b>TOTAL ASSET RESIDUAL VALUE</b>												
Domestic Component		1839132	2130032	2247456	2380096	2530366	2701141	2895859	3118643	3374449	3669252	4010275
Tradable Component		369778	451724	378168	304612	342406	268850	329202	313036	350830	277274	203718
Financial Value		2208910	2581756	2625624	2684708	2872771	2969990	3225061	3431678	3725278	3946525	4213992
Economic Value		1998840	2337966	2370462	2416500	2587241	2667219	2899603	3082054	3346722	3537085	3768584

FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA COMMUNITY WILDLIFE USE - NGAMILAND 2000 - 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%	31	33	34	36	38	40	43	45	48	50	53
Duiker	22.60%	150	179	214	256	306	367	438	524	627	750	897
Eland	6.70%	0	0	0	0	0	0	0	0	0	0	0
Elephant	3.10%	135	138	142	145	148	152	156	159	163	167	171
Giraffe	6.20%	41	44	47	49	53	56	59	63	67	71	75
Impala	15.20%	341	382	429	481	540	606	680	763	856	961	1078
Kudu	9.90%	90	96	103	110	118	126	134	144	153	164	175
Leopard	15.00%	9	10	11	12	14	15	16	18	20	22	24
Lion	12.00%	17	18	20	21	23	24	26	28	30	32	34
Oryx	9.40%	0	0	0	0	0	0	0	0	0	0	0
Ostrich	10.00%	20	21	23	24	26	28	30	32	34	36	39
Sable	9.90%	32	34	37	39	42	45	48	51	55	58	62
Steenbok	27.70%	581	725	904	1127	1406	1753	2186	2726	3399	4238	5285
Warthog	14.40%	99	110	122	136	152	169	189	210	234	261	290
Wild dog	15.00%	9	11	12	14	16	19	21	25	28	33	37
Wildebeest	9.60%	49	53	56	60	64	68	72	77	82	88	93
Zebra	8.40%	37	38	39	40	41	42	43	44	45	46	47
Cattle	9.00%	0	0	0	0	0	0	0	0	0	0	0
Goats	20.00%	0	0	0	0	0	0	0	0	0	0	0
Donkeys/horses	10.00%	0	0	0	0	0	0	0	0	0	0	0
TOTALS		1642	1892	2192	2552	2986	3508	4141	4908	5841	6977	8363
ANNUAL INCREASE (%)			15%	16%	16%	17%	18%	18%	19%	19%	19%	20%

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	31	33	34	36	38	40	43	45	48	50	53
Duiker	0.07	10	13	15	18	21	26	31	37	44	53	63
Eland	1.00	0	0	0	0	0	0	0	0	0	0	0
Elephant	3.33	450	460	471	483	494	506	518	531	543	557	570
Giraffe	1.43	59	63	67	71	75	80	85	90	96	101	108
Impala	0.14	48	54	60	67	76	85	95	107	120	134	151
Kudu	0.45	41	43	46	49	53	57	60	65	69	74	79
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	0	0	0	0	0	0	0	0	0	0	0
Ostrich	0.26	5	6	6	6	7	7	8	8	9	9	10
Sable	0.40	13	14	15	16	17	18	19	20	22	23	25
Steenbok	0.06	35	43	54	68	84	105	131	164	204	254	317
Warthog	0.18	18	20	22	25	27	30	34	38	42	47	52
Wild dog	0.00	0	0	0	0	0	0	0	0	0	0	0
Wildebeest	0.40	20	21	22	24	25	27	29	31	33	35	37
Zebra	0.63	23	24	24	25	26	26	27	28	28	29	30
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	0	0	0	0	0	0	0	0	0	0	0
TOTALS		752	792	837	888	944	1008	1080	1162	1257	1367	1495



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 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
Duiker		0	0	0	0	0	0	0	0	0	0	0
Eland		0	0	0	0	0	0	0	0	0	0	0
Elephant		0	0	0	0	0	0	0	0	0	0	0
Giraffe		0	0	0	0	0	0	0	0	0	0	0
Impala		0	0	0	0	0	0	0	0	0	0	0
Kudu		0	0	0	0	0	0	0	0	0	0	0
Leopard		0	0	0	0	0	0	0	0	0	0	0
Lion		0	0	0	0	0	0	0	0	0	0	0
Oryx		0	0	0	0	0	0	0	0	0	0	0
Ostrich		0	0	0	0	0	0	0	0	0	0	0
Sable		0	0	0	0	0	0	0	0	0	0	0
Steenbok		0	0	0	0	0	0	0	0	0	0	0
Warthog		0	0	0	0	0	0	0	0	0	0	0
Wild dog		0	0	0	0	0	0	0	0	0	0	0
Wildebeest		0	0	0	0	0	0	0	0	0	0	0
Zebra		0	0	0	0	0	0	0	0	0	0	0
Cattle		0	0	0	0	0	0	0	0	0	0	0
Goats		0	0	0	0	0	0	0	0	0	0	0
Donkeys/horses		0	0	0	0	0	0	0	0	0	0	0
TOTALS		0	0	0	0	0	0	0	0	0	0	0

  

VALUE OF STOCK (N\$)	VALUE /UNIT	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Buffalo	1926	59377	62703	66214	69922	73837	77972	82339	86950	91819	96961	102391
Duiker	122	18300	21887	26176	31307	37443	44782	53559	64057	76612	91628	109587
Eland	1548	0	0	0	0	0	0	0	0	0	0	0
Elephant	3857	520736	533233	546031	559135	572555	586296	600367	614776	629531	644639	660111
Giraffe	1205	49748	52833	56108	59587	63281	67205	71372	75797	80496	85487	90787
Impala	977	333161	373807	419411	470579	527990	592405	664678	745769	836752	938836	1053374
Kudu	820	73809	78902	84347	90166	96388	103039	110148	117749	125873	134558	143843
Leopard	665	6153	6768	7445	8190	9009	9910	10901	11991	13190	14509	15960
Lion	744	12836	13734	14696	15725	16825	18003	19263	20612	22054	23598	25250
Oryx	2537	0	0	0	0	0	0	0	0	0	0	0
Ostrich	326	6468	6920	7405	7923	8478	9071	9706	10386	11113	11890	12723
Sable	9775	313336	334956	358068	382774	409186	437420	467602	499866	534357	571228	610642
Steenbok	122	71015	88556	110429	137705	171718	214133	267023	332978	415224	517784	645677
Warthog	218	21540	23996	26732	29779	33174	36956	41169	45862	51090	56914	63403
Wild dog	170	1572	1808	2079	2391	2749	3162	3636	4181	4809	5530	6359
Wildebeest	821	40482	43154	46002	49038	52274	55725	59402	63323	67502	71957	76707
Zebra	1012	37439	38337	39257	40200	41164	42152	43164	44200	45261	46347	47459
Cattle	420	0	0	0	0	0	0	0	0	0	0	0
Goats	190	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
TOTAL VALUE OF STOCK		1565972	1681593	1810399	1954421	2116072	2298229	2504329	2738494	3005682	3311867	3664271
% OF FINAL RESID. VAL.		42.74%	45.89%	49.41%	53.34%	57.75%	62.72%	68.34%	74.74%	82.03%	90.38%	100.00%
ANNUAL VALUE INCREASE			115622	128806	144022	161651	182157	206100	234166	267188	306185	352405







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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
<b>LONG TERM LOANS</b>													
<b>TWENTY YEAR LOAN</b>	<b>20</b>												
Total Expenditure		113817											
Loan Disbursements		68290	45527	0	0	0	0	0	0	0	0	0	0
Loan Payments		12758	21263	21263	21263	21263	21263	21263	21263	21263	21263	21263	21263
Amortisation		3415	5691	5691	5691	5691	5691	5691	5691	5691	5691	5691	5691
Interest Payments		9343	15572	15572	15572	15572	15572	15572	15572	15572	15572	15572	15572
Loans Outstanding		68290	110402	104712	99021	93330	87639	81948	76257	70567	64876	59185	
<b>FIFTEEN YEAR LOAN</b>	<b>15</b>												
Total Expenditure		51883											
Loan Disbursements		38912	12971	0	0	0	0	0	0	0	0	0	0
Loan Payments		7642	10190	10190	10190	10190	10190	10190	10190	10190	10190	10190	10190
Amortisation		2594	3459	3459	3459	3459	3459	3459	3459	3459	3459	3459	3459
Interest Payments		5048	6731	6731	6731	6731	6731	6731	6731	6731	6731	6731	6731
Loans Outstanding		38912	49289	45830	42371	38912	35453	31995	28536	25077	21618	18159	
<b>SIX YEAR LOAN</b>	<b>6</b>							<b>6</b>					
Total Expenditure		47824						47824					
Loan Disbursements		33477	14347	0	0	0	0	33477	14347	0	0	0	0
Loan Payments		9571	13674	13674	13674	13674	13674	13674	13674	13674	13674	13674	13674
Amortisation		5580	7971	7971	7971	7971	7971	7971	7971	7971	7971	7971	7971
Interest Payments		3992	5703	5703	5703	5703	5703	5703	5703	5703	5703	5703	5703
Loans Outstanding		33477	42245	34274	26303	18333	10362	35868	42245	34274	26303	18333	
<b>FOUR YEAR LOAN</b>	<b>4</b>												
Total Expenditure		27838				27838				27838			
Loan Disbursements		27838	0	0	0	27838	0	0	0	27838	0	0	0
Loan Payments		10348	10348	10348	10348	10348	10348	10348	10348	10348	10348	10348	10348
Amortisation		6959	6959	6959	6959	6959	6959	6959	6959	6959	6959	6959	6959
Interest Payments		3389	3389	3389	3389	3389	3389	3389	3389	3389	3389	3389	3389
Loans Outstanding		27838	20878	15919	6959	27838	20878	13919	6959	27838	20878	13919	
<b>SHORT TERM LOANS</b>													
<b>Working Capital</b>	<b>1</b>												
Overdraft		155957	155957	155957	155957	155957	155957	155957	155957	155957	155957	155957	155957
Interest Payments		42108	42108	42108	42108	42108	42108	42108	42108	42108	42108	42108	42108
<b>TOTAL LONG TERM LOAN DISBURSMENTS</b>													
Domestic Component		168517	72845	0	0	27838	0	33477	14347	27838	0	0	0
Foreign Component *		0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL LONG TERM LOAN AMORTISATION</b>													
Domestic Component		18548	24080	24080	24080	24080	24080	24080	24080	24080	24080	24080	24080
Foreign Component *		0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL INTEREST PAYMENTS</b>													
Domestic Component		63881	73504	73504	73504	73504	73504	73504	73504	73504	73504	73504	73504
Foreign Component *		0	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL LOANS OUTSTANDING</b>													
Domestic Component		168517	222815	198735	174655	178412	154333	163730	153997	157755	133675	109595	
Foreign Component *		0	0	0	0	0	0	0	0	0	0	0	

\* Economic Values

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TABLE 11: PROJECT FINANCIAL ANALYSIS - 5 YEARS (PULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5		
<b>EXPENDITURE</b>								
Capital Expenditure	642939	322510	0	0	111350	0		
Variable Expenditure	33212	199274	332123	332123	332123	332123		
Overhead Expenditure	396847	396847	396847	396847	396847	396847		
<b>TOTAL EXPENDITURE</b>	<b>1072998</b>	<b>918630</b>	<b>728970</b>	<b>728970</b>	<b>840320</b>	<b>728970</b>		
<b>INCOME</b>								
Gross Income	399990	429522	462423	499210	540499	587027		
Asset Residual Value	0	0	0	0	0	2969990		
<b>TOTAL INCOME</b>	<b>399990</b>	<b>429522</b>	<b>462423</b>	<b>499210</b>	<b>540499</b>	<b>3557017</b>		
<b>NET BENEFIT/COST</b>	<b>-673009</b>	<b>-489108</b>	<b>-266547</b>	<b>-229761</b>	<b>-299821</b>	<b>2828047</b>		
<hr/>								
PROJ. FINANCIAL RATE OF RETURN (FRR) OVER 5 YEARS	=				10.70%			
PROJ. NET PRESENT VALUE (NPV) @ 8.00%	=				155134	Per Hectare =		1.94

TABLE 12: PROJECT FINANCIAL ANALYSIS - 7 YEARS (PULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
<b>EXPENDITURE</b>								
Capital Expenditure	642939	322510	0	0	111350	0	133909	57389
Variable Expenditure	33212	199274	332123	332123	332123	332123	332123	332123
Overhead Expenditure	396847	396847	396847	396847	396847	396847	396847	396847
<b>TOTAL EXPENDITURE</b>	<b>1072998</b>	<b>918630</b>	<b>728970</b>	<b>728970</b>	<b>840320</b>	<b>728970</b>	<b>862879</b>	<b>786359</b>
<b>INCOME</b>								
Gross Income	399990	429522	462423	499210	540499	587027	639670	699482
Asset Residual Value	0	0	0	0	0	0	0	3431678
<b>TOTAL INCOME</b>	<b>399990</b>	<b>429522</b>	<b>462423</b>	<b>499210</b>	<b>540499</b>	<b>587027</b>	<b>639670</b>	<b>4131161</b>
<b>NET BENEFIT/COST</b>	<b>-673009</b>	<b>-489108</b>	<b>-266547</b>	<b>-229761</b>	<b>-299821</b>	<b>-141943</b>	<b>-223209</b>	<b>3344801</b>
<hr/>								
PROJ. FINANCIAL RATE OF RETURN (FRR) OVER 7 YEARS	=				7.55%			
PROJ. NET PRESENT VALUE (NPV) @ 8.00%	=				-39612	Per Hectare =		-0.49

TABLE 13: PROJECT FINANCIAL ANALYSIS - 10 YEARS (PULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<b>EXPENDITURE</b>											
Capital Expenditure	642939	322510	0	0	111350	0	133909	57389	111350	0	0
Variable Expenditure	33212	199274	332123	332123	332123	332123	332123	332123	332123	332123	332123
Overhead Expenditure	396847	396847	396847	396847	396847	396847	396847	396847	396847	396847	396847
<b>TOTAL EXPENDITURE</b>	<b>1072998</b>	<b>918630</b>	<b>728970</b>	<b>728970</b>	<b>840320</b>	<b>728970</b>	<b>862879</b>	<b>786359</b>	<b>840320</b>	<b>728970</b>	<b>728970</b>
<b>INCOME</b>											
Gross Income	399990	429522	462423	499210	540499	587027	639670	699482	767729	845936	935949
Asset Residual Value	0	0	0	0	0	0	0	0	0	0	4213992
<b>TOTAL INCOME</b>	<b>399990</b>	<b>429522</b>	<b>462423</b>	<b>499210</b>	<b>540499</b>	<b>587027</b>	<b>639670</b>	<b>699482</b>	<b>767729</b>	<b>845936</b>	<b>5149942</b>
<b>NET BENEFIT/COST</b>	<b>-673009</b>	<b>-489108</b>	<b>-266547</b>	<b>-229761</b>	<b>-299821</b>	<b>-141943</b>	<b>-223209</b>	<b>-86877</b>	<b>-72591</b>	<b>116966</b>	<b>4420972</b>
<hr/>											
PROJ. FINANCIAL RATE OF RETURN (FRR) OVER 10 YEARS	=				8.14%						
PROJ. NET PRESENT VALUE (NPV) @ 8.00%	=				20302	Per Hectare =			0.25		

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TABLE 14: SUBSIDIES FOR COMMUNITY PROJECT (FULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<b>SUBSIDIES ON EXPENDITURE</b>											
On Capital Expenditure	142939	-145990	0	0	111350	0	260000	260000	260000	260000	260000
On Variable Expenditure	-10787	152026	281256	277210	272668	267550	0	0	0	0	0
On Overhead Expenditure	396847	396847	396847	396847	396847	396847	0	0	0	0	0
<b>TOTAL EXPENDITURE</b>	<b>528999</b>	<b>-402883</b>	<b>678104</b>	<b>674057</b>	<b>780865</b>	<b>664397</b>	<b>260000</b>	<b>260000</b>	<b>260000</b>	<b>260000</b>	<b>260000</b>
<b>SUBSIDIES ON INCOME</b>											
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
<b>TOTAL INCOME</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>TOTAL SUBSIDIES</b>	<b>528999</b>	<b>-402883</b>	<b>678104</b>	<b>674057</b>	<b>780865</b>	<b>664397</b>	<b>260000</b>	<b>260000</b>	<b>260000</b>	<b>260000</b>	<b>260000</b>

TABLE 15: COMMUNITY FINANCIAL ANALYSIS - 5 YEARS (FULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
<b>EXPENDITURE</b>						
Capital Expenditure	500000	468500	0	0	0	0
Variable Expenditure	43999	47247	50866	54913	59455	64573
Overhead Expenditure	-209113	-209113	-209113	-209113	-209113	-209113
<b>TOTAL EXPENDITURE</b>	<b>334886</b>	<b>306635</b>	<b>-158246</b>	<b>-154200</b>	<b>-149658</b>	<b>-144540</b>
<b>INCOME</b>						
Gross Income	399990	429522	462423	499210	540499	587027
Asset Residual Value	0	0	0	0	0	671762
<b>TOTAL INCOME</b>	<b>0</b>	<b>429522</b>	<b>462423</b>	<b>499210</b>	<b>540499</b>	<b>1258789</b>
<b>NET BENEFIT/COST</b>	<b>-334886</b>	<b>122883</b>	<b>620669</b>	<b>653409</b>	<b>690157</b>	<b>1403328</b>

COMM. FINANCIAL RATE OF RETURN (FRR) OVER 5 YEARS = 111.17%  
 COMM. NET PRESENT VALUE (NPV) @ 8.00% = 2122304 Per Hectare = 26.50

TABLE 16: COMMUNITY FINANCIAL ANALYSIS - 10 YEARS (FULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<b>EXPENDITURE</b>											
Capital Expenditure	500000	468500	0	0	0	0	-126091	-202611	-148650	-260000	-260000
Variable Expenditure	43999	47247	50866	54913	59455	64573	332123	332123	332123	332123	332123
Overhead Expenditure	-209113	-209113	-209113	-209113	-209113	-209113	187734	187734	187734	187734	187734
<b>TOTAL EXPENDITURE</b>	<b>334886</b>	<b>306635</b>	<b>-158246</b>	<b>-154200</b>	<b>-149658</b>	<b>-144540</b>	<b>393766</b>	<b>317247</b>	<b>371207</b>	<b>259857</b>	<b>259857</b>
<b>INCOME</b>											
Gross Income	399990	429522	462423	499210	540499	587027	639670	699482	767729	845936	935949
Asset Residual Value	0	0	0	0	0	0	0	0	0	0	549721
<b>TOTAL INCOME</b>	<b>0</b>	<b>429522</b>	<b>462423</b>	<b>499210</b>	<b>540499</b>	<b>587027</b>	<b>639670</b>	<b>699482</b>	<b>767729</b>	<b>845936</b>	<b>1485671</b>
<b>NET BENEFIT/COST</b>	<b>-334886</b>	<b>122883</b>	<b>620669</b>	<b>653409</b>	<b>690157</b>	<b>731567</b>	<b>245904</b>	<b>382235</b>	<b>396521</b>	<b>586079</b>	<b>1225813</b>

COMM. FINANCIAL RATE OF RETURN (FRR) OVER 10 YEARS = 108.97%  
 COMM. NET PRESENT VALUE (NPV) @ 8.00% = 3044530 Per Hectare = 38.01

FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA COMMUNITY WILDLIFE USE - NGAMILAND 2000 - BASE CASE

TABLE 17: ECONOMIC ANALYSIS - 5 YEARS (PULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
<b>ECONOMIC COSTS</b>						
Capital Expenditure	605126	299529	0	0	109012	0
Unskilled Wages	40500	40500	40500	40500	40500	40500
Other Domestic Costs	66174	99261	132348	165435	165435	165435
Tradable Costs	14944	59777	119553	149442	149442	149442
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
<b>TOTAL COSTS</b>	<b>726744</b>	<b>499067</b>	<b>292401</b>	<b>355377</b>	<b>464388</b>	<b>355377</b>
<b>ECONOMIC BENEFITS</b>						
Gross Income	436046	468241	504107	544210	589222	639944
Asset Residual Value	0	0	0	0	0	2667219
Foreign Financing	0	0	0	0	0	0
<b>TOTAL BENEFITS</b>	<b>436046</b>	<b>468241</b>	<b>504107</b>	<b>544210</b>	<b>589222</b>	<b>3307163</b>
<b>NET BENEFIT/COST</b>	<b>-290698</b>	<b>-30826</b>	<b>211706</b>	<b>188834</b>	<b>124834</b>	<b>2951786</b>
<b>ECONOMIC RATE OF RETURN (ERR) OVER 5 YEARS</b>				=	73.44%	
<b>NET PRESENT VALUE (NPV) @</b>		8.00%	=	1956350	<b>Per Hectare =</b>	24.42

TABLE 18: ECONOMIC ANALYSIS - 10 YEARS (PULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<b>ECONOMIC COSTS</b>											
Capital Expenditure	605126	299529	0	0	109012	0	131097	56184	109012	0	0
Unskilled Wages	40500	40500	40500	40500	40500	40500	40500	40500	40500	40500	40500
Other Domestic Costs	66174	99261	132348	165435	165435	165435	165435	165435	165435	165435	165435
Tradable Costs	14944	59777	119553	149442	149442	149442	149442	149442	149442	149442	149442
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
<b>TOTAL COSTS</b>	<b>726744</b>	<b>499067</b>	<b>292401</b>	<b>355377</b>	<b>464388</b>	<b>355377</b>	<b>486473</b>	<b>411561</b>	<b>464388</b>	<b>355377</b>	<b>355377</b>
<b>ECONOMIC BENEFITS</b>											
Gross Income	436046	468241	504107	544210	589222	639944	697332	762536	836935	922192	1020319
Asset Residual Value	0	0	0	0	0	0	0	0	0	0	3768584
Foreign Financing	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL BENEFITS</b>	<b>436046</b>	<b>468241</b>	<b>504107</b>	<b>544210</b>	<b>589222</b>	<b>639944</b>	<b>697332</b>	<b>762536</b>	<b>836935</b>	<b>922192</b>	<b>4788903</b>
<b>NET BENEFIT/COST</b>	<b>-290698</b>	<b>-30826</b>	<b>211706</b>	<b>188834</b>	<b>124834</b>	<b>284567</b>	<b>210859</b>	<b>350975</b>	<b>372546</b>	<b>566815</b>	<b>4433527</b>
<b>ECONOMIC RATE OF RETURN (ERR) OVER 10 YEARS</b>				=	54.07%						
<b>NET PRESENT VALUE (NPV) @</b>		8.00%	=	2938580	<b>Per Hectare =</b>	36.69					

FINANCIAL/ECONOMIC MODEL - HIGH QUALITY AREA COMMUNITY WILDLIFE USE - NGAMILAND 2000 - BASE CASE

TABLE 19: SUMMARY OF RESULTS

ITEM	UNITS			TOTAL
Land Extent	Hectares			80100
Stock on Land	Large Stock Units (LSU)			1495
ITEM	% of TCI	P/LSU	P/HECTARE	PULA
Total Financial Capital (TCI)	-	750.18	14.00	1121406
Financial Gross Income	83.46%	626.12	11.68	935949
Variable Financial Costs	-	222.18	4.15	332123
Fixed Financial Costs	-	362.95	6.77	542561
Net Cash Income	5.46%	40.98	0.76	61265
Local Community Cash Income	33.91%	254.36	4.75	380224
Land Rental	-	2.14	0.04	3204
Resource Royalty	-	137.75	2.57	205909
Project FRR (@ 10 Years)	-	-	-	8.14%
Community FRR (@ 10 Years)	-	-	-	108.97%
Project FNPV (@ 8%, @ 10 Years)	-	-	0.25	20302
Community FNPV (@ 8%, @ 10 Years)	-	-	38.01	3044530
Total Economic Capital	-	659.22	12.30	985428
Economic Gross Income	131.27%	865.33	16.15	1293528
Economic Costs	44.06%	290.47	5.42	434211
Net Economic Benefit	87.20%	574.85	10.73	859317
Net Value Added	78.87%	519.90	9.70	777176
ERR (@ 10 Years)	-	-	-	54.07%
ENPV (@ 8%, @ 10 Years)	-	-	36.69	2938580
Economic Capital Cost/Job	-	-	-	57966
Domestic Resource Cost Ratio	-	-	-	0.47
Policy Analysis Matrix	: Effects of Policy / Market Imperfections	: on Output		-357578
		: on Tradable Inputs		-3206
		: on Domestic Factors		-355127
	: Net Effects of Policy / Market Imperfections	: on Annual Net Income		-715911
		: on Net Present Value (10 Years)		-2918278



**Appendix 7: Community wildlife use (sandveld) financial/economic model**





APPENDIX 7  
 FINANCIAL/ECONOMIC MODEL - LOW QUALITY AREA COMMUNITY WILDLIFE USE - NGAMILAND 2000 - BASE CASE  
 NS 2000

ASSUMPTIONS\*

Production System:	18	beds. Wildlife community area producing trophies, wildlife viewing, and biltong.									
Site:	Community area in northern Kalahari tree savanna dominated by Terminalia sericea and with Acacia spp. in flat terrain of Quihaba pro WMA; water points provided for low densities of wildlife; 245 households.										
Game Density:	<u>100%</u>	0.18	LSU Equivalents/Sq. Km. or,		556	Hectares per LSU Equivalent					
Carrying Capacity:	<u>100%</u>	0.002	Tourist Beds/Sq. Km. or,		50000	Ha. per Tourist Bed					
Land Extent	900000	Hectares or,		9000	Square Kilometres		Core Wildlife Area Si	900000			
Tourist Category:	Overseas	35%	Regional	35%	Resident	5%	Citizen	25%			
	Adults	100%	Children	0%							
Occupancy Rate:	<u>100%</u>	40.0%	Average Length of Stay:		10 Days						
Daily Tariffs (P):	<u>100%</u>	Overseas	298	Regional	298	Resident	298	Citizen	298		
		Children	75%	of Adult Price							
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	0%	Domestic	100%
Interest Rates:	<u>100%</u>	Rate for Capital Loans:			18%	Rate for Working Capital Loans:		27%			
Working Capital as Proportion of Annual Operating Costs:					30%						
Park Entry Fees:	<u>100%</u>	Fee per Tourist Night/Day (Average			P	30.00					
Household Dividends:	55	Households @		P 155							
Land Rental and Resource Royalty (P):	<u>100%</u>	Rental:	0.04	per Ha.	<u>100%</u>	Royalty:	1%	of Turnover			
Manpower Needs:	<u>100%</u>	Managers	2	Skilled Labour	7	Unskilled Labour	10				
	<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>	10%		Adjustment Factor =	1.10						
Tax Adjustments:	<u>100%</u>	General Sales Tax:		11%	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.

\* Shaded cells indicate degree of conformity with base case values. Underlined shaded cells can be changed

FINANCIAL/ECONOMIC MODEL - LOW QUALITY AREA COMMUNITY WILDLIFE USE - NGAMILAND 2000 - BASE CASE  
 TABLE 1: CAPITAL REQUIREMENTS

ITEM	QUANT.	PRICE (PULA)	FINAN. COST	LIFE Years	AMORT. + INT.	DEPREC- LATION	ECON. DEPR.	FOREX ADJ.	TAX ADJ.	ECON. COST
<b>FIXED CAPITAL</b>										
<b>DOMESTIC ITEMS</b>										
Houses Manager	2	25500	51000	40	2550	1275	1135	1.00	0.89	45390
Houses Labour	17	6375	108375	40	5419	2709	2411	1.00	0.89	0
Office/Storerooms	1	156931	156931	40	7847	3923	3492	1.00	0.89	139669
Tourist/Hunter Lodges/Campsites	0	63750	0	40	0	0	0	1.00	0.89	0
Borcholes	1	97173	97173	40	4859	2429	2162	1.00	0.89	86484
Reservoirs	0	1000	0	40	0	0	0	1.00	0.89	0
Waterpoint Development	1	256854	256854	40	12843	6421	5715	1.00	0.89	228600
Firebreaks/Roads (km)	30	850	25500	40	1275	638	567	1.00	0.89	22695
Hiking Trails (km)	0	100	0	40	0	0	0	1.00	0.89	0
Transaction Costs	1	212356	212356	40	10618	5309	4725	1.00	0.89	188997
CONTINGENCIES @ 5%			45409	40	2270	1135	1010	1.00	0.89	40414
SUBTOTAL DOMESTIC ITEMS			953599							752249
<b>TRADABLE ITEMS</b>										
Boma/Pens	1	211650	211650	20	39540	10583	10360	1.10	0.89	207205
Campsite	0	75000	0	15	0	0	0	1.10	0.89	0
Pump/Windmill	1	123922	123922	15	24339	8261	8088	1.10	0.89	121319
Fencing Perimeter (km)	0	4510	0	15	0	0	0	1.10	0.89	0
Other Items	0	2050	0	15	0	0	0	1.10	0.89	0
CONTINGENCIES @ 5%			16779	15	3295	1119	1095	1.10	0.89	16426
SUBTOTAL TRADABLES			352350							344951
SUBTOTAL- FIXED CAPITAL			1305949							1097200
<b>MOVABLE CAPITAL</b>										
<b>TRADABLE ITEMS</b>										
LDVs/Trucks	1	111350	111350	4	41393	27838	27253	1.10	0.89	109012
Tools/Office Equipment	1	60775	60775	6	17376	10129	9916	1.10	0.89	59499
Other Equipment	1	52020	52020	6	14873	8670	8488	1.10	0.89	50928
Generator/Computers	1	50990	50990	6	14573	8498	8320	1.10	0.89	49919
CONTINGENCIES @ 10%			27513	6	7866	4586	4489	1.10	0.89	26936
SUBTOTAL TRADABLES			302648							296292
<b>DOMESTIC ITEMS</b>										
Stock - Small Game	Batch	0	0	40	0			1.00	0.89	0
: Large Game	Batch	1	0	40	0			1.00	0.89	0
: Big Five		0	0	40	0			1.00	0.89	0
: Cattle		0	0	40	0			1.00	0.89	0
Horses and Donkeys		0	0	40	0			1.00	0.89	0
CONTINGENCIES @ 10%			0	40	0			1.00	0.89	0
SUBTOTAL- DOMESTIC ITEMS			0							0
SUBTOTAL- MOVABLE CAPITAL			302648							296292
<b>WORKING CAPITAL</b>										
			LOAN	INTEREST						
VARIABLE			96737	26119						
OVERHEAD			75965	20510			1.10	1.00		106411
SUBTOTAL- WORKING CAPITAL			172702	46629						83561
TOTALS			1781298	46629	210941	103523	99227			1583464

FINANCIAL/ECONOMIC MODEL - LOW QUALITY AREA COMMUNITY WILDLIFE USE - NGAMILAND 2000 - BASE CASE

TABLE 2: STOCK COMPOSITION BY SPECIES AT FULL PRODUCTION

ITEM	HEAD	POT. OFF-TAK (%)	OFF-TAK (NO.)	OFF-TAKE (%)	PROF. TROPH	LSU FACTOR	LSU
Buffalo	0	6.60%	0	3.30%	0	0	1.00
Duiker	1459	22.60%	330	11.30%	165	26	0.07
Eland	13	6.70%	1	3.35%	0	0	1.00
Elephant	0	3.10%	0	1.55%	0	0	3.33
Giraffe	54	6.20%	3	3.10%	2	1	1.43
Hartebeest	172	11.20%	19	5.60%	10	5	0.25
Kudu	486	9.90%	48	4.95%	24	15	0.45
Leopard	82	15.00%	12	7.50%	6	4	0.00
Lion	4	12.00%	0	6.00%	0	0	0.00
Oryx	190	9.40%	18	4.70%	9	9	0.40
Ostrich	407	10.00%	41	5.00%	20	12	0.26
Roan	0	8.59%	0	4.30%	0	0	0.65
Steenbok	7317	27.70%	2027	13.85%	1013	22	0.06
Warthog	415	14.40%	60	7.20%	30	12	0.18
Wild dog	62	15.00%	9	7.50%	5	0	0.00
Wildebeest	240	9.60%	23	4.80%	12	7	0.40
Zebra	0	8.40%	0	4.20%	0	0	0.63
Cattle	320	9.00%	29	4.50%	14	0	1.00
Goats	52	20.00%	10	10.00%	5	0	0.11
Donkeys/horses	75	10.00%	7	5.00%	4	0	0.63
TOTAL	11348		2638		1319	114	1618
STOCK DENSITY:	0.13	LSU PER SQ.KM.	LAND EXTENT:	900000	HECTARES		

TABLE 3: SALES AT FULL PRODUCTION

ITEM	QUANTITY	@	VALUE (PULA)	FINANCIAL VALUE	FOREX ADJ.	TAX ADJ.	ECON. VALUE
Safari Hunting Rental	1 camp	@	162563	162563	1.10	1.00	178819
Safari Hunting: Royalty	0	@	67500	0	1.10	1.00	0
Safari Hunting: Meat	114 animals	@	278	31746	1.10	1.00	34920
Tourism Rentals - Lodges	1 camp	@	108000	108000	1.10	1.00	118800
Campsite - Net Income	2 site	@	18921	37842	1.10	1.00	41626
Tourism Rentals - Other	0 site	@	148750	0	1.10	1.00	0
Live Game Sales	0 animals	@	0	0	1.10	1.00	0
Venison: Biltong	1205 animals	@	278	334759	1.10	1.00	368234
Livestock sales	22 animals	@	340	7500	1.10	1.00	8250
Crafts	1 outlet	@	73411	73411	1.10	1.00	80752
Gathering	1 h'holds	@	46350	46350	1.00	1.00	46350
Grapple	1 h'holds	@	45900	45900	1.00	1.00	45900
TOTALS			GROSS INCOME:	848070			923652

## FINANCIAL/ECONOMIC MODEL - LOW QUALITY AREA COMMUNITY WILDLIFE USE - NGAMILAND 2000 - 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
<b>TRADABLE ITEMS</b>								
Marketing Costs: Advertising	0.00	0.00	0	1.10	0.89	0.00	0.00	0
: Agents Fees	0.00	0.00	0	1.10	0.89	0.00	0.00	0
Other Running Costs : Accomodation	0.00	0.00	0	1.10	0.89	0.00	0.00	0
: Transport	0.00	0.00	0	1.10	0.89	0.00	0.00	0
: Communications	5.67	0.01	9172	1.10	0.89	5.55	0.01	8980
: Agricultural Inputs	0.00	0.00	0	1.10	0.89	0.00	0.00	0
: Crafts	0.00	0.00	0	1.10	0.89	0.00	0.00	0
Fodder and Supplements	0.00	0.00	0	1.10	0.89	0.00	0.00	0
Other Costs : Office Supplies	7.93	0.01	12842	1.10	0.89	7.77	0.01	12572
: Capture Team	0.00	0.00	0	1.10	0.89	0.00	0.00	0
: Biltong Distribution	8.28	0.01	13406	1.10	0.89	8.11	0.01	13125
: Live Game Distribution	0.00	0.00	0	1.10	0.89	0.00	0.00	0
Consultancies, Travel and Training	15.76	0.03	25500	1.10	0.89	15.42	0.03	24965
General Vehicle Running Costs	56.67	0.10	91727	1.10	0.89	55.48	0.10	89801
<b>SUBTOTAL TRADABLES</b>	<b>94.31</b>	<b>0.17</b>	<b>152647</b>			<b>92.33</b>	<b>0.17</b>	<b>149442</b>
<b>DOMESTIC ITEMS</b>								
Veterinary and Medicine Costs	47.28	0.09	76521	1.00	0.89	42.08	0.08	68104
BMC Marketing Fees	0.00	0.00	0	1.00	1.00	0.00	0.00	0
Bank Fees	0.00	0.00	0	1.00	1.00	0.00	0.00	0
Sales Tax	57.64	0.10	93288	1.00	1.00	0.00	0.00	0
<b>SUBTOTAL DOMESTIC ITEMS</b>	<b>104.92</b>	<b>0.19</b>	<b>169809</b>			<b>42.08</b>	<b>0.08</b>	<b>68104</b>
<b>TOTAL VARIABLE EXPENDITURE</b>	<b>199.23</b>	<b>0.36</b>	<b>322456</b>			<b>134.41</b>	<b>0.24</b>	<b>217546</b>

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
<b>DOMESTIC ITEMS</b>								
Salaries and Wages: Unskilled Labour	33.36	0.06	54000	1.00	1.00	33.36	0.06	27000
: Skilled Labour	46.71	0.08	75600	1.00	1.00	46.71	0.08	67284
: Managers	26.26	0.05	42500	1.00	1.00	26.26	0.05	42500
Administration	10.50	0.02	17000	1.00	0.89	10.50	0.02	15130
Maintenance and Repairs	19.29	0.03	31218	1.00	0.89	19.29	0.03	27784
Insurance	9.35	0.02	15132	1.00	0.89	9.35	0.02	13468
Miscellaneous Fixed Costs	10.98	0.02	17765	1.00	0.89	10.98	0.02	15811
<b>TOTAL OPERATING OVERHEAD EXPEN</b>	<b>156.45</b>	<b>0.28</b>	<b>253216</b>			<b>156.45</b>	<b>0.28</b>	<b>208977</b>

FINANCIAL/ECONOMIC MODEL - LOW QUALITY AREA COMMUNITY WILDLIFE USE - NGAMILAND 2000 - BASE CASE

TABLE 6: STATIC FINANCIAL MODEL (AT FULL PRODUCTION)

ITEM	UNITS		TOTAL
Land Extent	Hectares		900000
Stock on Land	Large Stock Units (LSU)		1618
Total Capital Requirement	PULA		1781298
	P/LSU	P/HECTARE	PULA
GROSS INCOME	523.99	0.94	848070
VARIABLE COSTS	199.23	0.36	322456
GROSS MARGIN	324.75	0.58	525614
OVERHEAD COSTS			
Overhead Operating Costs	156.45	0.28	253216
Loan Amortisation and Interest	32.58	0.06	52735
Provisions for Capital Replacement	47.97	0.09	77642
Interest on Variable Working Capital	16.14	0.03	26119
Interest on Overhead Working Capital	12.67	0.02	20510
Land Rental	22.24	0.04	36000
Resource Royalty	5.24	0.01	8481
TOTAL OVERHEAD COSTS	293.30	0.53	474703
NET CASH INCOME	31.46	0.06	50910
NET CASH INCOME/NS100 TOTAL CAPITAL INVESTMENT	2.86		
TOTAL BENEFITS**/NS100 TOTAL CAPITAL INVESTMENT	20.25		
TOTAL BENEFITS**/HECTARE	0.40		

\*\*Total Benefits\* = all of Net Cash Income, Salaries and Wages, Licences and Duties, Rental and Royalties.

FINANCIAL/ECONOMIC MODEL - LOW QUALITY AREA COMMUNITY WILDLIFE USE - NGAMILAND 2000 - BASE CASE

TABLE 7: STATIC ECONOMIC MODEL (AT FULL PRODUCTION)

ITEM	UNITS		TOTAL
Land Extent	Hectares		900000
Stock on Land	Large Stock Units (LSU)		1618
Total Initial Capital Requirement	PULA		1583464
Economic Depreciation Cost	PULA		99227
Foreign Financing (Prorated)	PULA		0
Foreign Amortisation	PULA		0
Foreign Capital Replacement Provision	PULA		0
Foreign Interest Cost	PULA		0
Domestic Interest Cost	PULA		169453
<hr/>			
ECONOMIC BENEFITS	P/LSU	P/HECTARE	PULA
Gross Income	570.69	1.03	923652
Stock Appreciation	110.31	0.20	178535
TOTAL ECONOMIC BENEFITS	680.99	1.22	1102187
<hr/>			
ECONOMIC COSTS			
DOMESTIC COMPONENT			
Shadow Unskilled Citizen Wages	16.68	0.03	27000
Other Citizen Wages	67.83	0.12	109784
Opportunity Cost of Capital	78.27	0.14	126677
Other Domestic Economic Costs	86.68	0.16	140297
SUBTOTAL DOMESTIC COMPONENT	249.47	0.45	403758
<hr/>			
TRADABLE COMPONENT			
Foreign Remuneration	0.00	0.00	0
Foreign Services	0.00	0.00	0
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	92.33	0.17	149442
SUBTOTAL TRADABLE COMPONENT	92.33	0.17	149442
TOTAL ECONOMIC COSTS	341.80	0.61	553200
<hr/>			
NET ECONOMIC BENEFIT (Gross Value Added)	339.20	0.61	548987
NET VALUE ADDED (Excluding Depreciation)	277.89	0.50	449760
<hr/>			
DOMESTIC RESOURCE COST RATIO =	0.74		
NET VALUE ADDED/P100 TOTAL CAPITAL COST =	28.40		
CAPITAL COST/EMPLOYMENT OPPORTUNITY CREATED =	83340		
NUMBER OF EMPLOYMENT OPPORTUNITIES/1000 HA.	0.02		

FINANCIAL/ECONOMIC MODEL - LOW QUALITY AREA COMMUNITY WILDLIFE USE - NGAMILAND 2000 - 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
<b>DEPRECIABLE ASSETS</b>												
"Forty Year" Items	40											
Total Expenditure		953599										
Phased Expenditure		572159	381440	0	0	0	0	0	0	0	0	0
Depreciation		14304	23840	23840	23840	23840	23840	23840	23840	23840	23840	23840
Residual value		572159	939295	915455	891615	867775	843935	820095	796255	772415	748575	724735
"Twenty Year" Items	20											
Total Expenditure		211650										
Phased Expenditure		211650	0	0	0	0	0	0	0	0	0	0
Depreciation		10583	10583	10583	10583	10583	10583	10583	10583	10583	10583	10583
Residual value		211650	201068	190485	179903	169320	158738	148155	137573	126990	116408	105825
"Fifteen Year" Items	15											
Total Expenditure		140700										
Phased Expenditure		84420	56280	0	0	0	0	0	0	0	0	0
Depreciation		5628	9380	9380	9380	9380	9380	9380	9380	9380	9380	9380
Residual value		84420	135072	125692	116312	106932	97552	88172	78792	69412	60032	50652
"Six Year" Items	6											
Total Expenditure		191298						191298				
Phased Expenditure		133909	57389	0	0	0	0	133909	57389	0	0	0
Depreciation		22318	31883	31883	31883	31883	31883	31883	31883	31883	31883	31883
Residual value		133909	168980	137097	105214	73331	41448	143473	168980	137097	105214	73331
"Four Year" Items	4											
Total Expenditure		111350				111350				111350		
Phased Expenditure		111350	0	0	0	111350	0	0	0	111350	0	0
Depreciation		27838	27838	27838	27838	27838	27838	27838	27838	27838	27838	27838
Residual value		111350	83513	55675	27838	111350	83513	55675	27838	111350	83513	55675
<b>NON DEPRECIABLE ASSETS</b>												
Stock	-											
Phased Fin. Expenditure		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
Residual value		1412085	1507879	1611960	1725214	1848637	1983345	2130594	2291796	2468537	2662607	2876020
Working Capital	-											
Phased Expenditure		172702	0	0	0	0	0	0	0	0	0	0
<b>TOTAL PHASED CAPITAL EXPENDITURE</b>												
Domestic Component		572159	381440	0	0	0	0	0	0	0	0	0
Tradable Component		541329	113669	0	0	111350	0	133909	57389	111350	0	0
Total Financial Value		1113488	495109	0	0	111350	0	133909	57389	111350	0	0
Total Economic Value		1039182	450764	0	0	109012	0	131097	56184	109012	0	0
<b>TOTAL ASSET RESIDUAL VALUE</b>												
Domestic Component		1984244	2447174	2527415	2616829	2716412	2827280	2950689	3088051	3240952	3411182	3600755
Tradable Component		541329	588632	508949	429266	460933	381250	435476	413182	444849	365166	285483
Financial Value		2525573	3035806	3036364	3046095	3177345	3208530	3386165	3501233	3685801	3776348	3886238
Economic Value		2295938	2754255	2747660	2749229	2868860	2889523	3052444	3152870	3319955	3393450	3484160



FINANCIAL/ECONOMIC MODEL - LOW QUALITY AREA COMMUNITY WILDLIFE USE - NGAMILAND 2000 - 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
Duiker	22.60%	500	557	619	689	767	854	950	1058	1177	1310	1459
Eland	6.70%	9	9	10	10	10	11	11	11	12	12	13
Elephant	3.10%	0	0	0	0	0	0	0	0	0	0	0
Giraffe	6.20%	40	41	43	44	45	47	48	50	51	53	54
Hartebeest	11.20%	100	106	112	118	124	131	139	146	155	163	172
Kudu	9.90%	300	315	330	347	364	382	401	421	442	463	486
Leopard	15.00%	40	43	46	50	53	57	62	66	71	77	82
Lion	12.00%	2	2	2	2	3	3	3	3	3	3	4
Oryx	9.40%	120	126	132	138	144	151	158	166	173	181	190
Ostrich	10.00%	250	263	276	289	304	319	335	352	369	388	407
Roan	8.59%	0	0	0	0	0	0	0	0	0	0	0
Steenbok	27.70%	2000	2277	2592	2951	3360	3826	4355	4959	5645	6427	7317
Warthog	14.40%	207	222	238	255	273	293	314	337	361	387	415
Wild dog	15.00%	30	32	35	37	40	43	46	50	54	58	62
Wildebeest	9.60%	150	157	165	173	181	190	199	208	218	229	240
Zebra	8.40%	0	0	0	0	0	0	0	0	0	0	0
Cattle	9.00%	206	215	225	235	246	257	268	280	293	306	320
Goats	20.00%	20	22	24	27	29	32	35	39	43	47	52
Donkeys/horses	10.00%	46	48	51	53	56	59	62	65	68	71	75
TOTALS		4020	4435	4899	5418	6000	6654	7387	8210	9136	10176	11348
ANNUAL INCREASE (%)			10%	10%	11%	11%	11%	11%	11%	11%	11%	12%

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
Duiker	0.07	35	39	43	48	54	60	67	74	82	92	102
Eland	1.00	9	9	10	10	10	11	11	11	12	12	13
Elephant	3.33	0	0	0	0	0	0	0	0	0	0	0
Giraffe	1.43	57	59	61	63	65	67	69	71	73	75	78
Hartebeest	0.25	25	26	28	29	31	33	35	37	39	41	43
Kudu	0.45	135	142	149	156	164	172	180	189	199	209	219
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	48	50	53	55	58	60	63	66	69	73	76
Ostrich	0.26	65	68	72	75	79	83	87	91	96	101	106
Roan	0.65	0	0	0	0	0	0	0	0	0	0	0
Steenbok	0.06	120	137	156	177	202	230	261	298	339	386	439
Warthog	0.18	37	40	43	46	49	53	57	61	65	70	75
Wild dog	0.00	0	0	0	0	0	0	0	0	0	0	0
Wildebeest	0.40	60	63	66	69	72	76	79	83	87	91	96
Zebra	0.63	0	0	0	0	0	0	0	0	0	0	0
Cattle	1.00	206	215	225	235	246	257	268	280	293	306	320
Goats	0.11	2	2	3	3	3	4	4	4	5	5	6
Donkeys/horses	0.63	29	30	32	34	35	37	39	41	43	45	47
TOTALS		829	881	938	1000	1067	1140	1220	1307	1401	1505	1618



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 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
Duiker	0	0	0	0	0	0	0	0	0	0	0
Eland	0	0	0	0	0	0	0	0	0	0	0
Elephant	0	0	0	0	0	0	0	0	0	0	0
Giraffe	0	0	0	0	0	0	0	0	0	0	0
Hartebeest	0	0	0	0	0	0	0	0	0	0	0
Kudu	0	0	0	0	0	0	0	0	0	0	0
Leopard	0	0	0	0	0	0	0	0	0	0	0
Lion	0	0	0	0	0	0	0	0	0	0	0
Oryx	0	0	0	0	0	0	0	0	0	0	0
Ostrich	0	0	0	0	0	0	0	0	0	0	0
Roan	0	0	0	0	0	0	0	0	0	0	0
Steenbok	0	0	0	0	0	0	0	0	0	0	0
Warthog	0	0	0	0	0	0	0	0	0	0	0
Wild dog	0	0	0	0	0	0	0	0	0	0	0
Wildebeest	0	0	0	0	0	0	0	0	0	0	0
Zebra	0	0	0	0	0	0	0	0	0	0	0
Cattle	0	0	0	0	0	0	0	0	0	0	0
Goats	0	0	0	0	0	0	0	0	0	0	0
Donkeys/horses	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	0	0	0	0	0	0	0	0	0	0

VALUE OF STOCK (N\$)	VALUE /UNIT	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Buffalo	1926	0	0	0	0	0	0	0	0	0	0	0
Duiker	122	61083	67985	75668	84218	93735	104327	116116	129237	143840	160094	178185
Eland	1548	13932	14399	14881	15380	15895	16428	16978	17547	18135	18742	19370
Elephant	3857	0	0	0	0	0	0	0	0	0	0	0
Giraffe	1205	48181	49674	51214	52802	54439	56126	57866	59660	61510	63416	65382
Hartebeest	977	97733	103206	108985	115088	121533	128339	135526	143116	151130	159593	168531
Kudu	820	246031	258210	270991	284405	298483	313258	328765	345038	362118	380043	398855
Leopard	665	26618	28614	30760	33067	35547	38213	41079	44160	47472	51033	54860
Lion	744	1487	1577	1671	1771	1878	1990	2110	2236	2371	2513	2664
Oryx	2537	304485	318795	333779	349466	365891	383088	401093	419945	439682	460347	481983
Ostrich	326	81444	85516	89792	94281	98995	103945	109142	114600	120330	126346	132663
Roan	9775	0	0	0	0	0	0	0	0	0	0	0
Steenbok	122	244331	278171	316698	360561	410498	467352	532081	605774	689674	785193	893943
Warthog	218	45208	48463	51952	55693	59703	64001	68609	73549	78845	84522	90607
Wild dog	170	5100	5483	5894	6336	6811	7322	7871	8461	9096	9778	10511
Wildebeest	821	123132	129043	135237	141728	148531	155661	163132	170963	179169	187769	196782
Zebra	1012	0	0	0	0	0	0	0	0	0	0	0
Cattle	420	86520	90413	94482	98734	103177	107820	112672	117742	123040	128577	134363
Goats	190	3800	4180	4598	5058	5564	6120	6732	7405	8146	8960	9856
Donkeys/horses	500	23000	24150	25358	26625	27957	29354	30822	32363	33981	35681	37465
TOTAL VALUE OF STOCK		1412085	1507879	1611960	1725214	1848637	1983345	2130594	2291796	2468537	2662607	2876020
% OF FINAL RESID. VAL.		49.10%	52.43%	56.05%	59.99%	64.28%	68.96%	74.08%	79.69%	85.83%	92.58%	100.00%
ANNUAL VALUE INCREASE			95794	104081	113254	123423	134708	147249	161201	176742	194070	213413





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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
<b>LONG TERM LOANS</b>													
<b>TWENTY YEAR LOAN</b>	<b>20</b>												
Total Expenditure			291312										
Loan Disbursements			174787	116525	0	0	0	0	0	0	0	0	0
Loan Payments			32654	54423	54423	54423	54423	54423	54423	54423	54423	54423	54423
Amortisation			8739	14566	14566	14566	14566	14566	14566	14566	14566	14566	14566
Interest Payments			23914	39857	39857	39857	39857	39857	39857	39857	39857	39857	39857
Loans Outstanding			174787	282573	268007	255442	238876	224310	209745	195179	180614	166048	151482
<b>FIFTEEN YEAR LOAN</b>	<b>15</b>												
Total Expenditure			55175										
Loan Disbursements			26381	8794	0	0	0	0	0	0	0	0	0
Loan Payments			5181	6908	6908	6908	6908	6908	6908	6908	6908	6908	6908
Amortisation			1759	2345	2345	2345	2345	2345	2345	2345	2345	2345	2345
Interest Payments			3423	4563	4563	4563	4563	4563	4563	4563	4563	4563	4563
Loans Outstanding			26381	33416	31071	28726	26381	24036	21691	19346	17001	14656	12311
<b>SIX YEAR LOAN</b>	<b>6</b>							<b>6</b>					
Total Expenditure			47824						47824				
Loan Disbursements			33477	14347	0	0	0	0	33477	14347	0	0	0
Loan Payments			9571	13674	13674	13674	13674	13674	13674	13674	13674	13674	13674
Amortisation			5580	7971	7971	7971	7971	7971	7971	7971	7971	7971	7971
Interest Payments			3992	5703	5703	5703	5703	5703	5703	5703	5703	5703	5703
Loans Outstanding			33477	42245	34274	26303	18353	10362	35868	42245	34274	26303	18353
<b>FOUR YEAR LOAN</b>	<b>4</b>												
Total Expenditure			27838				27838				27838		
Loan Disbursements			27838	0	0	0	27838	0	0	0	27838	0	0
Loan Payments			10348	10348	10348	10348	10348	10348	10348	10348	10348	10348	10348
Amortisation			6959	6959	6959	6959	6959	6959	6959	6959	6959	6959	6959
Interest Payments			3389	3389	3389	3389	3389	3389	3389	3389	3389	3389	3389
Loans Outstanding			27838	20878	13919	6959	27838	20878	13919	6959	27838	20878	13919
<b>SHORT TERM LOANS</b>													
Working Capital	<b>1</b>												
Overdraft			172702	172702	172702	172702	172702	172702	172702	172702	172702	172702	172702
Interest Payments			46629	46629	46629	46629	46629	46629	46629	46629	46629	46629	46629
<b>TOTAL LONG TERM LOAN DISBURSMENTS</b>													
Domestic Component			262483	139666	0	0	27838	0	33477	14347	27838	0	0
Foreign Component *			0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL LONG TERM LOAN AMORTISATION</b>													
Domestic Component			23037	31841	31841	31841	31841	31841	31841	31841	31841	31841	31841
Foreign Component *			0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL INTEREST PAYMENTS</b>													
Domestic Component			81347	100142	100142	100142	100142	100142	100142	100142	100142	100142	100142
Foreign Component *			0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL LOANS OUTSTANDING</b>													
Domestic Component			262483	379112	347271	315431	311427	279587	281223	263730	259727	227886	196045
Foreign Component *			0	0	0	0	0	0	0	0	0	0	0

\* Economic Values

FINANCIAL/ECONOMIC MODEL - LOW QUALITY AREA COMMUNITY WILDLIFE USE - NGAMILAND 2000 - BASE CASE

TABLE 11: PROJECT FINANCIAL ANALYSIS - 5 YEARS (PULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5			
<b>EXPENDITURE</b>									
Capital Expenditure	1113488	495109	0	0	111350	0			
Variable Expenditure	32246	193474	322456	322456	322456	322456			
Overhead Expenditure	297696	297696	297696	297696	297696	297696			
<b>TOTAL EXPENDITURE</b>	<b>1443430</b>	<b>986279</b>	<b>620153</b>	<b>620153</b>	<b>731503</b>	<b>620153</b>			
<b>INCOME</b>									
Gross Income	416390	444638	475329	508725	545119	584841			
Asset Residual Value	0	0	0	0	0	3208530			
<b>TOTAL INCOME</b>	<b>416390</b>	<b>444638</b>	<b>475329</b>	<b>508725</b>	<b>545119</b>	<b>3793372</b>			
<b>NET BENEFIT/COST</b>	<b>-1027040</b>	<b>-541641</b>	<b>-144824</b>	<b>-111428</b>	<b>-186384</b>	<b>3173219</b>			
<hr/>									
PROJ. FINANCIAL RATE OF RETURN (FRR) OVER 5 YEARS	=				11.66%				
PROJ. NET PRESENT VALUE (NPV) @ 8.00%	=				260615	Per Hectare =		0.29	

TABLE 12: PROJECT FINANCIAL ANALYSIS - 7 YEARS (PULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
<b>EXPENDITURE</b>								
Capital Expenditure	1113488	495109	0	0	111350	0	133909	57389
Variable Expenditure	32246	193474	322456	322456	322456	322456	322456	322456
Overhead Expenditure	297696	297696	297696	297696	297696	297696	297696	297696
<b>TOTAL EXPENDITURE</b>	<b>1443430</b>	<b>986279</b>	<b>620153</b>	<b>620153</b>	<b>731503</b>	<b>620153</b>	<b>754061</b>	<b>677542</b>
<b>INCOME</b>								
Gross Income	416390	444638	475329	508725	545119	584841	628262	675796
Asset Residual Value	0	0	0	0	0	0	0	3501253
<b>TOTAL INCOME</b>	<b>416390</b>	<b>444638</b>	<b>475329</b>	<b>508725</b>	<b>545119</b>	<b>584841</b>	<b>628262</b>	<b>4177029</b>
<b>NET BENEFIT/COST</b>	<b>-1027040</b>	<b>-541641</b>	<b>-144824</b>	<b>-111428</b>	<b>-186384</b>	<b>-35311</b>	<b>-125800</b>	<b>3499487</b>
<hr/>								
PROJ. FINANCIAL RATE OF RETURN (FRR) OVER 7 YEARS	=				8.55%			
PROJ. NET PRESENT VALUE (NPV) @ 8.00%	=				55958	Per Hectare =		0.06

TABLE 13: PROJECT FINANCIAL ANALYSIS - 10 YEARS (PULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<b>EXPENDITURE</b>											
Capital Expenditure	1113488	495109	0	0	111350	0	133909	57389	111350	0	0
Variable Expenditure	32246	193474	322456	322456	322456	322456	322456	322456	322456	322456	322456
Overhead Expenditure	297696	297696	297696	297696	297696	297696	297696	297696	297696	297696	297696
<b>TOTAL EXPENDITURE</b>	<b>1443430</b>	<b>986279</b>	<b>620153</b>	<b>620153</b>	<b>731503</b>	<b>620153</b>	<b>754061</b>	<b>677542</b>	<b>731503</b>	<b>620153</b>	<b>620153</b>
<b>INCOME</b>											
Gross Income	416390	444638	475329	508725	545119	584841	628262	675796	727913	785140	848070
Asset Residual Value	0	0	0	0	0	0	0	0	0	0	3886238
<b>TOTAL INCOME</b>	<b>416390</b>	<b>444638</b>	<b>475329</b>	<b>508725</b>	<b>545119</b>	<b>584841</b>	<b>628262</b>	<b>675796</b>	<b>727913</b>	<b>785140</b>	<b>4754308</b>
<b>NET BENEFIT/COST</b>	<b>-1027040</b>	<b>-541641</b>	<b>-144824</b>	<b>-111428</b>	<b>-186384</b>	<b>-35311</b>	<b>-125800</b>	<b>-1746</b>	<b>-3590</b>	<b>164987</b>	<b>4114155</b>
<hr/>											
PROJ. FINANCIAL RATE OF RETURN (FRR) OVER 10 YEARS	=				8.02%						
PROJ. NET PRESENT VALUE (NPV) @ 8.00%	=				3466	Per Hectare =				0.00	

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TABLE 14: SUBSIDIES FOR COMMUNITY PROJECT (PULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<b>SUBSIDIES ON EXPENDITURE</b>											
On Capital Expenditure	613488	26609	0	0	111350	0	260000	260000	260000	260000	260000
On Variable Expenditure	-13557	144564	270170	266496	262493	258124	0	0	0	0	0
On Overhead Expenditure	297696	297696	297696	297696	297696	297696	0	0	0	0	0
<b>TOTAL EXPENDITURE</b>	<b>897627</b>	<b>468869</b>	<b>567867</b>	<b>564193</b>	<b>671540</b>	<b>555820</b>	<b>260000</b>	<b>260000</b>	<b>260000</b>	<b>260000</b>	<b>260000</b>
<b>SUBSIDIES ON INCOME</b>											
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
<b>TOTAL INCOME</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>TOTAL SUBSIDIES</b>	<b>897627</b>	<b>468869</b>	<b>567867</b>	<b>564193</b>	<b>671540</b>	<b>555820</b>	<b>260000</b>	<b>260000</b>	<b>260000</b>	<b>260000</b>	<b>260000</b>

TABLE 15: COMMUNITY FINANCIAL ANALYSIS - 5 YEARS (PULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
<b>EXPENDITURE</b>						
Capital Expenditure	500000	468500	0	0	0	0
Variable Expenditure	45803	48910	52286	55960	59963	64333
Overhead Expenditure	-44481	-44481	-44481	-44481	-44481	-44481
<b>TOTAL EXPENDITURE</b>	<b>501322</b>	<b>472929</b>	<b>7805</b>	<b>11479</b>	<b>15482</b>	<b>19852</b>
<b>INCOME</b>						
Gross Income	416390	444638	475329	508725	545119	584841
Asset Residual Value	0	0	0	0	0	1225185
<b>TOTAL INCOME</b>	<b>0</b>	<b>444638</b>	<b>475329</b>	<b>508725</b>	<b>545119</b>	<b>1810026</b>
<b>NET BENEFIT/COST</b>	<b>-501322</b>	<b>-28292</b>	<b>467523</b>	<b>497246</b>	<b>529637</b>	<b>1790174</b>

COMM. FINANCIAL RATE OF RETURN (FRR) OVER 5 YEARS = 63.25%  
 COMM. NET PRESENT VALUE (NPV) @ 8.00% = 1736758 Per Hectare = 1.93

TABLE 16: COMMUNITY FINANCIAL ANALYSIS - 10 YEARS (PULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<b>EXPENDITURE</b>											
Capital Expenditure	500000	468500	0	0	0	0	-126091	-202611	-148650	-260000	-260000
Variable Expenditure	45803	48910	52286	55960	59963	64333	322456	322456	322456	322456	322456
Overhead Expenditure	-44481	-44481	-44481	-44481	-44481	-44481	253216	253216	253216	253216	253216
<b>TOTAL EXPENDITURE</b>	<b>501322</b>	<b>472929</b>	<b>7805</b>	<b>11479</b>	<b>15482</b>	<b>19852</b>	<b>449581</b>	<b>373061</b>	<b>427022</b>	<b>315672</b>	<b>315672</b>
<b>INCOME</b>											
Gross Income	416390	444638	475329	508725	545119	584841	628262	675796	727915	785140	848070
Asset Residual Value	0	0	0	0	0	0	0	0	0	0	1010218
<b>TOTAL INCOME</b>	<b>0</b>	<b>444638</b>	<b>475329</b>	<b>508725</b>	<b>545119</b>	<b>584841</b>	<b>628262</b>	<b>675796</b>	<b>727915</b>	<b>785140</b>	<b>1858288</b>
<b>NET BENEFIT/COST</b>	<b>-501322</b>	<b>-28292</b>	<b>467523</b>	<b>497246</b>	<b>529637</b>	<b>564990</b>	<b>178681</b>	<b>302735</b>	<b>300891</b>	<b>469468</b>	<b>1542616</b>

COMM. FINANCIAL RATE OF RETURN (FRR) OVER 10 YEARS = 57.27%  
 COMM. NET PRESENT VALUE (NPV) @ 8.00% = 2262077 Per Hectare = 2.51



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TABLE 17: ECONOMIC ANALYSIS - 5 YEARS (PULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
<b>ECONOMIC COSTS</b>						
Capital Expenditure	1039182	450764	0	0	109012	0
Unskilled Wages	27000	27000	27000	27000	27000	27000
Other Domestic Costs	100032	150049	200065	250081	250081	250081
Tradable Costs	14944	59777	119553	149442	149442	149442
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
<b>TOTAL COSTS</b>	<b>1181159</b>	<b>687589</b>	<b>346618</b>	<b>426523</b>	<b>535534</b>	<b>426523</b>
<b>ECONOMIC BENEFITS</b>						
Gross Income	453500	484265	517691	554063	593701	636964
Asset Residual Value	0	0	0	0	0	2889523
Foreign Financing	0	0	0	0	0	0
<b>TOTAL BENEFITS</b>	<b>453500</b>	<b>484265</b>	<b>517691</b>	<b>554063</b>	<b>593701</b>	<b>3526487</b>
<b>NET BENEFIT/COST</b>	<b>-727659</b>	<b>-203324</b>	<b>171073</b>	<b>127541</b>	<b>58167</b>	<b>3099964</b>
<b>ECONOMIC RATE OF RETURN (ERR) OVER 5 YEARS</b>				=	34.15%	
<b>NET PRESENT VALUE (NPV) @</b>		8.00%	=	1374565	Per Hectare =	1.53

TABLE 18: ECONOMIC ANALYSIS - 10 YEARS (PULA, 2000)

ITEM	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
<b>ECONOMIC COSTS</b>											
Capital Expenditure	1039182	450764	0	0	109012	0	131097	56184	109012	0	0
Unskilled Wages	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000	27000
Other Domestic Costs	100032	150049	200065	250081	250081	250081	250081	250081	250081	250081	250081
Tradable Costs	14944	59777	119553	149442	149442	149442	149442	149442	149442	149442	149442
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
<b>TOTAL COSTS</b>	<b>1181159</b>	<b>687589</b>	<b>346618</b>	<b>426523</b>	<b>535534</b>	<b>426523</b>	<b>557619</b>	<b>482707</b>	<b>535534</b>	<b>426523</b>	<b>426523</b>
<b>ECONOMIC BENEFITS</b>											
Gross Income	453500	484265	517691	554063	593701	636964	684254	736025	792786	855113	923652
Asset Residual Value	0	0	0	0	0	0	0	0	0	0	3484160
Foreign Financing	0	0	0	0	0	0	0	0	0	0	0
<b>TOTAL BENEFITS</b>	<b>453500</b>	<b>484265</b>	<b>517691</b>	<b>554063</b>	<b>593701</b>	<b>636964</b>	<b>684254</b>	<b>736025</b>	<b>792786</b>	<b>855113</b>	<b>4407812</b>
<b>NET BENEFIT/COST</b>	<b>-727659</b>	<b>-203324</b>	<b>171073</b>	<b>127541</b>	<b>58167</b>	<b>210441</b>	<b>126635</b>	<b>253318</b>	<b>257252</b>	<b>428591</b>	<b>3981289</b>
<b>ECONOMIC RATE OF RETURN (ERR) OVER 10 YEARS</b>					=	24.84%					
<b>NET PRESENT VALUE (NPV) @</b>		8.00%	=	1799142	Per Hectare =	2.00					

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TABLE 19: SUMMARY OF RESULTS

ITEM	UNITS			TOTAL
Land Extent	Hectares			900000
Stock on Land	Large Stock Units (LSU)			1618
ITEM	% of TCI	P/LSU	P/HECTARE	PULA
Total Financial Capital (TCI)	-	1100.59	1.98	1781298
Financial Gross Income	47.61%	523.99	0.94	848070
Variable Financial Costs	-	199.23	0.36	322456
Fixed Financial Costs	-	293.30	0.53	474703
Net Cash Income	2.86%	31.46	0.06	50910
Local Community Cash Income	13.00%	143.03	0.26	231491
Land Rental	-	22.24	0.04	36000
Resource Royalty	-	5.24	0.01	8481
Project FRR (@ 10 Years)	-	-	-	8.02%
Community FRR (@ 10 Years)	-	-	-	57.27%
Project FNPV (@ 8%, @ 10 Years)	-	-	0.00	3466
Community FNPV (@ 8%, @ 10 Years)	-	-	2.51	2262077
Total Economic Capital	-	978.36	1.76	1583464
Economic Gross Income	69.61%	680.99	1.22	1102187
Economic Costs	34.94%	341.80	0.61	553200
Net Economic Benefit	34.67%	339.20	0.61	548987
Net Value Added	28.40%	277.89	0.50	449760
ERR (@ 10 Years)	-	-	-	24.84%
ENPV (@ 8%, @ 10 Years)	-	-	2.00	1799142
Economic Capital Cost/Job	-	-	-	83340
Domestic Resource Cost Ratio	-	-	-	0.74
Policy Analysis Matrix	: Effects of Policy / Market Imperfections			-254117
		: on Output		-3206
		: on Tradable Inputs		-141527
		: on Domestic Factors		-398850
	: Net Effects of Policy / Market Imperfections			-1795676
		: on Annual Net Income		-1795676
		: on Net Present Value (10 Years)		-1795676

