

**A Study of the Contribution of Sustainable Natural Resource
Management to Economic Growth, Poverty Eradication and
Achievement of NDP 10 Goals**

Case Studies

June 2012

By



Botswana Institute for Development Policy Analysis

In association with

GY Associates Ltd

32 Amenbury Lane, Harpenden

Herts. UK. AL5 2DF

web site: www.gya.co.uk

Submitted to:

Ministry of Finance and Development Planning,

Gaborone, Botswana

Acknowledgements

This report was written by Gil Yaron and Pelotshweu Moepeng with David Mmopelwa, Lillian Mookodi and Raymond Lekobane. We are grateful to Ruud Jansen and David Smith of UNDP-UNEP PEI for constructive and helpful comments on an earlier version.

Contents

Acknowledgements.....	1
1 Case study 1: Vegetable production using treated waste water.....	2
1.1 Background	2
1.1.1 Horticulture production and consumption in Botswana	2
1.1.2 Waste water treatment and use in Botswana	3
1.2 Tomato production at Glen Valley.....	4
1.3 Conclusions and recommendations.....	7
References – case study 1.....	9
2 Community Based Natural Resource Management (CBNRM) and Tourism in Botswana: A Case Study of Sankuyo Village in the Okavango Delta	10
2.1 Background	10
2.2 The history of Sankuyo Tshwaragano Management Trust (STMT).....	10
2.3 The livelihood impact of STMT	11
2.4 The Economics of STMT	12
2.4.1 Financial returns.....	12
2.4.2 Broader economic issues	13
2.5 Conclusions and recommendations.....	14
References – case study 2.....	15

1 Case study 1: Vegetable production using treated waste water

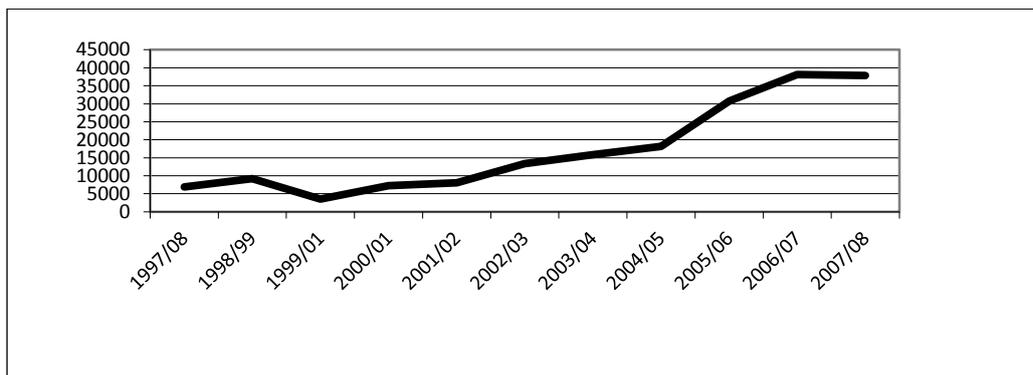
1.1 Background

1.1.1 Horticulture production and consumption in Botswana

Data from the Ministry of Agriculture (MoA) indicates that total horticultural production and yields per hectare rose dramatically from 1997/98 to 2007/08 – see Figure 1 and Figure 2 below. A number of factors are likely to be involved here but Madisa, Obopile and Assefa (2012) highlight the increasing number of “literate households” moving into small-scale vegetable production in Botswana over this period.

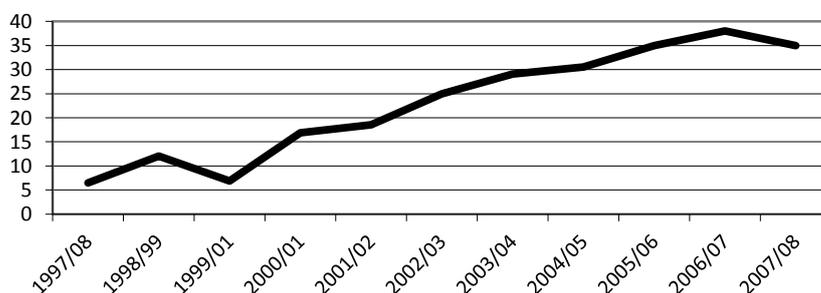
The demand for horticultural products (specifically vegetables) has risen even faster than the increase in production. This is likely to reflect rapidly rising urban incomes (and urbanisation combined with population growth). The gap has been filled by imports and Figure 3 shows how the horticultural trade balance has become steadily more negative since 2003.

Figure 1: Horticultural Production (mt)



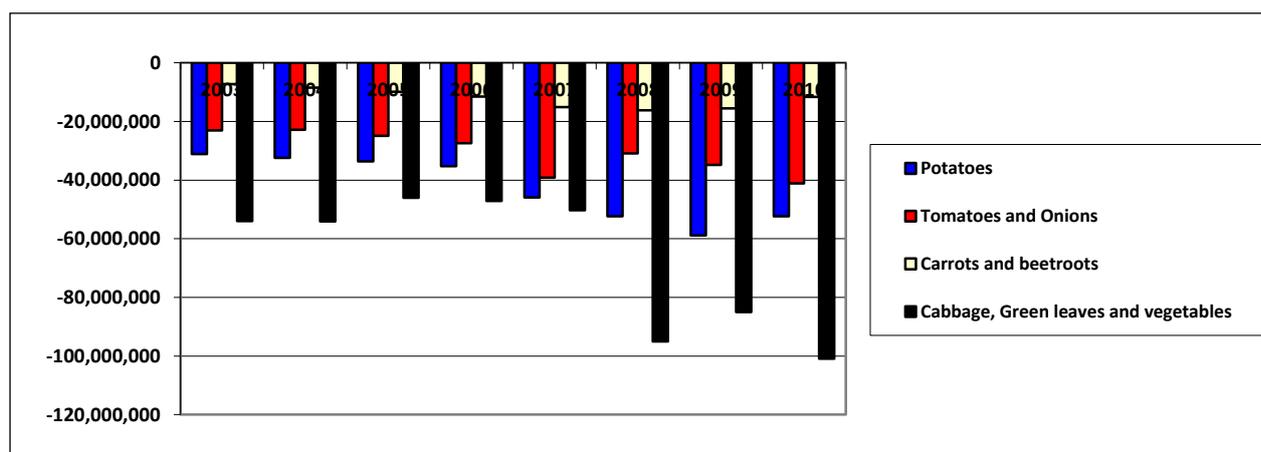
Source: MoA (Various)

Figure 2: Horticultural Yield (mt/ha)



Source: MoA (Various)

Figure 3: Trends in the Trade Balance (Pula) for Horticulture in Botswana 2003 -2010



Source CSO (Various)

Evidence on urban agriculture in Malawi¹ revealed two predominant ‘types’ of urban farmers: (i) low-income, less educated, often female-headed households, who use urban agriculture as an insurance against income losses and who can employ skilled workers to support their livestock activities; and (ii) middle- and high-income, often male-headed households, that undertake urban agriculture for personal consumption and hire significant numbers of unskilled workers. It is important to note that NGOs have played an important role in developing the capacity of poor women farmers who, otherwise, would not have been able to take advantage of this economic opportunity.

1.1.2 Waste water treatment and use in Botswana

Schutte and Mudge (2004) report actual and potential re-use of treated waste water (including Glen Valley) as shown in Table 1 below. Most of the opportunity for re-use is in agriculture but only a small fraction is currently realised.

What happens in practice is that this treated water is discharged back into the environment with 90% of it in 2004 falling below DWA standards (and international norms) for treated water quality. This reflected the preponderance of treatment ponds rather than the modern activated sludge and trickling filter facilities in the largest urban centres. There has been an on-going programme of modernisation since then and, although we do not know the proportion of treated water that now meets international norms, we do know that Glen Valley treated water is the product of a modern treatment process.

Table 1: treated waste water use

Reuse type	Current reuse (m ³ /day)	Potential reuse (m ³ /day)
Woodlots	236	636
Sports / Golf courses	5 044	6 044
Agriculture	1 555	29 751
Other	60	60
Total	6 895	36 491

Source: Schutte and Mudge (2004)

¹ Mkwambisi et al. (2011)

The 2006 review of the National Water Management Plan (NWMP2) and the draft Botswana National Water Conservation Policy 2004 highlight the importance of using treated waste water for horticulture in the context of general water demand management. The need to develop standards in this area has been recognised by GoB and IWRM (2010) reports the on-going development of livestock water quality and irrigation water quality standards.

As Botswana’s population gets richer and urbanises the demand for water is projected to rise significantly (see Table 2). At the same time, an increasing proportion of the population will be connected to a sewerage system with modern treatment facilities. This means that treated water for re-use - “New water” - will become an increasingly important way of meeting growing demand (Table 2).

Table 2: water demand and re-use water supply

Year	2001	2010	2020
Water Demand *(wd)	206.0**	258.0	335.0
Return Flows	24.5	55.0	89.9
“New water” (nw)	12.2	28.3	46.2
% (nw/wd)	5.9	11.0	13.7

Source: Schutte and Mudge (2004)

With this in mind we consider the potential for vegetable production in Botswana using secondary treated urban waste water. The Glen Valley pilot project on the outskirts of Gaborone is the case study chosen. Although this pilot project currently produces a very small proportion of the nation’s horticulture the use of treated waste water for horticulture in peri-urban locations is set to grow dramatically over the next decade. Hence this case study is highly relevant for the country as a whole.

1.2 Tomato production at Glen Valley

Approximately 135 ha of the designated 203ha of Glen Valley land is being cultivated, mainly for vegetable production, some 10km northeast of Gaborone using secondary treated waste water with drip or sprinkler irrigation. Areola et al (2011) report 47 farms ranging from 1 ha to 47 ha on soil with significant variation in clay content. For the purpose of this case study we have undertaken primary data collection from one relatively small farm and have checked the data collected against international data to confirm that the figures provided are credible². We found that while tomatoes were the most important crop, peppers, butternut squash, water melon, cabbage, spinach, rape and lettuce were grown within a multi-year rotation.

Treated waste water has been supplied by the by the Water Utilities Corporation of Ministry of Minerals, Energy and Water Resources since the scheme’s inception in 2005. In principle, a tariff of 0.47 Pula/m³ has been set by the Ministry of Agriculture for irrigation water (which is comparable to

² Our TOR specified that we should rely on secondary data but we found that the necessary data had not been published in formal or grey literature and hence we have undertaken primary research.

the tariff charged in a number of Middle East and North African countries³ although the full cost of secondary treated water supply is approximately five or six times greater⁴). In practice, water fees are not collected at Glen Valley. Farmers have had to invest in the piping and control gear for drip irrigation but not in pumps or water storage. For this reason we use the lower bound of commercial drip irrigation capital costs (US\$1250/ha) from Awulachew et al. (2009)⁵.

While water quality is high and no fees have been charged, the supply has not been reliable. There have been frequent burst water pipes which, farmers believe, is the result of poor system design: as the water reticulation system cannot cope with the high water pressure from the treatment plant. When there are supply problems, farmers have found the government maintenance system is very slow to respond.

Our economic analysis is based on a tomato crop grown over a three month period. This will tend to under-estimate annual net economic returns as some costs are spread across more than one crop grown on the same land over a year. However, detailed input data was only available for the tomato crop (which is the most important for farmers in this area). Cost, revenue and yield data is given in Table 3 below based on two recent growing seasons in which the farmer experienced irrigation water supply problems for one of them.

When there are no major interruptions to water supply and farmers can use drip irrigation it is very profitable to grow tomatoes. The net return to tomato growing is around 138,000 Pula/ha (US\$17,800/ha). If the water tariff was raised to its full economic cost (of approximately US\$0.36/m³)⁶ the net return falls by only 7% as water supply costs make up a small proportion of the total production cost. Post-harvest losses have a much bigger impact on the profitability of this enterprise: they are currently low (at around 6%) but if they were to rise to 30% (which is a risk for new businesses) profitability would fall to 91,000 Pula/ha.

Whether this business makes a profit or not depends on the reliability of the water supply. As we can see from Table 3, when a burst pipe between the treatment plant and the farm caused 70% of the crop to be lost, tomato growing was a loss making activity. Farmers believe firstly that the treated water supply system was not well designed for drip irrigation and secondly, that commercial irrigation requires much faster reactions from those responsible for maintenance than the government system is able to provide.

Unreliable water supply has made vegetable production using treated waste water in Glen Valley a risky business. This is a significant barrier to low income farmers who could otherwise be encouraged to move into this area with training and loans.

³ M. Abu-Madi, R. Al-Sa'ed, O. Braadbaart and G. Alaerts (2008), Viability of increasing the tariff of freshwater for irrigation as a tool to stimulate wastewater reuse in the MENA region, *Water Science & Technology* 57.9

⁴ USEPA (2004) *Guidelines For Water Re-use, Chapter 8, USEPA, Washington DC*
<http://water.epa.gov/aboutow/owm/upload/Water-Reuse-Guidelines-625r04108.pdf>

⁵ Awulachew, S.B, Lemperiere, P. and T. Tulu, Irrigation methods: Drip irrigation—Options for smallholders, Module 5 part II, IWMI and ILRI Ethiopia,
http://www.ilri.org/InfoServ/Webpub/fulldocs/IWMI_IPMSmodules/Module_5_Part_2.pdf

⁶ Table 8-5 USEPA (2004), Op. Cit.

Table 3: Costs & Revenues for Tomato Production

	Pula	Units & notes
Land preparation (de-bushing & fencing) - every 5 years	3000	per ha
Capital costs: fencing & drip-irrigation	9687.5	per ha
(filter, piping, controls) - every 5 years		
Equivalent annual costs	2537.5	per ha
Land cultivation (ploughing & discing)	600	per ha
Fertilizer	2,520	per ha/3 month season
Seeds	3,080	per ha/3 month season
Pesticides	1,870	per ha/3 month season
Casual Labour	9,000	3000/ha/per month;
Packaging Materials	15,000	per ha/3 month season
Staking materials	8,000	per ha/3 month season
Fuel	1,200	per ha/3 month season
Waste water/3 month season	3650	m ³ /ha/3 month season
Waste water tariff (Ministry of Agriculture)	0.47	Not currently collected
Waste water irrigation cost	1,716	per ha/3 month season
Distribution cost (to market)	1,200	per ha/3 month season
Tomato yield (if no water supply problems)	40,000	kg/ha/season
Post-harvest losses	2,340	kg/ha/season
Average market price	5	Pula/kg
Total revenue (if no water supply problems)	188,300	per ha/3 month season
Tomato yield (with water supply problems)	12,000	kg/ha/season
Post-harvest losses	2,340	kg/ha/season
Average market price	5	Pula/kg
Total revenue (with water supply problems)	48,300	per ha/3 month season
Total input costs	47,836	
Total fixed/capital costs (annualised)	2,538	
Total costs	50,373	
Total net revenue (if no water supply problems)	137,927	per ha
Total net revenue (with water supply problems)	-2,073	per ha

Source: farmer interviews unless otherwise stated

It is also worth mentioning that further research may be needed on health issues associated with vegetable production at Glen Valley and with the use of secondary waste water for irrigation in Botswana more generally. Studies by Li *et al.* (2001), Emongor and Ramolemana (2004), Ngole (2005) and Areola *et al.* (2011) suggest that secondary treated waste water at Glen Valley is generally suitable for irrigated vegetable production. The international evidence confirms that when used for

drip-irrigation, the microbial risk from secondary waste water treated to international norms is very low, but the way that vegetables are handled, stored and prepared is critical to tackle the major public health risks^{7, 8}.

As consumers become richer greater attention is paid to longer-term, chemical health risks from irrigated agriculture⁹. Health issues such as heavy metals in soils have to be examined on a site by site basis as the soil type and how they have been used in the past plays a critical role. Areola *et al.* (2011) report that cadmium, nickel and copper levels in Glen Valley soils are higher than internationally recommended levels although this quite possibly has nothing to do with wastewater irrigation as, with the exception of cadmium, these heavy metals are lower on irrigation plots than control sites. The use of sewage sludge by some farmers also has an impact on heavy metals in the soil and in countries such as the UK this is regulated quite separately from treated irrigation water.

1.3 Conclusions and recommendations

This case study illustrates both the potential and some significant constraints to increased commercial production of drip-irrigated horticulture using secondary treated waste water in Botswana.

From the farmer's perspective a reliable supply of irrigation water to the farm is absolutely vital. The full economic cost of treated water is a small proportion of the production cost and so farmers would be willing to pay this for a reliable supply. In countries such as Israel, where commercial agriculture is highly dependent on treated waste water, the Government sets standards and relies on the private sector to deliver the service. As the service is profitable there is a good incentive to deliver a reliable supply and quickly respond to any supply interruption. This incentive appears to be missing for the commercial supply of treated waste water in Botswana. While private sector involvement is by no means essential, the Government must identify how to enable and incentivise a suitable commercial supply of treated waste water in order for the potential of commercial horticulture to be realised.

International evidence suggests that treated waste water from modern activated sludge and trickling filter facilities is suitable for drip irrigation of horticulture. High levels of some heavy metals in Glen Valley soils may reflect previous land use, unregulated sludge application or, possibly, the water treatment system in use. Further research is needed to understand this.

We believe that the Government is in the process of setting irrigation water quality standards. In addition, there is a need to regulate the application of sewage sludge in commercial horticulture taken to ensure appropriate health control and soil quality standards, drawing on the experience of middle-income countries that have done this.

⁷ J. Charad (2011), SAI Platform: TB 7 - Technical Brief on Wastewater Use in Agriculture, SAI Platform, Belgium <http://www.saiplatform.org/uploads/Modules/Library/SAI%20Technical%20Brief%207%20%20Wastewater%20Use%20in%20Agriculture.pdf>

⁸ World Bank (2010), Improving Wastewater Use in Agriculture: An Emerging Priority, Energy Transport and Water Department Water Anchor (ETWWA), Washington DC

⁹ World Bank (2010), Op. Cit.

Low income consumers will gain if locally-produced horticulture is cheaper than the imports it replaces. Some local employment will also be generated by these new businesses although the evidence suggests that growers will have to rely on migrant farm labourers. In order for the poor to benefit as small-scale commercial producers, a great deal of capacity building is needed. Experience from Malawi suggests that sustained NGO support has enabled low income women to establish viable small businesses as peri-urban vegetable growers. The same model could well apply in Botswana provided that a reliable supply of treated irrigation water is available.

References – case study 1

Abu-Madi, M., R. Al-Sa'ed, O. Braadbaart and G. Alaerts (2008), Viability of increasing the tariff of freshwater for irrigation as a tool to stimulate wastewater reuse in the MENA region, *Water Science & Technology* 57.9

Areola O., Dikinya O., and L. Mosime, 2011: Comparative effects of secondary treated wastewater irrigation on soil quality parameters under different crop types. *The African Journal of Plant Science and Biotechnology* 5 (Special Issue), 41-55.

Awulachew, S.B, Lemperiere, P. and T. Tulu, Irrigation methods: Drip irrigation—Options for smallholders, Module 5 part II, IWMI and ILRI Ethiopia,

http://www.ilri.org/InfoServ/Webpub/fulldocs/IWMI_IPMSmodules/Module_5_Part_2.pdf

Charad, J., (2011), SAI Platform: TB 7 - Technical Brief on Wastewater Use in Agriculture, SAI Platform, Belgium

<http://www.saiplatform.org/uploads/Modules/Library/SAI%20Technical%20Brief%207%20%20Wastewater%20Use%20in%20Agriculture.pdf>

Emongor, V. E.; Ramolemana, G. M., (2004). Treated sewage effluent (water) potential to be used for horticultural production in Botswana. *Phys. Chem. Earth*, 29 (15–18), 1101-1108

Li, T. Y.; Baozhong, P.; Houquin, H.; Korong, J.; Monggae, C.; Disheitane, K., (2001). Sino-Botswana Government. Experimental irrigation Project at Glen Valley Water Care Works, Final Report.

Madisa, M.E., M. Obopile and Y. Assefa (2012), Analysis of Horticultural Production Trends in Botswana, *Journal of Plant Studies*, vol 1 (1)

Mkwambisi, D. D., E. D. G. Fraser and A.J. Dougill (2011). "Urban agriculture and poverty reduction: Evaluating how food production in cities contributes to food security, employment and income in Malawi", *Journal of International Development*, 23(2)

Ngole, V. M., (2005). An assessment of sewage sludge properties and their agronomic effects on selected soil types in Botswana: A greenhouse study. Ph.D. Thesis, Department of Environmental Science, University of Botswana

USEPA (2004), Guidelines For Water Re-use, Chapter 8, USEPA, Washington DC

<http://water.epa.gov/aboutow/owm/upload/Water-Reuse-Guidelines-625r04108.pdf>

World Bank (2010), Improving Wastewater Use in Agriculture: An Emerging Priority, Energy Transport and Water Department Water Anchor (ETWWA), Washington DC

2 Community Based Natural Resource Management (CBNRM) and Tourism in Botswana: A Case Study of Sankuyo Village in the Okavango Delta

2.1 Background

Community Based Natural Resources Management (CBNRM) is carried out in various districts of Botswana and in zoned areas known as Wildlife Management Areas (WMAs). The WMA are divided into Controlled Hunting Areas (CHAs) where community management of natural resources is an integral part of conserving and promoting sustainable management of the natural resources. The central idea is that communities gain a financial stake in sustainable wildlife management from being granted hunting quotas (meat and income), as well as revenue from photographic tourism and, in some cases, veld products and handicrafts. This compensates for significantly reduced opportunities for agriculture as well as loss of meat and income from illegal hunting. The Government gains from the arrangement from local wildlife monitoring and collaboration between the community and the Department of Wildlife to prevent poaching.

In practice, weak governance has meant that CBNRM benefits have often been obtained by the board members running community-based organisations (CBOs) rather than the wider community. Sankuyo Tshwaragano Management Trust (STMT) is, however, widely regarded as a CBNRM success story¹⁰, having managed to improve the livelihoods of community members and work closely with the Department of Wildlife on wildlife conservation. Nonetheless, it faces the challenges of a new policy environment – from March 2012 hunting has been prohibited within 25km of wildlife reserves - and the need to acquire tourism industry and business skills. This makes it a particularly relevant case study.

2.2 The history of Sankuyo Tshwaragano Management Trust (STMT)¹¹

Sankuyo village (pop. approximately 400) is located on the eastern fringe of the Okavango Delta some 80km from the town of Maun and close to Moremi Wildlife Reserve.

In the early 1990s, the Sankuyo community received support by a USAID-funded CBNRM programme for participatory planning which led to the Sankuyo Tshwaragano Management Trust (STMT) being established in 1995 as well as development of a strategic plan and 5-year management plan. The first objectives of the Trust were to obtain a concession of land from the Tawana Land Board and to establish community-based enterprises. In 1996, the Trust was awarded a 15-year lease on some 8,600 hectares of land known as NG34. Under the terms of the lease the area was sub-leased and its hunting quota sold to commercial safari and hunting operators, which provided the Trust with a source of income. In 2001, STMT was awarded the concession to an additional, adjoining, smaller block of land, NG33.

¹⁰ Spenceley (2008), for example, in her review of ecotourism in Botswana describes STMT as a case of successful ecotourism development

¹¹ This section draws on African Wildlife Foundation (2005), Community Owned and Run: Case Study of Santawani Lodge, Botswana, AWF Working Papers, July 2005

The two land blocks, NG 33 and NG34, are situated on the wildlife corridor between Moreni Game Reserve and Chobe National Park. This is a strategically important conservation area, particularly for elephant, and the success of STMT provides a valuable (but unquantified) service for wildlife-based tourism in Botswana.

In 1996, a Botswanan NGO, the People and Nature Trust, began working with STMT on a new strategic planning process. This led to the establishment of four community-based economic initiatives, for which STMT provided 50% of the start-up capital, with a grant providing the remainder. The enterprises were Kaziikini camp site, Shandreka cultural village, vegetable gardens and grass and reed harvesting.

Santawani lodge was acquired by STMT in a run-down state in 2001 as part of the NG33 concession. With support from the African Wildlife Foundation (AWF) and grants totaling US\$80,000 from USAID, the lodge was refurbished in 2003 and capacity building for marketing was provided to the community. The lodge was operated by STMT and initially, the business appears to have been successful: AWF (2005) reported a better first year occupancy rate than predicted in the business plan. However, by 2007 it was clear that the community did not have “the management and marketing capability to attract clients in sufficient volume to operate the business profitably”¹².

Financial support by USADF was provided in 2007 on the basis of the lodge being operated as a joint venture with a private company which would provide the necessary training and technical assistance to the community to enable them to manage and operate the lodge. The new business plan projected a significant expansion of the lodge and a move from a loss-making business in 2007 to a profit of 1.98 million Pula (US\$250,000) in 2012. Unfortunately this has not happened and as of 2012, STMT and the private operator have been locked in a disagreement over the operational agreement for some time which has stopped the lodge functioning. This dispute has now gone to court.

2.3 The livelihood impact of STMT

The greatest livelihood impact of STMT CBNRM operations has come from the employment generated. STMT employs 106 people of whom 18 work at the photographic camp, 18 at research and monitoring sites, 16 at the hunting camp, 39 work for the Sankuyo Kaziikini Maun Office and 15 people are employed by Santawani lodge. However, The Santawani lodge is currently not operational for reasons described above. In aggregate, salaries including overtime accounted for some 1,164,000 Pula (US\$ 147,000) in 2011 with a typical monthly salary of a hunting or photographic worker being P1000.00 (US\$126), housekeeping and waiting staff earn P800/month while a chef earns P2000/month. Staff meal allowances also totaled 65,000 Pula (US\$8,000) in 2011 while Board member allowances, meals & expenses were nearly 200,000 Pula (US\$25,000).

As there is a commitment to employing local staff wherever possible, these produce significant financial returns to the local community but in 2011 there were also important contributions from:

- Community projects – 236,000 Pula (US\$ 30,000);
- Sponsorship of a local club – 134,000 Pula (US\$17,000); and

¹² USADF Investment description Sankuyo Tshwaragano Management Trust Santawani Lodge Eco-tourism, Appendix A, page 1, 2007

- Educational scholarships – 108,000 Pula (US\$14,000).

Previous community support programmes have resulted in:

- Every household having a water stand pipe;
- Eight houses built for the poor households as identified through the government social welfare system;
- Provision of a P1,200 quarterly allowances for the elderly starting at the age of 55 years; and
- Provision of economic empowerment start-up capital for business to community members with convincing business proposals to the CBO Board.

Women in the village also hand craft baskets for sale in the Kaziikini campsite and use the revenue generated as a source of livelihood.

The fact that non-residents want to join the community also provides some evidence that benefits are not restricted to a core group of board members. In fact, the community has imposed a 1 year of continuous residence requirement to try and avoid benefits being captured by “elite” community members who have employment in towns and cities elsewhere in Botswana.

2.4 The Economics of STMT

2.4.1 Financial returns

A summary of annual income and expenses for STMT is given in It is striking that income from the game quota (primarily for trophy hunting) constituted 57% of total revenue in 2011 and a similar proportion in 2010. This income will be lost under new rules that prohibit hunting within 25km of a national park and will have a dramatic impact on the business. Clearly, even in one of Botswana’s richest wildlife areas, CBNRM is not financially viable for STMT based solely on photographic tourism income from the sources shown in **Error! Not a valid bookmark self-reference..**

The missing part of the picture is the potential offered by Santawani Lodge. Despite support from AWF, the community did not have the marketing and specialist technical skills required to run Santawani as a profitable business. Hence the idea of a joint venture with an experienced private sector operator who would provide these missing skills and transfer them to the community. The USADF (2007) Business Plan projected net profits before taxes and depreciation from the lodge joint venture would rise from a loss of almost 450,000 Pula to 1.7m Pula by year 3 and nearly 2m Pula by Year 5. So, in principle, photographic tourism income from Santawani lodge could replace the loss of hunting revenue. In practice, the joint venture has not worked out and this case has gone to court.

Table 1 below. From the limited perspective of income and current expenditure, STMT appears to be fundamentally profitable¹³. Many “administrative expenses” are discretionary (e.g. sponsorship) and only exist because there was a surplus in previous years.

It is striking that income from the game quota (primarily for trophy hunting) constituted 57% of total revenue in 2011 and a similar proportion in 2010. This income will be lost under new rules that prohibit hunting within 25km of a national park and will have a dramatic impact on the business. Clearly, even in one of Botswana’s richest wildlife areas, CBNRM is not financially viable for STMT based solely on photographic tourism income from the sources shown in **Error! Not a valid bookmark self-reference..**

The missing part of the picture is the potential offered by Santawani Lodge. Despite support from AWF, the community did not have the marketing and specialist technical skills required to run Santawani as a profitable business. Hence the idea of a joint venture with an experienced private sector operator who would provide these missing skills and transfer them to the community. The USADF (2007) Business Plan projected net profits before taxes and depreciation from the lodge joint venture would rise from a loss of almost 450,000 Pula to 1.7m Pula by year 3 and nearly 2m Pula by Year 5. So, in principle, photographic tourism income from Santawani lodge could replace the loss of hunting revenue. In practice, the joint venture has not worked out and this case has gone to court.

¹³ Although we were not able to obtain information on capital expenditures these are likely to be relatively low for the Kaziikini campsite.

Table 4: Extract of STMT Income and Expenses

	<u>2011</u>	<u>2010</u>
<u>Revenue:</u>	2,783,506	2,888,068
Trust Income - Kaziikini	474,702	590,680
Game Quota	1,589,060	1,606,680
Land Rental	609,743	580,708
Community Benefit Funds	110,000	110,000
<u>Cost of sales</u>	82144	103,908
<u>Other income</u>	215,117	254,193
<u>Selling & distribution expenses</u>	30,858	35,605
<u>Other operating expenses</u>	326,868	309,199
<u>Finance costs</u>		5,400
<u>Administrative expenses:</u>	2,829,768	2,496,842
Salaries and wages	983,531	1,142,528
Overtime	185,766	
Board member allowances, meals & expenses	199,262	141,400
Community beneficiaries	55,000	112,500
Community project	235,912	40,817
Club (Bushbucks) Sponsorship	134,322	53,481
Scholarships	108,033	81,896
<u>Net Deficit/Surplus</u>	-271,015	191,307

Source: STMT

Leaving aside the specifics of this case, the experience of CBOs involved in CBNRM in Namibia has been that they lack the commercial skills and experience to negotiate agreements with safari operators. This is almost inevitable and a lesson for Botswana may be that Government funding might be necessary to bring in appropriate legal and technical support. Given that this type of support is very expensive, some form of screening would be needed to restrict it to promising options.

2.4.2 Broader economic issues

The data provided by STMT relates to the income and expenditure of their operations. However, in addition to these community-level benefits and costs, there are broader economic impacts that determine whether CBNRM is economically attractive for Botswana. These include:

Costs

- Expenditure by local and central Government to support STMT activities;
- Crop losses due to wildlife; and
- Expenditure by NGOs to support STMT activities.

Benefits

- Indirect and induced expenditure (multiplier effects) STMT activities; and
- Increase in the stock of wildlife and other environmental benefits as a result of CBNRM.

While this data is not available for STMT, the cost-benefit analysis of Yaron (2010) for CBNRM in the nearby Caprivi region of Namibia provides some relevant findings. These are that:

- Over a 20 year period the internal rate of return taking into account all private and public costs and benefits was 27% i.e. CBNRM in Caprivi has been a good investment for the economy as a whole. However, long-term engagement is essential: in the first 9 years costs were greater than benefits.
- The most important benefit driving this result is the increase in wildlife resulting from CBNRM. This varied year to year but, for example, in 2005 the value of the stock increase was three times the value of (direct) local tourism spending in community-run establishments. Achieving a sustainable increase in local wildlife numbers is a benefit for wildlife-based tourism in the area, not simply community-based wildlife tourism.

2.5 Conclusions and recommendations

The case of STMT has a number of lessons for CBNRM and rural development in Botswana. This is a success story in terms of generating benefits for the community and profitable tourism businesses such as the Kaziikini campsite. However, income and expenditure data for 2010 and 2011 clearly show revenue from trophy hunting is critical for the financial viability of CBNRM even in a wildlife-rich concession area with established photo-tourism. Suddenly removing this income will do very serious damage to CBNRM in Botswana. As a minimum, the loss of trophy hunting revenue should be brought in gradually over a sufficient period to allow communities to adapt. The question also has to be asked whether a blanket ban on trophy hunting within 25km of game reserves is the best available way of making CBNRM sustainable.

A second lesson is that considerable and sustained external support will be required to enable CBOs to add higher-value tourism operations (such as lodges, even in joint venture partnerships) to replace game quotas. As part of this support, government funding may be required to contract the necessary commercial and legal expertise for communities to negotiate promising joint venture agreements.

Experience from the Caprivi in Namibia suggests that investing in CBNRM can produce a good economic return over a 20 year period but that it takes many years of sustained engagement to start to see positive net returns. In this case, communities generated a large economic benefit for all tourism businesses in the region through enabling the increase in wildlife.

References – case study 2

African Wildlife Foundation (2005), Community Owned and Run: Case Study of Santawani Lodge, Botswana, AWF Working Papers, July 2005

Spenceley, A. (2008) Responsible Tourism: Critical issues for Conservation and Development, Earthscan

Yaron, G., (2010), Consolidating Communal Land Conservations in Namibia Case Study, a report for WWF-UK, Godalming, UK

USADF (2007), Investment description Sankuyo Tshwaragano Management Trust Santawani Lodge Eco-tourism, Appendix A