

Makana LEAP: Implementation Proposal to Biocarbon Fund

**MAKANA LEAP
IMPLEMENTATION PROPOSAL TO BIOCARBON FUND**

Prepared by

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Project Idea Note for South African - Carbon Sequestration Project Agricultural Research Council

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1. Project Proponent

- 1.1. **Name of Organization:** Agricultural Research Council – Range & Forage Institute
- 1.2. **Organizational Category:** Parastatal
- 1.3. **Address:** ARC-Range & Forage Institute, PO Box 101, Grahamstown, South Africa
- 1.4. **Contact Person:** Dr AR Palmer, Specialist Researcher
- 1.5. **Phone/Fax:** +27 46 6222638, Mobile: +27 828871081 Fax: +27 46 6222398
- 1.6. **E-mail:** t.palmer@ru.ac.za
- 1.7. **Function of Proponent in the Project:** Operational Entity/Technical Advisor
- 1.8. **Project Sponsors:**
 - a. Bio Carbon Fund
 - b. Agricultural Research Council (ARC) – South Africa (Anthony Palmer t.palmer@ru.ac.za) : An entity charged with agricultural research in South Africa. The ARC-RFI is responsible for monitoring natural rangeland condition, and for identifying sites of rangeland degradation. Using a range of techniques, including field survey and remote sensing, the ARC-RFI has identified those areas within South Africa that no longer perform according to their potential for forage production. Having identified these areas, remedial action has been taken to rehabilitate these rangelands using suitable native species. Intensive monitoring of these sites is carried out to describe changes in standing biomass and biodiversity.
 - c. Eastern Cape Department of Agriculture (Member of the Executive Council, Mr Max Mamase and Mr Felix Hobson foh@medschemeclub.co.za). This entity is charged with the management of agricultural activities on all land within the province, and is mandated in terms of the Conservation of Agricultural Resources Act 43 of 1983, to oversee the sustainable management of the natural resources of the region.
 - d. National Botanical Institute (John Donaldson Donaldson@nbi.ac.za). This entity is responsible for describing the biodiversity of South Africa. The Conservation Farming Project (EU-funded) explored trends in carbon sequestration across four ecosystems, and demonstrated that *Portulacaria afra* has a significant potential as a carbon sequestrator.
 - e. Working for Water (Christo Marais chris@dwaf.gov.za). This is a national initiative to remove invasive alien trees from catchments. This programme, funded largely from the Poverty Relief Budget of the South African Treasury and the private sector, is designed to train and encourage entrepreneurial skills amongst all participants.

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- f. Wilderness Foundation (Andrew Muir, executive director, The Wilderness Foundation (WF)). This entity is responsible for land management within the proposed Baviaans-Kouga Wilderness Area and has provided land for re-afforestation.
- g. University of Stellenbosch (Dept of Soil Science – Martin Fey (fey@sun.ac.za) and Anthony Mills (mills@nbi.ac.za). This entity has been auditing soil carbon levels throughout southern Africa, and represents the main auditing component of the project. They will provide technical skills on the techniques used to quantify above- and below-ground soil carbon.
- h. SA National Parks (Ayanda Sigwela ayanda.sigwela@upe.ac.za). This entity is responsible for research and land management within the national parks in South Africa. Many of the newly established national parks have been created on land with a long history of commercial exploitation and are degraded. The contribution of SAN Parks is towards the management of the re-afforestation programme on their land.
- i. University of Technology Sydney (Prof Derek Eamus derek.eamus@uts.edu.au). *Portulacaria afra* is a facultative CAM plant, and its success as a carbon sink is strongly linked to this aspect of its physiology. It can survive extremely arid conditions when in CAM, but at the same time possesses an ability capture C very efficiently during the wet season using the C3 pathway. Little is known about the mechanism for switching between C3 and CAM. UTS has offered its facilities to enable Dr AR Palmer to assess the environmental conditions under which the two pathways operate. This work will take place during a sabbatical period from 2005-2007.
- j. Environmentek, CSIR, South Africa (Dr Bob Scholes scholes@csir.co.za). This entity has undertaken global climate change research, and is represented by Dr Scholes on the Intergovernmental Panel on Climate Change.
- k. Eastern Cape Parks Board (ECPB) (Mr Derick Clarke). This entity is responsible for the management of nature reserves where spekboom grows naturally and has been planted as part of the pilot project for carbon sequestration. The ECPB will supervise the re-afforestation of land under their management.
- l. Development Bank of South Africa (DBSA) (Mr Gert de Waal GertD@dbsa.org). The DBSA is responsible for funding policy development at local government level and through a Local Environmental Action Plan (LEAP) has identified carbon sequestration as an important project within Makana and Ngqushwa municipalities.
- m. Terrestrial Ecology Research Unit (TERU), University of Port Elizabeth (Prof RM Cowling rnc@kingsley.co.za). Through the STEP programme (GEF funded), TERU has identified the Subtropical Thicket as a vegetation type worthy of urgent conservation attention. The STEP identified a number of threats to the Subtropical Thicket, including cultivation, urbanization, over-grazing and alien infestation. Spekboom has an important role to play in the rehabilitation of degraded thicket, and TERU, through its research programme, will continue to provide the direction for important interventions in restoring the thicket.
- n. Biotrack South Africa (Pty) Ltd. Biotrack is a subsidiary of the company established at Macquarie University's Key Centre for Biodiversity and will monitor biological signatures (terrestrial invertebrates) at all the sites. Co-operation between Biotrack SA and southern African centres of excellence in invertebrate identification will be developed.

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2. Type of Project

- 2.1. **Greenhouse Gases Targeted:** CO₂
- 2.2. **Type of Activities:** CO₂ Sequestration
- 2.3. **Field of Activities:** Land Use, Land Use Change

3. Location of Project

- 3.1. **Region:** Eastern Cape, South Africa
- 3.2. **Country:** SOUTH AFRICA
- 3.3. **City:** Port Elizabeth, Uitenhage, Grahamstown
- 3.4. **Brief Description of Location:** The target areas of the project are located in several municipalities in South Africa

Site #	Municipality	Area (ha)	Present status of land	Owner*
	Eastern Cape Province			
1	Ngqushwa Municipality	2,000	Degraded land, unproductive	Amahlubini, Celetyma and Mgwalana Communities
2	Makana Municipality	1,000	Degraded land, unproductive	Local council – identified by a LEAP.
3	Addo Elephant National Park	1,000	National Park. Degraded	South African National Parks
4	Addo Elephant National Park (Darlington Dam)	500	National Park. Degraded land, unproductive	South African National Parks
5	The Havens and Goedehoop	100	Degraded land, unproductive	Eastern Cape Parks Board
6	Sewefontein/Bosdorp	100	Degraded thicket	Community based
7	Koleski	100	Degraded thicket	Eastern Cape Parks Board (Derick Clarke)
8	Cambria	50		Wilderness Foundation
	TOTAL	4850		

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**For all non-State lands there are local council decisions to change the land use from rangeland to protected thicket, and to afforest the areas¹.*

Description of the sites:

Eastern Cape Province

All of the proposed rehabilitation areas fall in the Eastern Cape Province, and are part of the Thicket Biome, which has been the subject of the successful GEF-funded “Subtropical Thicket Ecosystem Planning” (STEP) project (<http://cpu.uwc.ac.za/step.htm>).

The regional land use in the Eastern Cape comprises three predominant tenure systems, freehold, state-owned and communal tenure. The region has been used for commercial agriculture production from natural rangeland for 150 years. The vegetation consists of a unique thorny succulent shrubland known locally as *thicket*, which comprises numerous endemic succulent shrubs of the genera *Euphorbia*, *Portulacaria*, *Aloe* and *Crassula*. The primary agricultural products include a range of commodities derived from cattle, sheep, goats and wildlife, and include meat, fleece, hides, skins, game-related tourism activities and curios. Because of historical policies on access to land, in-effective natural resource policing and the disproportionate allocation of state resources, both the commercial and the communal land have been subjected to excessive use. Rural land in communal areas has higher population numbers (56 people km⁻²) as opposed to the lower numbers (3-6 people km⁻²) on freehold and state-owned land. This is largely due to the formation of rural villages where inhabitants rely directly upon the local natural resources for their livelihoods. Two of the areas are communally managed (Ngqushwa and Makana), and the high unemployment level necessitates intervention using a poverty alleviation programme. The Eastern Cape Department of Agriculture, through the Landcare programme, has already provided support for the preparation of the land for the afforestation project. Further support has been promised. The technical plan involves the planting of the endemic leaf succulent *Portulacaria afra*, a facultative CAM plant, which has excellent carbon sequestration attributes, together with associated succulent (*Crassula* spp, *Aloe* spp) and woody (*Azima* spp, *Lycium* sp., *Maytenus* spp, *Acacia karroo*) taxa. These two areas will be registered as Local Forest Reserves after the planting to prevent further exploitation.

Sites 3 and 4 are located inside the Addo Elephant National Park, and are already formally protected in terms of the National Parks Act. Site 3 had been cleared of thicket by commercial farmers for dryland cropping. This land was purchased and incorporated into the Addo Elephant National Park as part of the park’s expansion programme. At both sites, poverty relief funds, available from the National Treasury, will be used to employ local residents to implement an existing rehabilitation plan and to afforest with the endemic leaf succulent *Portulacaria afra*. The fourth site is also situated within the AENP and represents an example of the impact of intensive herbivory by domestic livestock (mainly goats) on *Portulacaria afra*. Here *Portulacaria afra* will be planted as part of a rangeland rehabilitation project of the South African National Parks.

In a well co-ordinated effort to conserve the Kouga-Baviaans Wilderness Area (KBWA), the Wilderness Foundation and the Eastern Cape Parks Board (previously the Eastern Cape Department of Nature Conservation) have purchased freehold land which will be incorporated into the existing KBWA. Sites 5-8 are all identified re-afforestation sites within these purchase areas. At all sites, poverty relief funds will be

¹ The afforestation of these areas with financing from BCF could represent a demonstration project for municipalities/communities which own the majority of the degraded agricultural land in South Africa and most of them own very small areas of forests, with significant positive social/environmental impact on local communities.

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used to employ local residents to afforest with the endemic leaf succulent *Portulacaria afra* and other succulent shrubs.

4. Expected Schedule

- 4.1. Earliest Project Start Date: winter 2004 - spring 2004
- 4.2. Current Status: Under Discussion/Planning
- 4.3. Time Required Before Becoming Operational: 6 months
- 4.4. Project Lifetime: 40 years

5. Financing Sought

- 5.1. Project Financing:

5.1.1. Estimate of total project cost in US\$: 7,275,000 USD (1500 USD/ha)

5.1.2. Financing (other than BCF) to be sought or already identified:

Eastern Cape Department of Agriculture will cover some costs of afforestation for 2000 ha under its administration, namely the communal areas in Ngqushwa. US\$160k is currently available for land preparation.

Eastern Cape Parks Board and SAN Parks will cover costs in the maintenance of the areas under their management. Estimated value US\$50k

The Working for Water Programme is providing US\$170k for the re-afforestation currently being carried out at the Havens, Goedehoop, Addo Elephant National Park and Koleski.

- 5.2. Requested BCF Contribution: 12 US\$/ERU

- 5.3. Expected Schedule for BCF Contribution: Total: 2 158 928 USD

Year	BCF Contribution (USD)	Area afforested(ha)
Fore front financing after signature of the contract, needed for seedling purchase and site preparation	250 000	
Year 1(end of 2004)	3025	500
Year 2 (end of 2005)	20043	1,000
Year 3(end of 2006)	62064	2,000
Year 4(end of 2007)	124827	1,250
Year 5(end of 2008)	150240	-
Year 6(end of 2009)	186551	-

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Year 7(end of 2010)	204600	-
Year 8(end of 2011)	223514	-
Year 9(end of 2012)	226630	-
Year 10(end of 2013)	248343	-
Year 11(end of 2014)	264594	-
Year 12(end of 2015)	316338	
Year 13(end of 2016)	128154	

* The advance payment (250,000 USD) is deducted from the ERU's value for 2016

5.4. Brief Description of Other Financial Considerations:

Eastern Cape Department of Agriculture, Working for Water Programme, South African National Parks and the Wilderness Foundation will co-finance the expenses of planting and maintaining works until canopy closure (costs that will not be covered by BCF) for the area under its administration. For the same area, the Eastern Cape Department of Agriculture will provide technical advice and management of the newly created thicket over the lifetime of the project.

Management of communal lands: Communal land management will require regular interaction with communities on the maintenance of the agreement. Interaction with the communities and the enforcement of the forest management policies of the National Department of Water Affairs and Forestry will be monitored.

6. Technical Summary of Project

Please provide a brief paragraph of maximum 10 lines for each of the below.

6.1. Objective:

- to afforest ca 4500 ha of bare land with the purpose of increasing carbon sinks by using fast growing endemic native species (*Portulacaria afra*, *Euphorbia bothae*, *E. coerulescens*, *Aloe* and *Crassula*.)
- to create multi-function thickets on abandoned and transformed agriculture land,
- to rebuild a natural thicket vegetation and preserve ecosystem function,
- to recreate a suitable environment for wild birds and animals and preserve the present fauna,
- to provide habitat for the introduction of rare herbivores including black rhinoceros and African elephant,
- to offer options for development of handicrafts in the neighboring communities,
- to improve the local climate

6.2. Brief Description of Project:

The Project consists in afforestation of degraded rangelands (both under state, private, town and village ownership) through successive works over a period of four years: site/soil preparation, truncheon plantation, plantation tending/maintenance until canopy closure. The Eastern Cape Department of Agriculture and the Agricultural Research Council will provide both technical advice and truncheons (cuttings), which will be prepared for planting in local nurseries. The work will be done mainly by local communities, employed temporarily. After establishment, the thicket will be periodically surveyed and monitored for identification/control of pests/damages. The maintenance of the newly created thicket will

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extend beyond the project lifetime. For this reason, the forests will be subject to forest management in the context of local sustainable development, and provide several benefits for local communities.

6.3. Technology to be Employed:

Afforestation of bare lands and their management will occur under modified, CO₂ sequestration efficient management systems. The methods applied will be based on the long technical experience of ECDA and SAN Parks on thicket regeneration.

6.4. Brief Description of Technology

The regeneration technology applied will be based on well established regeneration method. They will be modified to meet the needs of carbon sequestration as compared to traditional timber production. Mechanization of work is planned for site preparation (removing of brushes, where necessary) and soil preparation (preparing holes for truncheons). The truncheons are planted and forest maintenance/tending operations are undertaken by hand until canopy closure. The schedule of planting will avoid the negative effect of drought. Some fencing to protected plantations against cattle and goat grazing might be needed in some areas.

7. Expected Environmental Benefits

Please provide a brief paragraph of maximum 10 lines for each of the below.

7.1. Estimate Greenhouse Gases (CO₂) Sequestered in "tons of carbon equivalent" (show calculations):

7.1.1. before 2008: 45 000 ERU (Emission Reduction Units)

7.1.2. during 2008 – 2012: 90 000 ERU

7.1.3. during entire project lifetime: 970 000 ERU (for a 60 year period)

7.2. Baseline (or Reference) Scenario:

BCF contribution is an incentive for afforestation of the areas. The ECDA is contributing approximately US\$160k towards the preparation of the land and fencing of the afforested areas in the communal lands. The Working for Water Programme is contributing US\$180k to the project in 2004, US\$125k in 2005 and US\$80k in 2006.

Without the project, taking into account the past decade experience and the domestic funding possibilities, the envisaged areas would be afforested only after a long period (about 50 years) or left for further degradation or natural regeneration. In the latter case new thicket cover could be established in some 100 years if the area is fully protected against grazing animals.

7.3. Specific Global & Local Environmental Benefits Expected: creation of multifunctional thicket on former agriculture abandoned lands or abandoned pasturelands, positive local and general climatic effects, preserving the actual ecosystems, recreate proper habitats for wilderness (fauna, flora) and the landscape, maintaining and improve the biodiversity.

7.3. Relevance for Host Country Socioeconomic and Environmental Priorities: The action suits to numerous South African laws related to rangeland and environment (e.g. Conservation of Agricultural Resource Act 43 of 1983, National Forestry Act); international agreements signed by South Africa (e.g. Convention for Combatting Desertification, Convention on Biodiversity,

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Convention on Global Climate Change, Kyoto Protocol) and various national strategies (Landcare Programme, Working for Water Programme).

Community Development Carbon Fund (CDCF)

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Community Benefits Arising from CDCF Projects

1. Communities that will benefit from this project

There are three separate geographic areas will benefit from the project. The first consists of three villages in the Ngqushwa district of the Eastern Cape Province that will benefit directly from the project. These villages comprise 915 mainly female-headed (54%) households, with a total population of 3128 individuals. There is very high un-employment (90%), and the population comprises mainly young (<35y) people (61%), with a relatively high number of pensioners (16%). Ninety percent the heads of households are not economically active. Farmers in the area are mainly livestock owners (cattle, sheep and goats), with many households owning poultry and pigs for personal use. Income is derived from pensions and remittances. The poverty levels are very high with 93% of individuals earning <US\$1560 per annum (Source: Statistics South Africa Census 2001).

The second geographic area is the Addo Elephant National Park and the adjacent town of Addo. The town comprises 432 mainly male-headed (68%) households, with a total population of 1842 individuals. There is high un-employment (66%), and the population comprises mainly young (<35y) people (67%), with a relatively small number of pensioners (7%). Those heads of households who are employed work in the formal agricultural sector (citrus and cash crops) as elementary workers, service staff and machine operators. There are high poverty levels with 92% of individuals earning <US\$1560 per annum.

The third geographic area comprises the rural area of Steytlerville Municipality. This rural area comprises mainly commercial farms and associated farm labourers. There are 601 mainly male-headed (88%) households, with a total population of 1760 individuals. Most heads of households are employed (82%), and the population comprises mainly young (<35y) people (54%), with few pensioners (8%). Most heads of households are employed in the formal agricultural sector (livestock sector) as farmers, elementary workers, service staff and machine operators. There are high poverty levels, with 83% of individuals earn <US\$1560 per annum.

2. Specific community benefits that will result from this project.

Ngqushwa and Makana district

Short-term (6-12 months) employment for at least 300 people during the preparation of the land and the re-afforestation project.

Long-term (15-20 years) employment for 20 people in the management of the re-afforested areas.

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The communities will also benefit directly from the improvement in rangeland condition, as livestock ownership is an important form of wealth. Once the re-afforestation is complete, limited herbivory by domestic stock will be permitted

Addo Elephant Park

Short-term (6-12 months) employment for approximately 100 people during the preparation of the land and the re-afforestation project.

Long-term (15-20 years) employment for 5 people in the management of the re-afforested areas.

The expansion of the AENP from 6000 to 40000ha, and the rehabilitation of formerly degraded and transformed areas, has added impetus to the eco-tourism industry in the region. This is having positive consequences to adjacent communities, where employment in the eco-tourism sector has increased.

There are also very important biodiversity conservation benefits from improving the condition of the rangeland, increasing total standing biomass and increasing species richness. Endemic mega-herbivores (elephant and black rhinoceros) will ultimately benefit from the rehabilitated areas.

Steytlerville and Baviaanskloof

Short-term (6-12 months) employment for approximately 50 people during the preparation of the land and the re-afforestation project.

Long-term (15-20 years) employment for 3 people in the management of the re-afforested areas.

On-farm labour is the major source of employment in this region. The additional employment opportunities will improve the living standards of the poorest members of this community.

3. Community involvement in planning, implementing, and managing these benefits.

Ngqushwa and Makana district

The communities within the villages have been consulted about the project, and have been employed to prepare the land for re-afforestation during 2002 and 2003. This has included the clearing of invasive woody shrubs, the assessment of techniques and equipment for optimum clearing and ground preparation, and the establishment of a bio-monitoring programme for terrestrial invertebrates. Using GIS technology and high resolution imagery, villages prepare quotes for the clearing and preparation of pre-defined areas. This builds capacity within the community to undertake formal contract work. Community co-operation has been overwhelming, with visible positive benefits to the rangeland condition and increased forage production.

Addo Elephant Park

South African National Parks will manage the employment of short-term and long –term staff on this component of the project. Staff selection will take due cognizance of gender and poverty profiles within Addo village, and employ people in the most needy categories. SANParks has a strict employment policy which is in line with the regulations of the South African Labour legislation.

Steytlerville and Baviaanskloof

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The Working for Water Programme and the Wilderness Foundation are responsible for developing and managing contract-based labour-intensive projects. The activities on the private land in this area are managed in strict accordance to the employment policies embodied in South African Labour legislation. Staff selection will take due cognizance of gender and poverty profiles within the surrounding farm land.

4. Underprivileged or minority groups: how they will participate in and benefit?

The 2001 Census data indicates that in the Ngqushwa district the youth (<35y) and women are the main under-privileged groups in this region. Employment opportunities will be differentially offered to these groups during the first phase (land preparation and planting) of the project. In the Addo region, residents of the village of Addo will benefit. As these are mainly male headed households, special focus will be to ensure that children are directly benefiting from the programme.

5. Government and/or other organizations and institutions (local, regional, national) that will participate in and contribute to the project and their role in providing the community benefits.

Agency	Region	Role
Eastern Cape Department of Agriculture Agricultural Research Council	Ngqushwa and Makana	Provide project management services and support infra-structure (vehicles, equipment) for contracts.
Wilderness Foundation Eastern Cape Parks Board Working for Water Programme	Steytlerville	Provide management services and support infra-structure (vehicles, equipment) for contracts
South African National Parks	Addo Elephant National Park.	Provide management services and support infra-structure (vehicles, equipment) for contracts

6. Community benefits: measurement and verification

Community benefit will be measured using livelihood surveys at the beginning of the project. These surveys will define the topologies within each community, and describe the livelihoods of a selected number of individuals within each typology. Follow up surveys will be undertaken after 5 years to assess the benefits to each of the range of typologies identified.

7. Community benefits: maintenance and sustenance

Community benefits will be maintained principally by improved structures to manage natural resources. In Ngqushwa and Makana Municipalities, the local authority, led by the Ward Councillors and with assistance from the Agricultural Extension Officers, will be responsible for ensuring that the re-afforested areas are correctly managed. In the Baviaanskloof, the

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Eastern Cape Parks Board will maintain and monitor the re-afforestation process using its own land management officials. Similarly, South African National Parks will monitor and manage the progress in the Addo Elephant National Park.

8. Negative environmental, social or economic consequences

The increase in attention being given to the three villages in Ngqushwa, and the concomitant increase in employment opportunities, may lead to an increase in immigration into the villages. At present, control of this process is largely driven by the structures in the village which make decisions on land occupation, cultivation and livestock ownership. These structures are supported within the whole project, and will be strengthened during the process by regular engagement and feed-back on progress.

9. Communications policy during implementation of the project.

At present, communication with the villages is carried out by an ARC liaison officer based in Peddie, the administrative heart of Ngqushwa. This officer is responsible for maintaining contact with the leaders in the village and for organizing public meetings. In addition, the Agricultural Extension Officer and the democratically elected Ward Councillors are invited to all meetings with the villages.

10. Please provide a summary budget for the community benefits component of the project.

Site	Item	Number	Unit cost	Year 1	Year 2	Year 3
Ngqushwa and Makana	Labour (short term)	300	US\$1.6k	US\$480k	US\$480	
	Labour (long term)	20	US\$1.6k	US\$32k	US\$35k	US\$38k
	Biodiversity Monitoring	350	US\$1k	US\$175k	US\$175k	
Addo	Labour (short term)	100	US\$1k	US\$100k	US\$100k	
	Labour (long term)	5	US\$1.6k	US\$8k	US\$9k	US\$10k
	Biodiversity Monitoring	100	US\$1k	US\$50k	US\$50k	
Steytlerville	Labour (short term)	50	US\$1k	US\$50k		
	Labour (long term)	3	US\$1.6k	US\$5	US\$5	US\$5.5
	Biodiversity Monitoring	100	US\$1k	US\$50k	US\$50k	
TOTAL				US\$950k	US\$904k	US\$43.5