BIODIVERSITY, CLIMATE CHANGE AND SUSTAINABLE DEVELOPMENT – HARNESSING SYNERGIES AND CELEBRATING SUCCESSES

Final Technical Report

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EXECUTIVE SUMMARY

Biodiversity and well functioning ecosystems provide natural solutions that build resilience and thereby help society adapt to the adverse impacts of climate change. They also support poverty alleviation by providing safer and more secure livelihoods, especially for the poor and vulnerable.

With climate change already happening, and further change unavoidable, adaptation is increasingly relevant and receiving more scientific and political attention. Adaptation is of particular interest to African countries, which are amongst the most exposed and most vulnerable. African people and African ecosystems have been coping with significant climate variability for millennia, and this region provides insights for adaptation strategies under future climate change. There is also potential to link these insights with the growing understanding of the role of ecosystem services in enhancing societal adaptation responses.

This technical paper examines how the value of ecosystem services is being unlocked for climate change adaptation purposes in the African context, and how even greater benefits could be realised. The success stories presented here come from various geographic locations across Africa and showcase diverse approaches. They provide useful initial insights into the wide variety of project types that are already underway and from which best practices can be developed. They iillustrate how some of Africa's sustainable development challenges can be effectively addressed through an integrated approach that responds to the triple challenge of socio-economic deprivation, ecosystem degradation and adverse climate change impacts. They show how Ecosystem Based Adaptation (EbA) is an important approach for achieving multiple benefits in the context of sustainable development.

Ecosystem Based Adaptation (EbA) has been defined by the Convention on Biological Diversity (CBD) as **"*the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change*"**.

In the context of sustainable development, our analysis suggests that EbA can be viewed as a three-way synergy between biodiversity and ecosystem conservation, socio-economic development and climate change adaptation outcomes. In addition to achieving this three-way synergy, one of the findings of this work is that many of the projects reviewed here deliver additional livelihood benefits such as job creation, poverty alleviation and green economy outcomes including economic diversification. The acronym **EbA+** is introduced to denote this additional value. **EbA+** moves beyond utilizing biodiversity and ecosystem services as low-cost, low-tech solutions to climate change, showing how investments in biodiversity and ecosystem services can provide direct and sustained livelihood benefits to local communities.

There is an existing body of work in community based adaptation and community-based natural resource management that can be developed to achieve additional EbA benefits, and significant scope for innovative Ecosystem based Adaptation implementation activities that could be designed *de novo*. It is however important to recognise that there is complexity in combining socio-economic, development, biodiversity conservation and climate change adaptation outcomes and this can involve both costs and risks which require monitoring and management. To address these costs and risks and implement EbA best practice at scale, the following guidelines are recommended:

- **Involve relevant stakeholders in integrated and adaptive planning and implementation.** Projects should involve local communities, integrate indigenous local knowledge and draw on multi-disciplinary stakeholders from the outset.
- **Develop adaptation responses that are locally contextualised.** Take cognisance of relevant climate scenarios and ensure appropriate adaptation approaches – thus avoiding mal-adaptation and reducing short and long term risks.
- **Develop linkages with national and sub-national enabling frameworks.** Projects should draw on and inform relevant international, national and local sustainable development, conservation and climate policy. Particular attention should be given to National Adaptation Plans of Action (NAPAs) and prospective National Adaptation Plans (NAPs) for short and long term planning respectively.
- **Locate adaptation approaches within the context of the broader landscape.** Landscape-wide ecosystem processes and services should be factored into project design and monitored.
- **Safeguard communities against risks and costs**. Build safeguards into projects that ensure that communities do not absorb risks and costs associated with adaptation practices, especially where benefits accrue elsewhere.
- **Carefully consider project financial sustainability from the outset.** Market mechanisms including Payments for Ecosystem Services have been shown to provide a good basis for financial sustainability, should transaction costs be feasible and local communities benefit directly. Potential sources of public funding such as the Adaptation Fund and Green Climate Fund as well as other mechanisms through government and private sector funding should be considered.
- **Develop a robust monitoring and evaluation system.** Developing a comprehensive monitoring and evaluation framework that has sustainable financing allows one to demonstrate effectiveness of the approach**.**
- **Track cost effectiveness and resilience outcomes.** Develop systematic monitoring and evaluation systems to document the cost effectiveness of ecosystem based adaptation solutions in relation to other forms of adaptation. Criteria that demonstrate the benefits of resilience for both people and nature should be developed.
- **Establish learning networks and communities of practice.** Learning networks and communities of practice can add value to adaptation approaches, and encourage sharing of lessons learned. A new EbA platform that is developed by building on existing regional networks, and international forums such as the Nairobi Work Programme on Adaptation under the UNFCCC, could support this community of practice.

In summary, there is great opportunity to scale up existing work and to develop new EbA approaches. Scaling up can take different forms. It can mean building on the success of, and growing a demonstration pilot to scale, replicating a successful pilot in more areas, or transitioning a project from reliance on donor funding to the generation of self-sustaining income.

The potential of EbA projects to achieve additional socio-economic objectives relating to economic diversification and job creation for local communities is recognised in the concept of EbA+, which appears to have significant potential for enhancing green economy objectives and supporting poverty alleviation.

In Africa it has been shown that, by realising these synergies, the power of natural solutions can be harnessed to enhance livelihoods, diversify economies and build resilience to a changing climate.

1. INTRODUCTION AND OBJECTIVES

The potential role of ecosystem services, supported by biodiversity, is an important and growing focus area for climate change adaptation planning and implementation in a context of sustainable development. Adaptation planning and implementation activities that employ ecosystem services are best described as "Ecosystem-based approaches to adaptation" or simply as "Ecosystem-based Adaptation (EbA)". EbA has been conceptually defined as "the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change", but a more precise understanding of the concept, how it can be applied, and its potential value, would be useful for researchers, funders and practitioners in the area of climate change adaptation. In this paper we attempt to develop this more precise understanding through a review of EbA projects that are underway in Africa and which illustrate the concept in action.

Our objectives in this short review were:

- To review available African experiences, to distill lessons learnt in inventing, innovating and implementing ecosystem-based approaches to biodiversity conservation, and to manage natural assets and to foster their human capital.
- To identify examples that showcase how these approaches provide cost-efficient and low-technology solutions to many pressing global challenges – including food, fuel and fiscal crises – that are being exacerbated by climate change.
- To develop set of features that are useful in describing adaptation approaches.

1.1. METHODOLOGY/ APPROACH

A scan of potential case studies was conducted through a literature review and by canvassing various project funders and adaptation networks in sub-Saharan Africa. A set of roughly 40 potential cases was initially identified and a selection of 15 cases was made from this set in an attempt to achieve a diversity of geographic representation, ecosystem representation, and representation of project approaches. Due to the new and evolving nature of the concept, few of the projects that are presented as cases in this study were originally designed as EbA projects, but are now delivering EbA outcomes. Projects were also selected with a view to illustrating a range of projects across the classification scheme suggested in Figure (1).

A workshop was held with local experts to share the case studies that had been reviewed, explore lessons and distill recommendations for the scaling up of EbA. A list of workshop participants and their organizations is provided in Annexure 1.

From the workshop and case study review, elements of best practice EbA design and implementation were distilled and a set of recommendations developed. These lessons and recommendations are discussed in the sections that follow. Half of the projects are South African and the others are from across Africa.

2. BRIEF *STATUS QUO* REVIEW

Multilateral negotiations under the UN Framework Convention on Climate Change are currently on a path to exceed the 2°C limit that might ensure a safe climate. There has therefore been a significant increase in international scientific and policy attention on adaptation to climate change, because some impacts of climate change are now unavoidable, even if anthropogenic emissions were to cease immediately (Meehl et al. 2005). In response to the needs of policy makers, The IPCC 5th Assessment Report will significantly increase its focus on adaptation[1].

Adaptation is recognized as one of four building blocks of a potential new multilateral agreement on climate change action (UNFCCC 1/CP.16). Scientific and technical understanding on adaptation has been developing under the Nairobi Work Program (NWP) of the UNFCCC, which has taken a subject area approach to gathering information over two phases of research starting in 2005. Negotiations on the NWP have been characterized by repeated calls especially from developing country parties for more in-depth consideration of adaptation at local scales, especially through "learning by doing", "action research" and pilot projects. At the COP 17 meeting in Durban In December 2011 there was a decision to host a workshop that focuses on EbA under the NWP, which shows a significant step forward in developing understanding in this field.

Academic and applied research on adaptation is currently increasing sharply, with funding resources being allocated towards the role of adaptation to climate change in achieving social and sustainable development outcomes, such as poverty alleviation. The role that ecosystems can play in supporting this is being increasingly recognised (Biggs et al. 2004). For example, the value of ecosystem services in delivering social and sustainable development outcomes is being explored by the Ecosystem Services for Poverty Alleviation research program that is coordinated by the United Kingdom's Natural Environment Research Council and Department for International Development[2]. Action research based approaches have recently been advancing in the area of community-based adaptation through collaborations such as the Global Partnership on Community-Based Adaptation (Huq 2011). There is now a growing knowledge base in the intersection between the sustainable use of ecosystems and their benefits for communities, with the potential for applying these principles to enhance adaption responses to climate change (CBD 2009, The World Bank 2009).

Adaptation technologies are often discussed in the context of traditional socio-economic sectors, and often with an emphasis on engineering and technical solutions, such as water supply augmentation or agricultural crop breeding for climate resilience. Such approaches often require relatively clear guidance on the climate scenarios likely to play out in order for them to be appropriate, and as a result have fuelled calls for climate projections at ever finer spatial scales. They therefore are limited in regions where climate future uncertainty is high, and they run the risk of resulting in investment in responses that might be maladaptive (**see Box 1**). This is especially because uncertainties in projections are unlikely to be reduced as the scale of projection becomes finer. But apart from these limitations, engineering solutions tend to be expensive and demand high technological capacity. However, greater attention is now being given to adaptation solutions that recognize local realities,

[1] http://www.ipcc.ch/pdf/ar5/ar5-outline-compilation.pdf
[2] http://www.nerc.ac.uk/research/programmes/espa/

threats and opportunities. These include community-based approaches, and "natural solutions", including the use of ecosystem services, for climate change adaptation. These approaches may not completely replace the need for hard engineering solutions (CBD 2009), but certainly have several advantages either on their own or in conjunction with high technology approaches, and address several of the disadvantages outlined above.

Box 1: Definitions of key concepts relating to adaptation

Vulnerability to climate change is "the degree to which a system is susceptible to, and unable to cope with, the adverse effects of climate change" (Cadman et al., 2010). Vulnerability "is reflective of (or a function of) the exposure and sensitivity of a system to hazardous conditions and the ability or capacity or resilience of that system to adapt or recover from the effects of those conditions" (Smit and Wandel, 2006: 286)

Exposure is defined as the degree of climate stress upon a particular unit analysis; it may be represented as either long-term changes in climate conditions, or by changes in climate variability, including the magnitude and frequency of extreme events (IPCC, 2001). Two main elements need to be considered when quantifying exposure, namely that which is affected by climate change (populations, resources, property, and so on), and the amount of change in climate itself (sea level rise, precipitation and temperature changes, and so on)

Resilience is the ability of a human community to resist, absorb and recover from the effects of hazards in a timely and efficient manner, preserving or restoring its essential basic structures, functions and identity: (United Nations International Strategy for Disaster Reduction (UNISDR)[3])

Ecological resilience is related to a system's ability to absorb disturbance and change, while still maintaining the same relationships. It includes a system's "capacity to reorganise while undergoing change, so as to preserve structure and function" (Eakin and Luers 2006): 371)

Adaptation is an adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates hard or exploits beneficial opportunities (IPCC)

Maladaptation is an action or process that increases vulnerability to climate change-related hazards[4]. Maladaptive actions and processes often include planned development policies and measures that deliver short-term gains or economic benefits but lead to exacerbated vulnerability in the medium to long-term.

Increasing interest is being directed towards integrated approaches to adaptation that employ the capacity of natural or semi-natural ecosystems to provide greater climate resilience (especially to extreme climate events), and the World Bank prepared one of the first reports on Ecosystem Based Adaptation (EbA), in 2009 (The World Bank 2009).

With this rapid growth of interest in ecosystem-based approaches to adaptation, and a need to place the approach into context with other recognized approaches, there is the potential for confusion to arise about the concept and what it entails. Confusion may arise, for example, with an approach to biodiversity management developed under the CBD, termed the "Ecosystem Approach". This refers to a management approach that is of general value, and is applicable much more broadly than to climate change concerns alone, but which contains key elements of high relevance to ecosystem-based approaches to climate change adaptation.

[3] http://know.climateofconcern.org/index.php?option=com_content&task=article&id=144#
[4] http://www.undp.org/climatechange/adapt/definitions.html#15

3. CREATING MEANINGFUL SYNERGIES THROUGH ECOSYSTEM BASED ADAPTATION

Ecosystem Based Adaptation is an important approach for achieving multiple benefits in the context of sustainable development. As stated above, Ecosystem Based Adaptation has been defined by the Convention on Biological Diversity (CBD) as ***"the use of biodiversity and ecosystem services as part of an overall adaptation strategy to help people to adapt to the adverse effects of climate change"***. This definition clearly identifies a strong link between biodiversity and ecosystem conservation, climate change adaptation and societal resilience. This is represented in our classification under Figure 1, which shows the practices of biodiversity and ecosystem conservation, livelihood development and climate change adaptation in the context of sustainable development, with EbA as a three way synergy at the centre.

In addition to achieving this three-way synergy, one of the findings uncovered in this study is that many of the projects reviewed here go even further. They deliver direct benefits for local communities such as livelihoods, poverty alleviation and job creation outcomes. The acronym **EbA+** is introduced to denote this additional achievement.

EbA+ moves beyond utilizing biodiversity and ecosystem services as low-cost, low-tech solutions to climate change, showing how investments in biodiversity and ecosystem services can realise resilient growth in vulnerable communities.

Biodiversity and ecosystem conservation, socio-economic benefits and climate change adaptation outcomes can be paired to create CBNRM-, CBA- and CLICS-type projects. EbA may draw from these related approaches, but what distinguishes EbA projects is the combined achievement of all three of these outcomes.

CBNRM: Community Based Natural Resource Management is the management of natural resources by all concerned stakeholders. Communities managing the resources have the legal rights, the local institutions, and the economic incentives to take substantial responsibility for sustained use of these resources (CBNRM Net 2001). Example: Co-management of harvestable resources (e.g. fisheries) and protected areas.

CLICS: Climate Change-Integrated Conservation Strategies are climate-resilient conservation plans that often result in spatial and related types of planning products. These guide planning for ecosystem service corridors and protected areas that are resilient to climate change (Hannah et al. 2002a, Hannah et al. 2002b). Example: Vulnerability mapping and development of plans for conservation corridors and protected area expansion.

CBA: Community-Based Adaptation projects work to empower people to plan for and cope with climate change impacts by focusing on community led processes grounded in the priorities, needs, knowledge and capacities of communities (Chesterman and Hope, 2011). Example: Flood protection strategies that support local communities to construct settlements outside of flood lines or with engineering innovations.

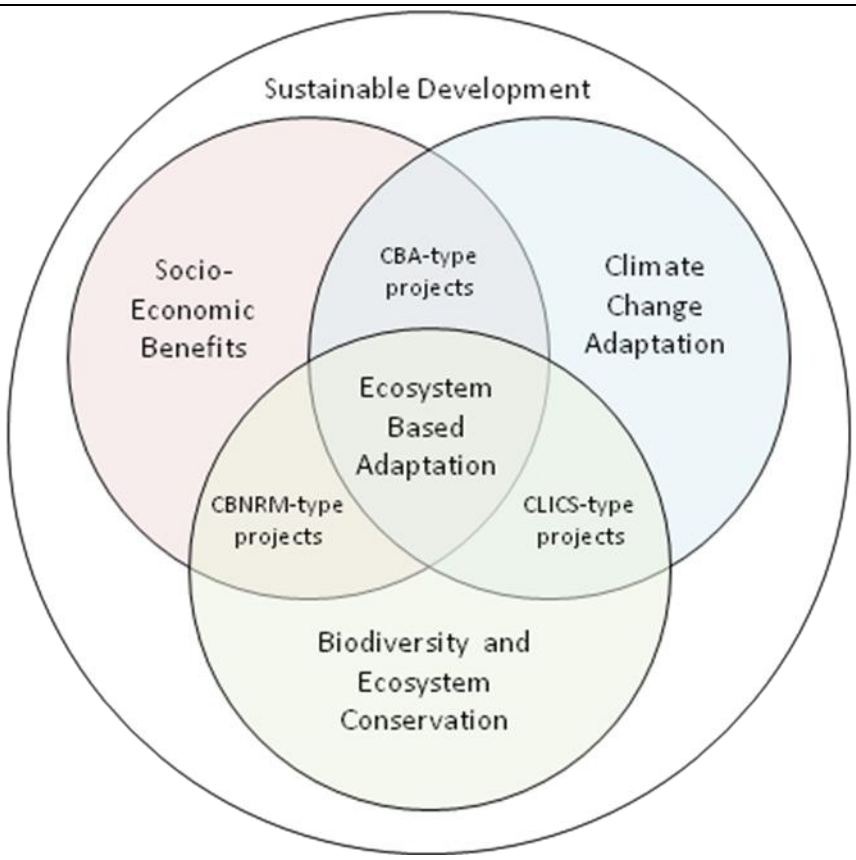

Figure 1: Ecosystem Based Adaptation (**EbA**) integrates biodiversity and ecosystem conservation, socio-economic benefits and climate change adaptation outcomes. **EbA+** builds on this further, to deliver tangible and sustainable livelihood benefits for affected communities.

4. THE SUCCESS STORIES

The fifteen case studies that formed the focus of this study are summarized below. Full cases are provided in Annexure 2.

Case Study 1: Small-scale Rooibos Tea farmers in the Northern Cape, South Africa

With the support of local non-governmental organisations (NGOs) and academic partners, a resource-poor community in the Northern Cape of South Africa has established and grown a solid, member-owned, for-profit company. The Heiveld Co-operative is grounded in sustainable management of rooibos plants, it has organic and Fairtrade certifications and the capacity to process 100 tonnes of tea per season. This tea realizes premium prices on the local and international market supporting local economic diversification. Through a process of participatory action research, between farmers, academics, NGOs and practitioners, the farmers continuously work to develop and adapt sustainable practices and strategies, in order to deal with the uncertainties of future climate and the fluctuating business environment. The farmers are also involved in daily climate monitoring which informs their short and long term farming strategies.

Case Study 2: Community Markets for Conservation in Zambia

COMACO works to address ecosystem protection and poverty among small-scale rural farmers in Zambia through a business approach. The non-profit company creates economic incentive for improved land management and practices and resistance to poaching, by marketing farmers' organic produce to high end urban consumers. COMACO also supports diversification of livelihoods by training and assisting farmers and previous poachers, to start small ventures such as honey farming, animal husbandry and fish farming. With regional branches projected to be self-sufficient by 2013, COMACO represents a cost effective approach to creating sustainable livelihoods and food security that is grounded in healthy ecosystems.

Case Study 3: Collective action on the Agulhas Plain, South Africa

The Nuwejaars Wetland Special Management Area (SMA) consists of 25 private landowners, who through collective action work to convert their land use practices from "conventional" agriculture towards land use dependent on biodiversity conservation, eco-tourism and carbon-and energy neutral production. The SMA is located within a biodiversity hotspot, with biologically rich lowland fynbos, endangered Renosterveld and irreplaceable wetlands, which after centuries of inappropriate land use practices has become highly vulnerable to two inter-related climate change impacts, increasing frequency in wild fires and floods. Building on natural and human capital, the Nuwejaars Wetland SMA is using sustainable agriculture as an economic driver, together with other biodiversity

economic drivers, such as eco-tourism, in order to create resilience to climate change and become a sustainable venture.

Case Study 4: Conservation and collaborative management in the Mudumu North Complex, Namibia

The focus of the Mudumu North Complex (MNC), a broad management area comprising conservancies, community forests and protected areas, is to rehabilitate fauna and flora of the area, and to guide the development of tourism and resource use for social, cultural and economic benefits through collaborative management. The MNC has introduced several new approaches to natural resource management, in order to conserve the area's wildlife, biodiversity and ecosystem services under a changing climate, while at the same time building a tourism industry with huge economic benefits for local communities. Through this new alternative income, locals are able to move away from an economy based on farming and the use of natural vegetation for food, fuel and building material, creating more resilient ecosystems and livelihoods.

Case Study 5: Community based reforestation in the eThekwini Municipality, South Africa

Addressing issues of ecosystem degradation and poverty, the eThekwini Municipality has started reforestation projects for which local 'treepreneurs' grow and trade indigenous trees for goods such as bicycles, school fees and staple food. Reforestation works to increase the resilience and adaptive capacity of ecosystems, while providing increased ecosystem goods and services that benefit local communities. The municipality is working towards certifying the reforestation under the Climate, Community and Biodiversity Standard (CCBS), through which the carbon sequestered can be measured and verified, and used to offset CO2 emissions associated with Durban's hosting of 2010 FIFA World Cup matches.

Case Study 6: Reducing emissions through forest co-management in the Mkuwazi Forest Reserve, Malawi

At the Mkuwazi Forest Reserve in Malawi, the Department of Forestry has entered into a co-management agreement through which communities surrounding the reserve take responsibility for the maintenance and management of forest resources. In order to create a strong incentive for forest protection, the project is working to create financial benefits through a reduced emissions from deforestation and forest degradation (REDD) project, from which the Department of Forestry and local communities will share the income created from carbon credits. Working to maintain forest cover for carbon conservation, the co-management agreement further aims to maintain biodiversity, protect watersheds and prevent soil erosion, while at the same time ensuring increased and continued supply of forest products, providing alternative income generating activities to improve livelihoods and providing fuel efficient stoves to decrease pressure on forest resources from firewood collection.

Case Study 7: Subtropical thicket restoration in protected areas in the Eastern Cape, South Africa

The aim of the subtropical thicket restoration programme is to restore the thicket and create large-scale employment for previously unemployed workers through ecosystem based work opportunities. It is also increasing carrying capacities for species such as black rhino, elephant and kudu, which have significant long-term tourism benefits as well as hunting potential. The project supports healthy functioning of the ecosystem and healthy thicket has remarkably high carbon storage for a semi-arid system, and in the long term, the project thus aims to fund the restoration through the sale of carbon credits through the Voluntary Carbon Market.STRP thus works to build and expand South Africa's green economy, building social and ecological resilience through thicket restoration and job creation.

Case Study 8: Mountain Gorillas, ecosystem services and local livelihoods in Rwanda, Uganda and the DRC

The mountain gorilla vulnerability assessment project focuses on assessing climate change impacts on gorillas, considering a range of climate change scenarios and socio-economic issues related to livelihoods of local communities. The series of steps and adaptation actions outlined in the vulnerability assessment address a broad range of aspects that work to conserve biodiversity and ecosystem services and improve local livelihoods, with the Mountain Gorilla a key focus species that provides a strong anchor for a diversity of activities. Many rural communities across eastern and southern Africa depend on economies that are based on wildlife tourism and that are vulnerable to climate induced habitat destruction. This project aims to secure habitat by developing a good understanding of the future vulnerabilities associated with climate change. In so doing it also supports and secure ecotourism and its associated livelihood benefits.

Case Study 9: Collaborative action for adapting to climate change in Madagascar

The aim of the project was to follow up on the recommendations that came out of a climate change vulnerability assessment workshop in 2008. Following the recommendations, the project focused on three main activities, namely: terrestrial activities, developing an action plan to achieve forest connectivity in priority areas; marine activities, addressing knowledge gaps critical to building coral reef and mangrove resilience; and policy support, mainstreaming climate change into policy decisions related to natural resource management. Accordingly, there was strong focus on communication, cooperation and knowledge sharing with relevant government stakeholders.

Case Study 10: Conservation of Coastal Eco-Systems in Tanzania

The Pwani project works to reverse the trend of environmental destruction of critical coastal habitats in Tanzania, while at the same time sustaining the flow of environmental goods and services and improving the livelihoods of residents in the Bagamoyo-Pangani and Menai Bay Seascapes. The coastal habitats are biodiversity-rich areas, with estuaries, mangrove forests, beaches, seagrass beds, coral reefs, coastal forests and endangered wildlife species. These coastal ecosystems also provide income, food and trade opportunities for local communities and can help buffer the effects of climate

change including storms, severe weather events and sea level rise. Healthy ecosystems are therefore important for both local biodiversity and for the livelihoods of people in the area. The project takes a broad approach, working to create enabling conditions for coastal governance, supporting local participation in natural resource management and addressing socio-economic and other cross cutting issues such as HIV/AIDS, community energy needs and gender equality within the context of climate change.

Case Study 11: South Africa's environmental Expanded Public Works Programmes grow the Green Economy

A number of Public Works Programmes have been created under the South African government's Expanded Public Works Programme, aiming at either maintaining, rehabilitating or restoring ecosystems and natural landscapes, while at the same time creating jobs for marginalised communities. The different programmes, which include Working for Water, Working for Wetlands, Working for Land, Working on Fire and Working for Energy all address critical political priorities, job creation and water scarcity, while at the same time supporting the expansion of South Africa's green economy. The programmes work to reduce South Africa's environmental and social vulnerability to climate change, and thus form important examples of ecosystem based adaptation to climate change. An important component of the Natural Resource Management programmes is the development of value-added industries.

Case Study 12: Restoration of the Manalana Wetland in Mpumalanga, South Africa

The Manalana Wetland in Mpumalanga Province was under considerable threat from headcut erosion. In response, the Working for Wetlands Programme initiated a rehabilitation project, consisting of the construction of two erosion control structures. It was found that these interventions contributed significantly to the health of the wetland, and a cost effective approach to the delivery of ecosystem services such as erosion control, sediment trapping and streamflow regulation. In addition, the rehabilitation of the wetland provided very favourable conditions for crop production and significantly increased the retention of water, making water much more readily available for domestic use. Through its association with the broader and longer term initiative facilitated by the Association for Water and Rural Development, the Manalana project also highlighted the importance of local governance of natural resources, and the need for rehabilitation projects to take cognisance of the different components that make up dynamic socio-ecological systems. In addition the project demonstrated that restoring natural capital provided a much more cost effective approach than other engineered/ hard infrastructure solutions for ecosystem service delivery.

Case Study 13: Payments for Ecosystem Services in the Maloti Drakensberg mountains, South Africa

The Maloti Drakensberg mountains supply water to large parts of the sub-continent, and form South Africa's most strategic water source. This water flow is now under threat due to inappropriate land use and transformation of the natural vegetation in the area. This project came about as it recognised the possibility for compensating mountain communities for the supply of ecosystem services, most

particularly for the provision of water. The model appears to be a win-win solution, creating better water flow regulation and water quality, improved water security, land management and livelihoods, and reduced vulnerability. As an initial phase of the project, the South African government is working to catalyze market based trade by paying small contractors for rehabilitation and clearing of invasive plants (similar to the EPWP approach, with the exception that they engage locals who are residents on the land for clearing activities). This is aimed to unlock payment for ecosystem services, thus facilitating a shift towards paying contractors for ecosystem services through market based trade.

Case Study 14: Partnering with the private sector in Namibia's Bush-to-Fuel Project

The Bush-to-Fuel project is an example of a private sector investment in renewable energy, whose innovative approach works to create multiple societal benefits. Using native invader bush that is encroaching on wide areas in Namibia and reducing grazing productivity for livestock farmers, the Energy For the Future project (EFF) is paying farmers to remove the native bush in order to produce wood chips that are then used as an energy source in a cement factory. This multi-benefit project, works to mitigate climate change by reducing the carbon dioxide emissions of the cement factory by 130 000 tons by replacing coal use with wood chips and addresses the issue of bush encroachment. This project is creating 50 workplaces directly and about 200 additional ones indirectly, supports a payments for ecosystem services approach and has the potential to reduce Namibia's energy imports. The farmers are then responsible for maintaining of the area through various approaches which the EFF provide guidance on, and the monitoring is supported through an environmental management plan. Long term research is also being led by the Namibian Ministry of Water, Agriculture and Forestry.

Case Study 15: Climate change, risk and insurance premiums in the Insurance Industry in South Africa

Globally, the insurance industry is coming under increasing pressure due to rising claims resulting from natural disasters. In this context, a pilot study with South Africa's largest short-term insurer, Santam, was conducted in an area exposed to a number of floods and intense rainfall events over the past decade. The aim was to create an understanding of the systemic drivers of risk, how the drivers are changing over time and how the insurance industry can best respond to ensure its own viability and build overall resilience of the area. One of the main findings was that for flooding, local land-use changes have likely had at least as much an effect as climate change has had on flood risk. Accordingly, the main recommendation of the study is that the insurance industry's risk assessment approach should be complemented with proactive management of risk aimed at the underlying land use change drivers in the landscape.

5. ANALYSIS OF SUCCESS STORIES

This section aims to analyse the cases studies and distill lessons learned from them, using a set of observed features as a departure point. This analysis is summarized in Table 1, and the findings and lessons are discussed below.

Table 1: Case study assessment per observed features

	Strongly demonstrates that feature
	Partially demonstrates that feature
	Does not show that feature
	Unknown

	Case studies	***Impact, Vulnerability and Adaptation Assessment***	***Disaster Risk management***	***Climate Change Mitigation***	***Partnerships and collaboration***	***Involvement of local communities***	***Benefits from Ecosystem Service***	***Biodiversity and Ecosystem Conservation***	***Link to overall adaptation policy/ strategy***	***Other explicit policy support***	***Financial sustainability***	***Cost effectiveness demonstrated***	***PES***	***Market linkages+***	***Monitoring***	***Scalability***	***Economic Diversification/ Alternative livelihoods***	***EbA+***
1	Small-scale Rooibos Tea farmers in the Northern Cape, South Africa	*Strong*	*Strong*	***None***	*Strong*	*Strong*	*Strong*	*Strong*	*Partial*	*Strong*	*Strong*	*None*	*None*	*Strong*	*Strong*	*Strong*	*Strong*	*Strong*
2	Community Markets for Conservation in Zambia	*None*	*Partial*	***None***	*Strong*	*Strong*	*Strong*	*Strong*	*Strong*	*Unknown*	*Partial*	*None*	*None*	*Strong*	*Strong*	*Strong*	*Strong*	*None*
3	Collective action on the Agulhas Plain, South Africa	*Strong*	*Strong*	***Partial***	*Strong*	*Strong*	*Strong*	*Strong*	*Partial*	*Partial*	*Partial*	*None*	*None*	*Partial*	*Strong*	*Strong*	*Strong*	*None*
4	Conservation and collaborative management in the Mudumu North Complex, Namibia	*None*	*Strong*	***None***	*Strong*	*Strong*	*Strong*	*Strong*	*Partial*	*Strong*	*Strong*	*None*	*None*	*Strong*	*Unknown*	*Strong*	*Strong*	*Strong*
5	Community based reforestation in the eThekwini Municipality, South Africa	*Strong*	*Strong*	***Strong***	*Strong*	*Strong*	*Strong*	*Strong*	*Partial*	*Strong*	*Strong*	*None*	*Strong*	*Strong*	*Strong*	*Strong*	*Strong*	*Strong*
6	Reducing emissions through forest co-management in the Mkuwazi Forest Reserve, Malawi	*Strong*	*Strong*	***Strong***	*Strong*	*Strong*	*Strong*	*Strong*	*Strong*	*Partial*	*None*	*None*	*None*	*Strong*	*Strong*	*Strong*	*Strong*	*Strong*
7	Subtropical thicket restoration in protected areas in the Eastern Cape, South Africa	*Partial*	*Strong*	***Strong***	*Strong*	*Strong*	*Strong*	*Strong*	*Partial*	*Partial*	*Partial*	*None*	*Strong*	*Strong*	*Strong*	*Strong*	*Strong*	*None*
8	Mountain Gorillas, ecosystem services and local livelihoods in	*Strong*	*None*	***None***	*Strong*	*Partial*	*Strong*	*Strong*	*Strong*	*Partial*	*None*	*None*	*None*	*Strong*	*Unknown*	*Strong*	*Partial*	*None*

	Case studies	***Impact, Vulnerability and Adaptation Assessment***	***Disaster Risk management***	***Climate Change Mitigation***	***Partnerships and collaboration***	***Involvement of local communities***	***Benefits from Ecosystem Service***	***Biodiversity and Ecosystem Conservation***	***Link to overall adaptation policy/ strategy***	***Other explicit policy support***	***Financial sustainability***	***Cost effectiveness demonstrated***	***PES***	***Market linkages+***	***Monitoring***	***Scalability***	***Economic Diversification/ Alternative livelihoods***	***EbA+***
	Rwanda, Uganda and the DRC																	
9	Collaborative action for adapting to climate change in Madagascar	*Strong*	*Strong*	***Strong***	*Strong*	*Strong*	*Strong*	*Strong*	*Strong*	*Strong*	*None*	*None*	*Partial*	*Partial*	*None*	*Strong*	*Partial*	*None*
10	Conservation of Coastal Eco-Systems in Seascapes in Tanzania	*Partial*	*Strong*	***None***	*Strong*	*Strong*	*Strong*	*Strong*	*Strong*	*Strong*	*None*	*None*	*None*	*Strong*	*Strong*	*Strong*	*Strong*	*Partial*
11	South Africa's environmental Expanded Public Works Programmes grow the green economy	*Partial*	*Strong*	***None***	*Strong*	*Strong*	*Strong*	*Strong*	*Partial*	*Strong*	*Strong*	*None*	*Partial*	*Partial*	*Strong*	*Strong*	*Strong*	*None*
12	Restoration of the Manalana Wetland in Mpumalanga, South Africa	*Partial*	*Strong*	***Partial***	*Strong*	*Strong*	*Strong*	*Strong*	*Partial*	*Strong*	*Partial*	*Strong*	*None*	*Strong*	*Strong*	*Strong*	*Strong*	*None*
13	Payments for Ecosystem Services in the Maloti Drakensberg mountains, South Africa	*Partial*	*Strong*	***None***	*Strong*	*Partial*	*Strong*	*Strong*	*Partial*	*Partial*	*None*	*None*	*Strong*	*Strong*	*Partial*	*Strong*	*Partial*	*None*
14	Partnering with the private sector in Namibia's Bush-to-Fuel Project	*Partial*	*Strong*	***strong***	*Strong*	*Strong*	*Strong*	*Strong*	*Partial*	*Partial*	*Strong*	*None*	*Strong*	*Strong*	*Strong*	*Strong*	*Strong*	*Strong*
15	Climate change, risk and insurance premiums in the Insurance Industry in South Africa	*Strong*	*Strong*	***None***	*Strong*	*Partial*	*Strong*	*Strong*	*Partial*	*Partial*	*Partial*	*None*	*None*	*None*	*Strong*	*Strong*	*Partial*	*None*

5.1. IMPACT, VULNERABILITY ASSESSMENTS FOR ADAPTATION

Impact Vulnerability Assessments (IVA) (or similar) assessments are a critical feature of EbA as they are needed to validate that project activities and objectives take cognisance of possible future climate and socio-economic conditions. IVA's include the consideration of impacts suggested by climate models, projections and scenarios, and ensure that well-conceived adaptation responses to these future conditions are designed and implemented. IVA's also demonstrate additionality as the relevance of the project is designed in relation to a likely climate scenario and with appropriate approaches to this new scenario as opposed to a "business as usual" one.

Three of the case studies in particular (Case Study 1: Small-scale Rooibos Tea farmers; Case Study 8: Mountain Gorillas in Rwanda, Uganda and the DRC and Case Study 9: Collaborative action in Madagascar) illustrate how well designed IVA assessments can effectively guide EbA responses. These processes are also participatory, ensuring local communities are involved in the design of appropriate adaptation responses.

However, with EbA being a relatively new field of work, many of the case studies that were examined were not designed as EbA projects at the outset, and in several cases, IVA (or similar) assessments were applied once projects were already underway, and then integrated with existing work. This approach is effective if the approach is adapted to apply the new assessment information and responses are appropriate for addressing the climate impact scenarios. An example of this is at the regional scale is Case Study 11: South Africa's environmental Expanded Public Works Programmes grow the green economy, as climate models project reduced water supply and thus alien clearing has a clear climate adaptation role. By using a more detailed IVA analysis, project designers could analyse future fire risk and drought risk to prioritise clearing of alien vegetation, and raise the relevance of this project as an EbA approach.

Such integration of climate scenarios also appears to work well where CBNRM-type investments in ecological infrastructure (restoring and maintaining ecosystems) were part of the original project design because ecological infrastructure investments appear to correlate well with adaptation responses. This is because healthy well-functioning ecosystems are desirable and provide resilience in the face of uncertain climate futures.

5.2. DISASTER RISK REDUCTION

Many of the cases demonstrate disaster risk reduction linkages, but it is noteworthy that the cases which involve maintaining or restoring ecological infrastructure tend to provide a very strong link to reducing the impacts of disasters. This is clearly illustrated in Case Study 10: Coastal Eco-Systems in Tanzania and Case Study 12: Restoration of the Manalana Wetland and Case Study 15: Climate change, risk and insurance premiums in the Insurance Industry in South Africa. The latter case was also expanded in a report by CSIR, (Nel et al. 2011). This report shows the importance of EbA in managing risks, and how poor land management practices resulted in a reduction of the buffering capacity of the landscape, and is a big a driver of risk of flood, fire and coastal storms, only to be exacerbated by climate change.

By restoring our natural capital through restoring wetlands, mangroves and sea grasses, coastal dunes and riverine vegetation we can buffer the effects of flood, sea level rise and severe storm events. By also supporting sustainable land management practices as with Case Study 1: Small-scale Rooibos Tea farmers, the impact of evaporation from high temperatures and prolonged drought can be reduced.

5.3. Climate Change Mitigation

Mitigation co benefits of EbA should be seen as secondary and not an essential feature of EbA. However, when EbA is twinned with mitigation, it was shown in cases to lead to market linkages and financial sustainability as in Case Study 6: Reducing emissions through forest co-management in the Mkuwazi Forest Reserve, Malawi and Case Study 5: Community based reforestation in the eThekwini Municipality. However it should also be noted that mitigation projects can have huge transaction costs in order to calculate, validate and verify the carbon stored, so it is cost-effective to link EbA into an existing mitigation project, such as in Case Study 5: Community based reforestation in the eThekwini Municipality. EbA projects will often have a carbon benefit but the carbon is not being calculated and sold on the carbon market due to the high transaction costs exceeding the financial benefit/income derived from the market. For mitigation to be cost effective, it needs to be done at scale to reduce these high costs such as addressing REDD+ at a national scale. The Case Study 11: South Africa's environmental Expanded Public Works Programmes also demonstrates a mitigation co benefit through using alien vegetation as a form of energy in their Working for Energy Programmes, thus reducing the reliance on coal.

5.4. Partnerships and Collaboration

All cases demonstrated positive outcomes from working with a variety of organisations and stakeholders in order to implement EbA. Partnerships are critical to ensure existing work is built on and the approach is strengthened as different partners bring different skills, knowledge and capacity into the process. Partnerships also enable positive policy shifts (often in cases where government is involved) such as Case Study 11: South Africa's environmental Expanded Public Works Programmes and Case Study 10: Conservation of Coastal Eco-Systems in Seascapes in Tanzania, or finance where there is a private sector partner or market for example in Case Study 15: Climate change, risk and insurance premiums in the Insurance Industry in South Africa and Case Study 2: Community Markets for Conservation and Case Study 14: Namibia's Bush-to-Fuel Project.

Learning networks are critical to ensure we build on the practice of EbA and start to develop robust programmes of practice. To achieve the necessary information sharing, alignment between NGO's and government, civil society, research institutions and the private sector, is important. Cases that showed a strong linkage into a learning network are for example Case Study 1: Small-scale Rooibos Tea farmers, where lessons on adaptation are fed into a broader adaptation network which exists in South Africa and Case Study 3: Collective action on the Agulhas Plain, South Africa which feeds lessons through the Cape Action For People and the Environment learning network. Tools to support EbA with community practitioners are evolving and can be shared through these learning networks.

5.5. Involvement of Local Communities

While all projects selected involved local communities as a feature of their EbA approach, the extent of involvement varied across the projects. It was noted that local involvement was especially evident where local communities are project leaders or beneficiaries such as Case Study 5: Community based reforestation in the eThekwini Municipality, and less explicit when projects are seeking to influence external and market influences as in Case Study 15: Climate change, risk and insurance premiums in the Insurance Industry in South Africa.

It is noted that community involvement in the early design stages of projects is desirable and that in some cases, it appears that this element could be strengthened. Like all community based projects,

for ownership, beneficiation and sustainability of the approach, EbA requires local stakeholder input to ensure local knowledge is integrated in project design and implementation. The best examples of community participation show how communities can be involved in project inception, design, implementation, participatory action research and monitoring, and therefore derive livelihood benefits from this involvement, as in Case Study 1: Small-scale Rooibos Tea farmers.

5.6. Benefits from Ecosystem Services

All case studies that are presented here clearly show benefits of ecosystem services, with supporting, provisioning and regulating services being most easily linked to EbA. Cultural services were also frequently cited as being promoted, but appear to be more difficult to quantify and not always highlighted adequately, suggesting an important role for more effective monitoring and evaluation if this aspect is to be better understood, documented, valued and reported on.

5.7. Biodiversity and Ecosystem Conservation

The case studies further illustrate that benefits can only be derived sustainably if ecosystems are used wisely and sustainably managed. It follows that all of the case studies include ecosystem management, restoration, rehabilitation and conservation as part of their objectives.

5.8. Link to overall adaptation strategy

Five of the fifteen cases studies had strong links to an overall adaptation strategy or plan with NAPA linkages in four of the cases (Case Study 2: Community Markets for Conservation; Case Study 10: Coastal Eco-Systems in Tanzania; Case Study 9: Collaborative action in Madagascar; Case Study 8: Mountain Gorillas in Rwanda, Uganda and the DRC). Case Study 6: Reducing emissions through forest co-management in Malawi, also had a strong link to the United Nations Framework Convention on Climate Change (UNFCCC) as it includes Reduced Emissions from Deforestation and Degradation which falls under this convention (REDD+).

While EbA projects certainly benefit from enabling adaptation policies and or strategies, and while linkages between EbA projects and enabling adaptation policies and strategies could be strengthened to inform both project and policy design, these are not necessarily a condition for their development or success. However when new emerging policies are developed such as NAPS and NAPAs, projects should feed in lessons to inform the development of these policies. Case studies where there was a link to an overall strategy also showed much improved monitoring frameworks, which is important for scalability and sustainability of these EbA approaches. Ultimately having the link to an overall adaptation strategy or guiding policy also ensures that you are integrating your EbA approach as part of a broader adaptation approach which will enhance its accountability in the long term.

See Annexure 3 for a more in depth discussion.

5.9. Other explicit Policy Support

Local planning and development frameworks were also seen as important for enabling EbA in several of the case studies. South Africa's human rights, green economy and social and economic development context was found to be an important enabler for several South African case studies, with Case Study 11: South Africa's environmental Expanded Public Works Programmes as a noteworthy example of this. Case Study 9: Collaborative action in Madagascar and Case Study 10: Coastal Eco-Systems in Tanzania are further examples.

Mainstreaming ecological infrastructure priorities into spatial planning frameworks is another important opportunity for realising EbA benefits. This is well illustrated in the eThekwini reforestation project (Case Study 5: Community based reforestation) where the municipal Metropolitan Open Space System (MOSS) provides a good spatial platform for EbA interventions and again provides a context in which the projects exist in a broader mitigation and adaptation and planning approach.

Climate integrated conservation strategies (CCS) have already demonstrated the benefits of aligning climate projections with spatial conservation strategies. When used now as a basis for engaging local communities in adaptation, these can provide for excellent EbA approaches. By harmonising with policies and strategies that guide conservation of ecosystems, spatial planning and socio-economic development, EbA projects can support and enhance governments' and society's ability to deliver on agreed priorities.

5.10. Financial Sustainability

In this paper we define financial sustainability as a feature to indicate those projects that are self-funded (through markets or incentive schemes) or have sustainable finance streams such as public or government funding and are not reliant on intermittent donor funding. Most projects reviewed here were initiated with donor funds, and most have financial sustainability objectives. South Africa's EPWP programmes (Case Study 11) is an important case of funding for EbA through government funding which is sustainable, and which supports the development of Small to Medium Enterprises. While funding for these programmes is continuous, the model for EPWP is however of short term job creation rather than a sustainable livelihoods opportunity. Shifting this short term model towards greater sustainability is a challenge but is being considered within the programme. Projects that appear to have the best potential to attain financial sustainability appear to be those that have strong market links and particularly those that were designed with these market linkages in mind (Case Study 2: Community Markets for Conservation), and have been underway for a significant period of time (Case Study 1: Small-scale Rooibos Tea farmers). Many projects are looking towards the adaptation fund and other similar resources (like the Green Climate Fund) as sustainable finance for future activities (e.g. Case Study 8: Mountain Gorillas in Rwanda, Uganda and the DRC).

It is not always possible for EbA projects to become financially self-sustaining at the site level, especially when benefits are accrued remotely from the site of intervention (a problem of "free-riding" by those who benefit but do not support the intervention). In these cases focused Payments for Ecosystem Services (PES) type models may be useful to sustain finance at the local level to benefit the community which interacts directly with the ecosystem as well as "downstream" beneficiaries.

5.11. Cost Effectiveness

Cost effectiveness is demonstrated when projects deliver a higher benefit to cost ratio than other adaptation approaches, such as high technology/engineered solutions.

Only one case was analysed sufficiently well to illustrate how restoring and maintaining ecological infrastructure can be cost-effective, namely Case Study 12: Restoration of the Manalana Wetland in Mpumalanga. It should be noted therefore that there is often not sufficient information about cost effectiveness in EbA case studies. In Case Study 12, benefits were seen to at least double the initial investment to implement the adaptation intervention. The lack of this kind of information noted in the other studies needs to be addressed in the design and monitoring of EbA projects to ensure that their effectiveness can be compared with the costs, for example, of hard infrastructure (sea walls,

gabions) and other costs incurred by the private sector and government in preventing damages from storms, floods and droughts.

5.12. PAYMENTS FOR ECOSYSTEM SERVICES

Payments for ecosystem services (PES) involve payments from a willing buyer to a willing seller for an ecosystem service (such as water provision, carbon sequestration, biodiversity conservation or a combination of these) or a land use likely to secure the ecosystem service (SANBI PES discussion document , 2011).

Several case studies in the sample set have a PES feature including Case Study 5: Community based reforestation in the eThekwini Municipality; Case Study 7: Subtropical thicket restoration; Case Study 13: Payments for Ecosystem Services in the Maloti Drakensberg mountains and Case Study 14: Namibia's Bush-to-Fuel Project.

Payments for ecosystem services (PES) is an important tool that can be used to incentivise best practice land and water management, provide multiple benefits to communities and secure ecosystem service provision. PES also helps assist communities to develop their understanding of the importance of ecosystem services and helps the buyer of the service to understand the implications of providing that service. Examples would include changing agriculture practices to reduce agro chemical pollution of rivers or reducing overgrazing to restore vegetation and prevent sedimentation. PES is a market based mechanism, whereby you have a buyer and seller of a service, such as the carbon market and the evolving water markets. PES ultimately aims to stimulate improved land management practices with the delivery of ecosystem services as the outcome. In South Africa, Case Study 11: South Africa's environmental Expanded Public Works Programmes, creates jobs in order to clear alien vegetation and improve land condition, and thus creates the potential basis for a PES mechanism to be developed in those areas with landowners.

5.13. MARKETS

Clear market linkages other than those demonstrated under PES are shown in several cases including Case Study 1: Small-scale Rooibos Tea farmers and Case Study 2: Community Markets for Conservation; where sustainable linkages into the retail industry have been highlighted in both the national and international market.

A lesson from these cases is that with a market mechanism there is often a strong monitoring focus which supports an adaptive management and learning by doing approach. These types of markets also provide financial sustainability and local beneficiation.

5.14. MONITORING

The cases that showed strong monitoring approaches were often those projects with a strong overall adaptation strategy or policy link and those with market linkages. This is because monitoring is required for the regulation or enforcement of the policy or for a certification or standards process that is required by the market.

In Case Study 6:: Reducing emissions through forest co-management in the Mkuwazi Forest Reserve, Malawi requires a strong monitoring, verification and reporting process as does Case Study 5: Community based reforestation in the eThekwini Municipality, through its application of the Community, Climate and Biodiversity Standard (CCBS). This in itself is an important lesson for future

approaches, showing where standards can assist in robust project delivery. In Case Study 1: Small-scale Rooibos Tea farmers, the market regulation and labeling also requires strict monitoring processes which again supports best practice and implementation.

5.15. SCALABILITY

Scaling up can take different forms. It can mean building on the success of, and growing a demonstration pilot to scale, replicating a successful pilot in more areas, or transitioning a project from reliance on donor funding to the generation of self-sustaining income. All of the cases examined here show elements of scalability in one or more form, demonstrating how approaches have the ability to be scaled up in a variety of ways.

When growing a project or replicating it, it should always be considered in the context of where it is located in the broader landscape. It should be noted that some ecosystem service benefits can only be measured when the project is taken to scale, such as the effect of siltation reduction on a catchment through better land management practices. Projects should therefore always understand and locate their projects within the broader ecosystem. This can be assisted through a mapping and scenario exercise and ensuring that the project is part of an integrated approach to adaptation.

It is possible to have an EbA project without a strong policy link but we recommend for scalability that a strong supportive link to an overall adaptation strategy and enabling policy, such as National Adaptation Plans, is desirable. On financial scalability it is important to demonstrate that the project is effective so that it can be expanded or replicated or so that finance is secured for the long term. Market mechanisms and PES were also shown to provide good ways of supporting financial sustainability which should be considered when scaling up.

5.16. ECONOMIC DIVERSIFICATION

Economic diversification is demonstrated in many of the cases, and especially so in Case Study 2: Community Markets for Conservation; Case Study 5: Community based reforestation in the eThekwini Municipality; and Case Study 14: Namibia's Bush-to-Fuel Project. It has been shown that economic diversification is a critical feature of EbA but especially EbA +, when livelihoods are strengthened and diversified. The creation of sustainable livelihoods can assist in building resilience against climate shocks such as severe drought or floods. Market links can support economic diversification and can be made by finding a buyer for a specific commodity (as in case studies 1 and 2 above) or through developing a market for payment for an ecosystem service such as water quality and carbon sequestration (as shown in case studies 5, 7, 14, 15 above). These cases demonstrate how ecosystem based approaches can create sustainable jobs and alternative livelihoods which builds resilience and allows people to think creatively about innovative ways to engage with their environment; while at the same time building the economy through restoring and conserving ecosystems. Case Study 4: Conservation and collaborative management in Namibia and Case Study 10: Coastal Eco-Systems in Tanzania also show potential for economic diversification through game farming and mariculture, respectively.

5.17. EBA+

EbA+ moves beyond utilizing biodiversity and ecosystem services as cost effective and low technology solutions to climate change, showing how investments in biodiversity and ecosystem services can

sustain livelihoods, enhancement economic diversification and is an opportunity to reduce poverty especially in vulnerable communities.

Several of the cases studies that are presented here could be categorized as EbA+ projects because they can be seen as having further additional benefits such as economic diversification, sustainable job creation and community-level governance and/or ownership. Case Study 1: Small-scale Rooibos Tea farmers is a good example of EbA+ because not only does it make the green economy link, it explicitly provides a climate context and assessment to the project where farmers are monitoring climate changes and adapting their activities accordingly, whilst supporting a new market for rooibos and supporting biodiversity conservation. Another example is Case Study 5: Community based reforestation in the eThekwini Municipality, which has multiple benefits of carbon sequestration and biodiversity conservation, the creation of alternate livelihoods and has clearly supported poverty alleviation in the affected communities. Case Study 11: South Africa's environmental Expanded Public Works Programmes shows how the provision of support to the development of small and medium enterprises (SMMEs) in EbA projects can catalyse sustainable economic diversification and the building of a green economy.

Other cases that are starting to show EbA+ potential are Case Study 4: Conservation and collaborative management in Namibia, which aims to provide economic diversification through supporting game versus goat farming; and Case Study 10: Coastal Eco-Systems in Tanzania has strong links to economic diversification for example with future mariculture, while both are considering these as new options under a changing climate..

6. RECOMMENDATIONS TOWARDS BEST PRACTICE EBA

Within a sustainable development context, synergies between socio-economic benefits and ecosystem conservation and climate change adaptation outcomes can be achieved in a variety of ways. In this context, EbA best practice, and especially EbA+, present significant opportunities for job creation, poverty alleviation, private sector investment and stimulating the green economy.

There is an existing body of work that can be developed further, and significant scope for innovative Ecosystem based Adaptation implementation activities that could be designed *de novo*. It is however important to recognise that there is complexity in combining socio-economic benefits, biodiversity and ecosystem conservation and climate change adaptation outcomes and this can involve both costs and risks which need to be managed.

To address these risks and implement EbA best practice at scale, the following guidelines are recommended:

- **Involve relevant stakeholders in integrated and adaptive planning and implementation.** Projects should involve local communities, integrate indigenous local knowledge and draw on multi-disciplinary stakeholders from the outset. A framework for how stakeholders will be consulted throughout the process should be developed. Funders should also be included in the workshops to allow a full understanding of the process and its potential outcomes. By including local communities, particularly woman and the youth early on in the process, as well as in implementation and monitoring, local ownership and beneficiation of the project is developed and local knowledge is integrated into the approach. Capacity building also occurs through the consultation around the understanding of ecosystem services and how they support adaptation as well as the importance of contextualization of relevant climate impacts scenarios. Adaptive management principles will be important in ensuring an appropriately responsive strategy for project implementation.
- **Locate adaptation approaches within the context of the broader landscape.** Landscape-wide ecosystem processes and services should be factored into project design and monitored to demonstrate effectiveness in the broader landscape.
- **Develop adaptation responses that are locally contextualised.** Take cognisance of relevant climate scenarios and ensure appropriate adaptation approaches are designed, thus avoiding mal-adaptation and reducing short and long term risks.
- **Develop linkages with national and sub-national enabling frameworks.** Projects should draw on and inform relevant international, national and local sustainable development, conservation and climate policy. Particular attention should be given to overarching adaptation strategies such as National Adaptation Plans of Action (NAPAs) and prospective National Adaptation Plans (NAPs) for short term and long term planning respectively.
- **Safeguard communities against risks and costs**. Building safeguards into projects that ensure that communities do not absorb the risks and costs associated with adaptation practices, is critical, especially where benefits accrue elsewhere.
- **Carefully consider project financial sustainability from the outset.** Market mechanisms including Payments for Ecosystem Services have been shown to provide a good basis for financial sustainability, should transaction costs be feasible and local communities benefit directly. Other

potential sources of public funding such as the Adaptation Fund and Green Climate Fund as well as other mechanisms through government and private sector funding should be considered.

- **Develop a robust monitoring and evaluation system.** Developing a comprehensive monitoring and evaluation framework that has sustainable financing allows one to demonstrate effectiveness of the approach. The framework should include the determination of baselines upon which comparison is made and EbA indicators and targets should be well defined for social, environmental and economic factors. A process for adaptive management should be included in the framework where information from monitoring informs the project approach and also future EbA approaches, through information being communicated in learning networks.
- **Track cost effectiveness and resilience outcomes.** EbA should be able to demonstrate the cost effectiveness of the approach in relation to other forms of adaptation and take into account the full range of benefits associated with these ecosystem based approaches. Criteria or indicators that demonstrate the cost effectiveness and the benefits of resilience for both people and nature should be developed within Monitoring and Evaluation frameworks.
- **Establish learning networks and communities of practice.** Learning networks and communities of practice can add value to EbA approaches, and encourage sharing of lessons learned. A new EbA platform should be developed by building on existing regional networks, and international forums such as the Nairobi Work Programme on Adaptation under the UNFCCC.

In summary, there is great opportunity to scale up existing work and build new EbA approaches that are locally relevant, participatory and have robust monitoring frameworks which demonstrate their effectiveness in building resilience in communities and nature. The cases have shown success stories where, through the restoration and conservation of ecosystems and ecosystem services, people have been able to engage more interactively with their environment, and enhance their understanding and adaptive capacity to cope with climate change impacts.

The potential of EbA projects to achieve additional socio-economic objectives relating to economic diversification and job creation for local communities is recognised in the concept of EbA+, thus enhancing the green economy and supporting poverty alleviation.

In Africa we have shown that, by realising the synergies between ecosystems, climate and people, we can harness the power of natural solutions to enhance livelihoods, diversify economies and build resilience to a changing climate.

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8. ANNEXURE 1: WORKSHOP PARTICIPANTS

Ecosystem Based Adaptation workshop - 10 October 2011	
Caroline Petersen	UNDP
Carolyn Ah Shene-Verdoorn	Birdlife SA
Christy Bragg	EWT
Farayi Madziwa	CSA
Guy Midgley	SANBI
Katinka Wågsæther	Indigo
Kristal Maze	SANBI
Onno Huyser	TMF
Rosie Stanway	CSA
Farayi Madziwa	CSA
Sarah Frazee	CSA
Sarshen Marais	CSA
Stephanie Midgley	OneWorld
Stephen Holness	SANParks
Tony Knowles	Cirrus Group
Tracey Cumming	SANBI
Wadzi Mandivenyi	DEA
Mandy Barnett	SANBI
Tessa Mildenhall	CSA
Ntando Mkhize	DEA
Bettina Koelle	Indigo Development and Change
Mao Amis	WWF
Carol Poole	SANBI - ABRD

Unable to attend: Gabriel Lekalalala (Dept of Agriculture, Limpopo); Malusi Vatsha (indalo yethu)and Noel Oettle (EMG)

9. ANNEXURE 2: THE CASE STUDIES

9.1. CASE #1: SMALL-SCALE ROOIBOS TEA FARMERS IN THE NORTHERN CAPE, SOUTH AFRICA

Location: Suid Bokkeveld, Hantam District, Northern Cape, South Africa
Ecosystem: Succulent Karoo/ Fynbos
Organisations involved: Environmental Monitoring Group (EMG) (facilitation and general support), Indigo development and change (facilitation and general support) and the University of Cape Town (research and academic support)

DESCRIPTION

Through its collaboration with provincial government, the Environmental Monitoring Group (EMG), Indigo development & change and academic partners, members of a resource-poor community in the Suid Bokkeveld in the Northern Cape Province of South Africa have over a period of 10 years established and grown a for-profit enterprise, the Heiveld Co-operative. The enterprise specialises in high quality cultivated and wild-harvested organic rooibos tea, and has a strong focus on ensuring that their harvesting methods are sustainable and in no ways harmful to the wild population of rooibos. Accordingly, all Heiveld producers must follow a harvesting protocol designed to ensure sustainable management of both the rooibos plants and of the associated biodiversity.

The Heiveld Co-operative is a member-owned co-operative, built through a multifaceted, dynamic process focused on local ownership, that today has the ability to produce and market high quality products, with the capacity to process in excess of 100 tonnes of dry tea per season.

HOW PROJECT INVOLVES LOCAL COMMUNITIES, INSTITUTIONS AND DECISION MAKERS

The project is grounded in a practice of Participatory Action Research (PAR), a process that has involved participatory learning amongst researchers, practitioners and farmers. While the PAR process has involved both members and outsiders in providing guidance and support for the Heiveld Co-operative, it is important to note that the responsibility for business decisions and outcomes is in the hands of its owners and employees.

HOW THE PROJECT WORKS TO CONSERVE BIODIVERSITY AND ECOSYSTEM SERVICES, SECURE LIVELIHOODS AND INCREASE RESILIENCE THROUGH AN ECOSYSTEM BASED APPROACH

BENEFITS TO BIODIVERSITY AND ECOSYSTEM SERVICES

While creating a livelihood for the local community, the participatory learning and the establishment of the Heiveld Co-operative have also created a strong focus around local biodiversity and sustainable management of resources. Sustainable resource use is both an internal objective of the Co-operative and its members linked to livelihoods, and a market-facing claim that is supported by multiple certification (organic and Fairtrade).

BENEFITS TO LIVELIHOODS AND POVERTY ALLEVIATION

The drought-stressed region of the Suid Bokkeveld faces further environmental stress due to climate change, and participatory learning between academics, NGOs, practitioners and farmers has become a way of building and maintaining resilience for the local community. The uncertainties of future climate, together with the fluctuating business environment, makes it even more important to maintain this participatory learning process, so that farmers can continue to adapt their practices and strategies using climate information.

FINANCIAL ASPECTS

The Heiveld Co-operative was founded with a capital of R1 400, which was provided by the membership fees of the founding members. While there has been some supporting funding over the last ten years, for example from the Canadian Embassy to purchase a tea cutting machine and from the United Nations Development Program to develop packaging for the products, the Heiveld Co-operative is financially self-sufficient and now employs three full time office personnel and 10 seasonal employees.

LESSONS LEARNT

Over the years the development of the Heiveld Co-operative has faced several challenges, and addressing these has generated important learnings for similar initiatives. Firstly, it has been important to find a balance between the independence of the Co-operative and the support provided through the PAR process and other sources, and it has therefore been important to regularly clarify responsibilities. Secondly, the members' lack of experience in collective organization and the management systems that are needed for the consistent and profitable production of a quality product requires capacity building, as well as the experience that can only be build up with learning by doing over time. Thirdly, inclusion of young people in management and women in the governance structures has provided new skills and perspectives to business, and there is an ongoing need to draw younger and better-educated members into the Co-operative.

LINKS TO POLICY:

The draft of South Africa's Second National Communication (SNC) (2010), highlights conservation agriculture as one of the specific options for adaptation in crop and livestock agriculture. When identifying responses to climate change impacts on the agricultural sector, the South African National Climate Change Response White Paper (2011) highlights how South Africa will support and develop adaptation strategies that include conservation agriculture practices.

THIS CASE STUDY WAS COMPILED BASED ON

Malgas, R., Oettle, N. and Koelle, B. (2010), Positive Visions for addressing complexity of small farmers' livelihoods: A case study about an integrated learning approach in the Suid Bokkeveld, South Africa (in print).

Malgas, R. & Oettle, N. 2006. *The sustainable harvesting of wild rooibos tea*.

Oettle, N., Goldberg, K. & Koelle, B. 2009. The Heiveld Co-operative - a vehicle for sustainable local development. *Drynet Case Study.* Cape Town.

Oettle, N. & Koelle, B. 2003. New Directions for Extension in democratic South Africa - Enhancing Farmers' initiative to conserve natural resources. *In:* SANBI (ed.) *Conservation Farming Project.* Nieuwoudtville: Indigo development & change.

The Department of Environmental Affairs, 2010. South Africa's Second National Communication under the United Nations Framework Convention on Climate Change.

The Government of the republic of South Africa, 2011. *National Climate Change Response White Paper.*

With input from Noel Oettle from the Environmental Monitoring Group (dryland@global.co.za)

9.2. CASE #2: COMMUNITY MARKETS FOR CONSERVATION IN ZAMBIA (COMACO)

Location: Zambia
Ecosystem: All
Organisations involved: The non-profit company is managed by Wildlife Conservation Society (WCS), in close consultation with Community Resource Boards of Luangwa Valley, Producer Group Cooperatives, District Council authorities and key Government institutions, including Zambia Wildlife Authority and Ministries of Tourism and Environment and Natural Resources.

DESCRIPTION

Using a business approach, COMACO works to end poverty among small-scale rural farmers by creating economic incentives for improved land management practices and resistance to poaching. The company gives participating farmers economic incentive to resist poaching and adopt more sustainable farming practices by marketing their organic produce at the highest value possible. The urban-based consumers provide the buying power that sustains this market based solution, and which works to improve rural incomes and increase food security.

Farmers who become COMACO producer group members grow organic, healthy and nutritious crops that are best suited for their soils, crops that are also important food and nutrition sources in the rural areas. COMACO, which is primarily a food processing business, purchases the crops from the farmers and sells it to urban consumers. The crops are processed at regional branches of the company, called Conservation Farmer and Wildlife Producer Trading Centres (CTCs). The CTC's provide participating communities with the opportunity to learn improved production skills through their resident extension staff, to engage with COMACO's business management and to enhance the transparency of trade benefits and opportunities when compliant with conservation guidelines. The CTC's operate through a network of trading depots in rural areas, often in close proximity to a national forest or national park. As opposed to most approaches to biodiversity conservation, COMACO is highly decentralised, household-focused, incentive-driven and potentially self-financing.

HOW THE PROJECT INVOLVES LOCAL COMMUNITIES, INSTITUTIONS AND DECISION MAKERS

COMACO works in close consultation with a number of national and regional government departments, and is at the same time rooted in partnership with local communities through their producer group cooperatives.

HOW THE PROJECT WORKS TO CONSERVE BIODIVERSITY AND ECOSYSTEM SERVICES, SECURE LIVELIHOODS AND INCREASE RESILIENCE THROUGH AN ECOSYSTEM BASED APPROACH

BENEFITS TO BIODIVERSITY AND ECOSYSTEM SERVICES

It can be challenging to measure the success of ecosystem protection programs, as outcomes are not always measurable. Some of the tangible outcomes that COMACO can show includes the transformation of 1200 poachers since 2001 to adopt new and alternative livelihoods that result in an annual saving of over 5000 wild animals. In addition, there has been a rapid decline in poaching arrests with the surrender of over 70 000 snares and close to 2000 guns. A wildlife aerial census survey has also found that, though not uniformly statistically significant, there are indications of a positive growing wildlife population from levels prior to the introduction of the COMACO model.

While more difficult to measure, it can also be assumed that changes in agricultural practices have worked to improve the health of the soils and the local ecosystems.

BENEFITS TO LIVELIHOODS AND POVERTY ALLEVIATION

COMACO works to influence the livelihoods of a vast number of people. It has over 45 000 producers, spread between 2400 producer groups. Based on a baseline survey, household income for COMACO farmers was found to have increased by between 120% and 220% since COMACO began in 2003. COMACO also seems to have a direct influence on food security, as the tonnage of maize used by the World Food Program for relief assistance has declined drastically in areas were COMACO is operating. A detailed study of crop harvests has further found that farmers who adopted conservation farming have on average 18% higher maize crop yields compared to those not practicing conservation farming.

COMACO has significant participation by women-headed households, also contributing to further empowering of women, as economically empowered women are more likely to send girl children to school. In 2010 women held 51% of producer group memberships.

FINANCIAL ASPECTS

COMACO started as a low-cost, pilot program, and a grant from the Royal Norwegian Embassy later made it possible to support the testing of the model. While it is still a model under test, forecasts based on projected sales of its existing products, assuming conservative growth based on prior sales, predicts CTC operations to be self-financed by the financial year 2013. Beyond that time, it is expected that the CTCs will be able to contribute towards the costs of running the Lusaka head office.

LESSONS LEARNT:

Some of COMACO's success can be linked to the fact that WCS had 20 years of community-based experience in the areas where it was launched. WCS' pre-existing relationship with communities made it easier to consult and overcome many expected problems, and its long-term presence meant that there was already an understanding of environmental and social issues in the area. The fact that COMACO was initially a low-cost pilot program also meant that it had flexibility, as it was not working with a fixed results framework and timeframe.

COMACO offers a number of recommendations for the export of the model to new sites, including: start small-scale to build the process with local stewardship and links to local authorities; rely on committed implementing organsations with cost-cutting capacity; rely on local staff with local knowledge and language skills: develop business plans that target the most vulnerable households, as identified by local leaders; employ adaptive efforts to reduce transaction costs; and commit sufficient time and expertise. For the model to be suitable it is also necessary that practical locations and infrastructure that can provide a trading hub exist, and that local stakeholders desire to manage their natural resources and be respectful of neighbouring protected areas.

LINKS TO POLICY

The fact that Zambia is a stable country with democratic institutions governing developmental policies played a role in COMACO's success. The Zambian Government welcomes dialogue and partnership from non-governmental organisations, and COMACO has received crucial technical support and advice from local Government authorities, ministries and Government departments.

The work of COMACO can also be seen as working to support some of the aspects addressed in the Zambian National Adaptation Program of Action on climate change (NAPA) (2007). Firstly, the

NAPA recognises how improved land management can work to assist vulnerable groups in adaptation to climate change. While not addressing the issue of poaching, the NAPA recognises the need to reduce human-wildlife conflict in the light of climate change, and maintenance and provision of water infrastructure to communities to reduce human-wildlife conflict is one of its key recommended projects.

THIS CASE STUDY WAS COMPILED BASED ON

Ministry of Tourism, Environment and Natural Resources (Zambia), 2007. Formulation of the National Adaptation Programme of Action on Climate Change (NAPA)

Wildlife Conservation Society, 2011. *2010 Annual Report: COMACO Expansion Project*. Prepared for the Royal Norwegian Embassy

http://www.itswild.org/

With input from Dale Lewis from COMACO (dlewis@itswild.org)

9.3. CASE #3: COLLECTIVE ACTION ON THE AGULHAS PLAIN, SOUTH AFRICA

Location: Agulhas Plan, Western Cape, South Africa
Ecosystem: Wetlands, lowland fynbos and Rhenosterveld
Organisations involved: The Nuwejaars Wetland Special Management Area (SMA) consists of 25 private landowners, including the Elim community. It has worked with a number of sponsors and partners, including the Agulhas Biodiversity Initiative (ABI), Cape Nature, the Cape Action for People and the Environment, the Denel Overberg Test Range, the Dennis Moss Partnership, the Department of Agriculture in the Western Cape, the Development Bank of Southern Africa (DBSA), the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU), Overberg District Municipality (ODM), South African National Parks (SANParks), the Table Mountain Fund (TMF), the United Nations Development Programme (UNDP)/Global Environment Facility (GEF) and Working on Fire.

DESCRIPTION

The Nuwejaars Wetland Special Management Area (SMA) consists of 25 landowners, who through collective action work to "flip" their land use practices from conventional agriculture towards land use dependent on biodiversity conservation, eco-tourism and carbon-and energy-neutral production. By moving away from the old thinking around conservation versus agriculture, the SMA landowners work together to combine conservation, climate change resilience, agriculture and social upliftment. Getting to where the initiative is today has taken nine years, a period over which a collective concern for the local ecosystem has led to the registration of the Nuwejaars Wetland SMA non profit Company, the signing of the SMA's Constitution by 25 landowners and the establishment of the Nuwejaars Wetland Owners' Association (NWLOA) in 2008. Further more, the landowners have all registered restrictive conditions on their title deeds, which binds the members and their successors to the Constitution and the SMA's Development Framework. As has been the intention since the start, the SMA has also applied for the area to become a National Protected Environment, and, when declared, it will be the first private National Protected Environment.

A grant from the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU), facilitated by UNDP and the Agulhas Biodiversity Initiative, then gave the Nuwejaars Wetland SMA the opportunity to turn plans into real action through a climate change adaptation project in 2009. The aim of the two-year project was to maintain biodiversity patterns and processes, sustain ecological functions and to further sustain livelihoods through sustainable production activities. The project focused on implementing climate change adaptation strategies identified by the Vulnerability and Adaptation Assessment for the Western Cape, within the context of the protected area expansion strategy. The adaptation strategies include rehabilitation and improved management of coastal wetlands, estuaries and vleis, effective flood control, establishing an effective fire management system, controlling alien plant infestations, implementing alternative farming practices and diversifying agricultural activities, thereby reducing the carbon footprint of production activities. The grant further made it possible to develop all the legal documentation that has been required for the different stages of the SMA process.

While the climate change adaptation project funding gave the Nuwejaars Wetland SMA the opportunity to get started on its work to "flip" land use practices, the SMA is ultimately working to find ways to unlock sustainable capital. Building on natural and human capital, the Nuwejaars Wetland SMA is using agriculture as an economic driver, together with other biodiversity economic drivers, such as eco-tourism, in order to become a sustainable venture. Some of the innovative approaches that have already been initiated include the set up of four renewable power facilities, whose income is fed back into the SMA non-profit company, and a secondary industry that makes biodiversity products from alien clearing material.

How project involves local communities, institutions and decision makers

The Nuwejaars Wetland SMA is an initiative driven by private landowners, including the previously disadvantaged community Elim, and builds on a strong stakeholder process. A lot of work also takes place with input from, and in cooperation with, a variety of organisations, agencies and government institutions. For example, the climate change adaptation program was funded by a BMU grant, which was facilitated by the UNDP and ABI, with SANParks as the implementing agency, under which a sub-agreement devolved the implementation to the Nuwejaars Wetland Land Owner's Associations. The SMA also works with government institutions at various levels, for example through its fire management agreement with the Overberg District Municipality, and with the Department of Agriculture in the Western Cape with whom they have signed a Memorandum of Cooperation.

How project works to conserve biodiversity and ecosystem services, secure livelihoods and increase resilience through an ecosystem based approach

Located within a biodiversity hotspot, the Agulhas Plain, the Nuwejaars Wetland Special Management Area is the home to the biologically rich lowland fynbos and the endangered Rhenosterveld. What is more, the Nuwejaars wetland ecosystem has been described as "highly irreplaceable." Through centuries of bad land use practices and expanding agricultural activities, as well as the spread of invasive alien plants, the area has come under threat. Aliens are not only more flammable than indigenous vegetation, thus causing increased fire frequency, they are also less able to withstand floods, and when uprooted they wash away parts of the carbon-storing peat. The area is therefore highly vulnerable to two inter-related climate change impacts, increasing frequency in wild fires and floods, which are further exacerbated by the degradation of habitats and unsustainable agriculture practices.

Benefits to biodiversity and ecosystem services

The Nuwejaars Wetland SMA has started rehabilitating the wetlands and revitalizing the ecosystems in the area. To this point they have cleared 3400 hectare of alien, planted 2500 indigenous trees and rehydrated 28 hectares of peat. They have also put huge efforts into improving the area's fire management system by partnering with the District Municipality to supporting the training of fire fighters and buying fire fighting equipment, and by constructing 145 km of firebreaks and conducting 605 hectares of block burns. Reintroduction of game is also an important component of the revitalisation strategy, and Bontebok, zebra, buffalo, hippos, hartebeest and hippo have been brought into the Nuwejaars Wetland SMA. These wild animals are much less destructive than livestock, and the hippo also assists directly in the rehabilitation of wetlands and peat rehydration. By walking through the vlei the hippo spreads water into the peat and opens up blocked channels, rehydrating the peat and ensuring that the vlei systems stay linked. The re-introduction of game has also required the construction of a 120 km long game fence that, while ensuring that natural corridors are not blocked, enables agricultural activities to continue in close proximity to conservation areas.

Accordingly, farmers are moving from conventional methods to more sustainable practices, including new tillage and cropping methods.

BENEFITS TO LIVELIHOODS AND POVERTY ALLEVIATION

By rehabilitating the wetlands communities on the Agulhas Plain benefit through the many ecosystem services provided by healthy wetlands. This includes the provision of clean water, river systems that do not dry up in the summer, flood control and replenishment of the groundwater. The rehabilitated peat further provides an important ecosystem service, carbon storage. It also has the potential to provide income through the carbon market, and research is currently underway to see how much carbon is being saved and stored through the wetland rehabilitation.

The Nuwejaars Wetland SMA also works to contribute to the economic development of Agulhas Plain through sustainable development, thereby improving the livelihoods of people in the area. The climate change adaptation project created temporary jobs for 270 people in the area through, among other things, work in alien clearing, construction of fencing and wetland rehabilitation. While the jobs created temporary income and worked to improve the skills of people in the area, the SMA's ultimate aim is to create sustainable jobs and business opportunities for people living in the Agulhas Plain. Two small business ventures are already established, one which takes aliens that have been cleared and makes wood chips to be used as mulch and for peat rehydration, and one which produces compost for the market. Biodiversity products, such as harvested fynbos bouquets and honey from beehives within the SMA, could also provide long term jobs if harvested and used sustainably. Further more, nature-based tourism is already developing, creating opportunities for small business ventures and the need for guides and other service industry jobs.

FINANCIAL ASPECTS

While funding and support through various partners and institutions, including the BMU, the Development Bank of Southern Africa and the Table Mountain Fund, has enabled the Nuwejaars Wetland SMA to get to where it is today, its long-term plan is to be self-sustainable. A very important part of the Nuwejaars Wetland SMA is therefore its drive to unlock sustainable capital, taking advantage of its physical assets and natural and human capital to ensure the protection of ecosystems, while also uplifting those who live in the area. Accordingly, the following plans are underway: sale of electricity from renewable energy plants to sustain administration and staff; a new way to fund alien clearing through a public-private partnership which links alien clearing and fire management; Memorandum of Understanding signed with the Overberg District Municipality and Working on Fire for fire prevention and control; the sale of secondary alien products has been established to fund parts of the wetland restoration, with plans for further support through seed funding, proto carbon markets and carbon credits; and tourism activities which are already providing income and covering costs, with the thought that profits will go towards further investment in tourism before being reinvested in other activities.

LESSONS LEARNT

The development and success of the Nuwejaars Wetland SMA is grounded in the initiative and drive of the landowners themselves. A crucial aspect of its success, and thus an important lesson learnt, is therefore that such an initiative requires people with the passion to drive the process, people from whom it requires time, effort, innovative thinking and persistence. As has been emphasized by the SMA members, the top down approach, where authorities and specialist tell landowner what to do, will never work without the landowners being part of the process.

While the SMA is working towards becoming self-sustainable, and having started to generate some income through, among other things, tourism and renewable energy, it is important to note that substantial funding has been crucial in supporting its first stages of development. Developing the legal documentation that was required to reach the point where the SMA is today has cost between R1.5 and 2 million, and would not have been possible without the assistance from ABI and BMU. This is a major restriction against duplicating this approach in other areas.

While providing crucial funding, the BMU project also provided several challenges and subsequent lessons learnt. The BMU project was awarded in early November 2008, with a time frame for financial completion by February 2010 and physical completion by September 2010. Because the agreement from SANParks, and the first payment, was only received in July 2009, it was only possible to start employing people at that point. This meant that implementation could only start in September 2009. As the original time frames could not be shifted, this meant that a two-year project had to be implemented in 9 months. This and other experience from the project provided some important lessons learnt: the main funders of projects should be more informed at the implementation level, and understand that it is a partnership where both partners have their own requirements, and so concessions have to be made; the flow of funds should be as simple and direct as possible to improve effectiveness and value for money; project implementation should be controlled at the project level by a trusted joint project team, and not by ad hoc decisions by senior management with little knowledge of the project and its objectives; projects should be constructed to include supervision and administration, as well as a sustainability plan for after project completion where applicable; and time frames must be realistic.

POLICY LINKS

The SMA initiative and the associated projects are all in compliance with national and provincial legislation and policy pertaining to land use management, which means that implementation is not subject to political support or interference.

The Nuwejaars Wetland SMA is aligned with international objectives that were identified by the United Nations (UN), addressing the Agenda 21 principles laid down at the conferences of the United Nations Conference on Environment and Development (UNCED). These principles have also been adopted as the foundation for the South African National Outcomes and Provincial Strategic Objectives.

The work of the Nuwejaars Wetland SMA is also aligned with both provincial and national assessments and strategies. This is illustrated through its climate change adaptation project, where it worked to implement the adaptive strategies that had been identified by the Vulnerability and Adaptation Assessment for the Western Cape, which are consistent with the National Climate Strategy for South Africa (Childe, 2010).

THIS CASE STUDY WAS COMPILED BASED ON

Author unknown, date unknown. *Nuwejaars Wetland SMA Project Report: Towards a sustainable Agulhas Plain*, published by the Nuwejaars Wetland Land Owners' Association.

Childe, B. 2010. Independent Terminal Evaluation of the UNDP/BMU "Protection of Wetlands in the Cape Floristic Region" International Climate Initiative. BMU Project Number 08 11 037 ZA M Feuchtgebieta.

www.nuwejaars.com

With input from Mick D'Alton, Vice Chair of the SMA (mandjdalton@omail.co.za)

9.4. Case #4 Conservation and Collaborative management in the Mdumu North Complex, Namibia

Location: Namibia
Ecosystem: River catchment, floodplains, riparian forests
Organisations involved: The management body of the Mudumu North Complex (MNC) comprises representatives of the conservancies, community forests, non-governmental organisations, public service agencies and the traditional authority.

Description

The MNC is a broad management area, comprising three conservancies, three community forests and three protected areas. The mission of the MNC is to work together to rehabilitate the fauna and flora of the area, and to guide the development of tourism and resource use for social, cultural and economic benefits through collaborative management.

Due to poaching, wildlife populations in the area were under considerable threat during the 1970s and 1980s. The subsequent crack down on poachers, who failed to cooperate with local residents and address the underlying issues, created a hostile environment between local residents and poaching officials. In an effort to develop a new approach in the 1990s, the Integrated Rural Development and Nature Conservation (IRDNC) then worked to make communities involved in decision-making, and provided them with the opportunity to benefit from wildlife. Later, new legislations enabled communities to establish conservancies and community forests. In 2005 a number of conservancies and community forests had been established along the Kwando River, and various stakeholders met to explore the possibility of some form of joint management. This led to the formation of the MNC.

At this point, the most important management activities of the MNC are fire management, game monitoring, monitoring, human-wildlife conflicts, zoning and wildlife corridors and agriculture.

How project involves local communities, institutions and decision makers

The MNC was formed by local stakeholders from the conservancies and community forests, in cooperation with public agencies, non-governmental organisations and traditional authority.

How project works to conserve biodiversity and ecosystem services, secure livelihoods and increase resilience through an ecosystem based approach:

Benefits to biodiversity and ecosystem services

The MNC has very high diversity of animals and plants compared to the rest of Namibia. After its formation the MNC has introduced several new approaches to natural resource management, in order to conserve the area's wildlife, biodiversity and ecosystem services.

Benefits to livelihoods and poverty alleviation

Before the conservancies and the MNC were formed the local economy was mainly based on farming, as well as the use of natural vegetation for food, fuel and building material. Over the past ten years the value of incomes obtained through the conservancies has risen sharply, with N$3.7 million obtained by the conservancies in 2008. The income mainly comes from concession fees paid for trophy hunting and from joint venture agreements for sharing of profits earned by tourism establishments. With 99 people working in full-time jobs for the conservancies (2008), there is also significant incomes earned through salaries paid to conservancy residents employed at lodges and campsites.

FINANCIAL ASPECTS

The conservancies generate considerable income, mainly through tourism and trophy hunting.

LESSONS LEARNT

A key aspect of the MNC's success is the fact that its joint management was driven by demand, as its member units shared common problems and realised that cooperation with neighbours was necessary to solve the problems. The fact that the conservancies have authority over the wildlife on their land further made it easier for the MNC to enter into discussions with government, as there was no risk of government disempowering the conservancies.

Maintenance of the collaborative management of the MNC requires that participants uphold productive cooperation, which in turn requires good communication between stakeholders. It is also important for MNC to communicate with the Regional Council and other ministries active in the area, so that MNC activities are not undermined by other initiatives. These spheres of communication require the establishment and maintenance of sound technical ability, management and infrastructure in each of the MNC components.

With increasing wildlife numbers the area is experiencing an increasing number of human-wildlife conflicts, and innovative measures to counter the loss of life is required. The number of elephants in the area must urgently be reduced, as valuable riparian woodlands are being destroyed at an alarming rate.

Community forests and conservancies should no longer be kept separate, as each offer aspects that benefit all. While community forests have legal control and ownership over a much broader range of natural resources than do conservancies, conservancies have longer management experience and can contribute high value wildlife and tourism.

LINKS TO POLICY

Legislation has played a crucial role in enabling the establishment of the conservancies and community forests in the MNC. A new legislation in 1996 made provision for the establishment of conservancies, after which several communities started to form their own conservancies in order to obtain legal rights over wildlife and tourism. In 2001 the new Forest Act made it possible for communities to form community forests, providing ownership rights over forests and other natural resources.

THIS CASE STUDY WAS COMPILED BASED ON

http://www.nacso.org.na/SOC_profiles/MNC_booklet.pdf

9.5. CASE #5 COMMUNITY BASED REFORESTATION IN THE ETHEKWINI MUNICIPALITY, SOUTH AFRICA

Location: Buffelsdraai Landfill and Inanda Mountain, Durban, KwaZulu-Natal, South Africa
Ecosystem: Coastal scarp Forest and Eastern Valley Bushveld
Organisations involved: The programme is commissioned by eThekwini Municipality, with Wildlands Conservation Trust (WCT) acting as implementing agent.

DESCRIPTION

The forest-grassland mosaics provide important ecosystem services for rural communities, as well as for the urban areas of Kwazulu-Natal, including grazing lands, access to clean water, erosion control and climate regulation. Having previously been used for large-scale sugarcane monoculture, the ecosystems are now further threatened by housing and industrial development.

At two sites, namely Buffelsdraai Landfill and Inanda Mountain, local ´treepreneurs´ are trained to grow indigenous trees. When at a certain height, these trees are traded for goods such as bicycles, school fees and staple food. The next phase of the project uses the trees grown by treepreneurs to restore forest habitat to areas, which were either previously cleared for agriculture, or the forests damaged by fire and resource harvesting. The municipality is working with the WCT towards certification of the Buffelsdraai Landfill Site Community Reforestation Project under the Climate, Community and Biodiversity Standard (CCBS). This certification does not yield tradable carbon credits, but puts in place a formal system of monitoring and verification that will ensure that the actual amounts of carbon sequestered by the reforestation activities are measured and the carbon is verified by an external auditor. The carbon sequestered has been allocated by the eThekwini Municipality as part of its offset for CO_2 emissions associated with Durban's hosting of certain 2010 FIFA World Cup matches.

The reforestation projects have further spawned an environmental education programme to accompany treepreneur work, as well as a 'wastepreneurs' programme.

HOW PROJECT INVOLVES LOCAL COMMUNITIES, INSTITUTIONS AND DECISION MAKERS

The eThekwini Municipality has established partnerships with households in local communities, who can become treepreneurs and supply indigenous trees for reforestation. It has also partnered with a local NGO- Wildlands to assist in the implementation and the programme.

HOW PROJECT WORKS TO CONSERVE BIODIVERSITY AND ECOSYSTEM SERVICES, SECURE LIVELIHOODS AND INCREASE RESILIENCE THROUGH AN ECOSYSTEM BASED APPROACH

Through forest restoration, the eThekwini Municipality's holistic approach works to address biodiversity conservation, climate change mitigation and adaptation, rural development and poverty alleviation. Although the project at Buffelsdraai was initiated primarily as a "carbon sink" to offset carbon emissions associated with the hosting of the 2010 FIFA World Cup matches in Durban, it also creates important benefits for the community and biodiversity, and on broader climate adaptation aspects. For example, at the Buffelsdraai project, the restoration of forests on old sugar cane land creates a natural odour, noise and visual buffer between residents and the landfill, while further increasing the habitat for biodiversity conservation and creating a carbon sink.

BENEFITS TO BIODIVERSITY AND ECOSYSTEM SERVICES

Reforestation can be seen as building "green infrastructure," which works to increase the resilience and adaptive capacity of the ecosystems. This includes improved ecosystem functioning, with restored areas able to provide increased ecosystem goods and services, including enhanced carbon sequestration, biodiversity refuges and water quality, fire risk reduction and flood attenuation and river flow regulation.

The total number of trees planted at the Buffelsdraai Landfill Site Community Reforestation Project since project inception is 213 145, and the area reforested is 185 Ha. The area planted to date is estimated to have sequestered 1 588 tCO2e and over 20 years the 185 Ha area is estimated to sequester 16 545 tCO2e. Another 336 ha will be reforested at this site over the next 4 years. The total reforested area of 521 hectares is estimated to be able to sequester approximately 40,000 tonnes CO_2equivilant.

BENEFITS TO LIVELIHOODS AND POVERTY ALLEVIATION

Socio-economic benefits for local communities are significant. According to the Wildlands Conservation Trust who run the tree-stores, tree trading by treepreneurs between 2010 and 2011 sponsored school fees and training to the value of R57,825. In a recent socio-economic survey, 7% of treepreneur households report that their children are receiving a better education because they moved to a better school. In addition, increased food security in project households also contributes towards improved rates of school attendance, with parents becoming able to prioritise children's education over other expenses. The project was also found to have provided additional disposable income for families. Food and school fees have been identified as the main expenses in project households, and by growing trees, beneficiaries are now able to meet those basic needs and use household income to cover additional needs. The number of participants experiencing irregular food supply has gone from 80% to 47%, and 30% of project households now source their food from the tree stores.

While local treepreneurs benefit from the Buffelsdraai Landfill Site Community Reforestation Project through the trading of goods and services in return for trees, the project also employs twenty-four full-time staff, ten part time staff, and a large number (up to 60 at a time) of other staff on short-term contracts when required.

FINANCIAL ASPECTS

The reforestation projects are funded by the eThekwini Municipality. While treepreneurs are currently reliant on the project for the trading of goods in exchange for trees, the eThekwini Municipality and WCT are considering ways by which to break this dependency. Ideas include the supply of trees by *treepreneurs* to nurseries, or the establishment of an online shop for tree sales. Any and all carbon credits generated by the Buffelsdraai Landfill Site and Inanda Mountain Community Reforestation Projects are being retired or "banked" by the eThekwini Municipality to contribute towards offsetting the CO_2 emissions associated with Durban's hosting of certain 2010 FIFA Soccer World Cup matches.

LESSONS LEARNT

The reforestation projects reflect how important it is to be responsive to the needs and interests of the communities that are involved. The projects have uncovered the need for education around understanding of conservation, climate change and ecosystem services in the communities involved. It also became clear that treepreneurs have not been informed sufficiently about the reforestation

programme. This presents an opportunity for increased levels of engagement with participants, as well as the need to expand the programmes impact by enhancing environmental awareness.

Lastly, one of the considerations for the project should be the possibility of reinforcing sustainability and boosting treepreneur self-reliance. Presently, treepreneurs are reliant on the project to provide goods in exchange for trees, which creates dependency. Ideally, beneficiaries should be able to move from exchanging trees to actually selling them on the open market. The programme could find ways to develop and expand the commercial potential of supplying trees to nurseries, establishing additional nurseries, or establishing an online shop. Furthermore, Treepreneurs can be encouraged to diversify their plant growing skills to include fruit trees and vegetables, seedlings and actual produce, which they can grow either for their own use and/or to sell to various local and regional markets.

LINKS TO POLICY

While the South African National Climate Change Response Strategy does not mention forest restoration specifically, it highlights the need to address climate change impacts on biodiversity assets by, among other things, conserving, rehabilitating and restoring natural systems that improve resilience to climate change impacts or reduce impacts which this project addresses. The application of CCBS also provides the link to the international voluntary carbon market which assists in mitigation of climate change. The reforestation programme is also supported by the Durban Metropolitan Open Space System policy which guides most of the municipality's

environmental planning.

THIS CASE STUDY WAS COMPILED BASED ON

Bourne, A. 2010. Community-based climate mitigation in KZN. *Environment: Science and Policy for Sustainable Development,* 5, p. 78-79

Author unknown, date unknown. *Greening your future*. (brochure)

Author unknown, date unknown. *Sustainable Communities.* (brochure)

The Government of the republic of South Africa, 2011. *National Climate Change Response White Paper.*

With input from Errol Douwes from eThekwini Municipality (douwese@durban.gov.za)

9.6. CASE #6 REDUCING EMISSIONS THROUGH CO- MANAGEMENT IN THE MKUWAZI FOREST RESERVE, MALAWI

Location: Northern Malawi
Ecosystem: Miombo woodland and evergreen forest
Organisations involved: The project is administered by Malawi Environment Endowment Trust (MEET), with technical service provided by Leadership For Environment and Development of Chancellor College (LEAD) and the Forest Research Institute of Malawi[5] (FRIM). Community coordination groups, who report to MEET, are responsible for overseeing the activities of activity groups.

Description

Malawian forests have been lost at concerning rates over the last few decades. Current threats to the Mkuwazi Forest Reserve in northern Malawi include growing demand for wood fuel and charcoal production, business and infrastructure development, growing populations in surrounding communities and development of timber and tobacco markets. The Mkuwazi Forest Reserve is owned and managed by the Government of Malawi under the Department of Forestry (DF), who has entered into a co-management plan with communities surrounding the reserve. Through a Village Natural Resource Management Committee (VNRMC) local communities take responsibility for the maintenance and management of forest resources, and are in turn entitled to share the benefits that arise.

Carbon finance from forest conservation has been included in the co-management through a reducing emissions from deforestation and forest degradation (REDD) project, in order to create a stronger incentive for forest protection, providing income that is shared between the DF and community groups. When accredited, the DF and local communities will benefit from the income made from the sale of carbon credits. Working to maintain forest cover for carbon conservation, the co-management agreement further aims to maintain biodiversity, protect watersheds and prevent soil erosion, while at the same time ensuring increased and continued supply of forest products, providing alternative income generating activities to improve livelihoods and providing fuel efficient stoves to decrease pressure on forest resources from firewood collection. This is done through a number of project activities, which all fall into the following three categories: forest protection, sustainable natural resource use and income-generating activities. While REDD in itself can not be considered ecosystem-based adaptation (EbA), the inclusion of activities that benefit local people, together with the project's biodiversity co-benefits, makes this a good example of EbA.

HOW PROJECT INVOLVES LOCAL COMMUNITIES, INSTITUTIONS AND DECISION MAKERS

With its co-management agreement, the project involves both government departments and local communities directly, with management and technical assistance provided by Malawian organisations and institutions, more specifically the MEET and LEAD. The project activities have been developed through a participatory community process, through training and consultation with local

[5] FRIM is the research section of the Malawi Department of Forestry

stakeholders. The activities are carried out by activity groups in the community, which are in turn managed by the community coordination groups, the latter whom reports to the project coordinator, MEET.

How project works to conserve biodiversity and ecosystem services, secure livelihoods and increase resilience through an ecosystem based approach

While the overall aim of the project is to avoid deforestation and forest degradation, it further works to preserve biodiversity, maintain important watersheds and create opportunities for livelihood development based on sustainable use of forest products. The project also contributes to climate change adaptation, as the forests provide a number of ecological benefits, including climate regulation and water conservation. By conserving the forest communities can be spared of some of the negative effects of climate change, as the forest works to ensure quality drinking water by protecting the streams and rivers that flow in it from running dry.

Benefits to biodiversity and ecosystem services

By preventing deforestation the project works to preserve the habitat of forest species, thereby conserving biodiversity in the Mkuwazi forest area. Biodiversity also benefits from fire management, wildlife protection, reporting of illegal activities and environmental education programs with surrounding communities. Maintaining natural forests further works to reduce the rate of soil erosion and land degradation, protect watersheds and lower the levels of carbon dioxide entering the atmosphere.

Benefits to livelihoods and poverty alleviation

In addition to direct benefits such as reduced erosion and more secure access to water resources through the protection of watersheds, the project also creates benefits through income from carbon payments for forest conservation, ecotourism development and community enterprises based on sustainable use of non-timber forest products. For example, a beekeeping enterprise has been established, where the sale of honey works to supplement the participating communities. Project activities also include establishing woodlots and agro forestry plantings in homesteads and customary land, through which communities are able to use and sell timber.

Financial aspects

Funding from the COPMASS II/USAID project, funded through USAID, made it possible to do the initial physical study of the area, and also worked to drive the development of assessing carbon credits. The COMPASS II/USAID funding also supported the development of the technical specifications and the training of technical personnel who now monitor the project. While the COMPASS II project closed in May 2009, MEET has continued to work as the project administer. The carbon credits accreditation has been delayed, first due to technical issues and later due to the development of a similar project in the same area. With the technical issues sorted, and the issue with the project duplication resolved by the Malawi Government, the project is now due to resume shortly.

The plan is that the money made from carbon credits will be distributed between the DF and to the communities involved. While MEET will require 10% for administration, 30% of the remaining funds will go to DF and 70% to the community. Within the community the money will be split between the following sectors: bee keeping, VNRMC, patrolling and eco-tourism, monitoring and community development.

Lessons learnt

One of the greatest challenges facing REDD projects is the issue of how to control leakage, the unintended loss of carbon stocks, as project activities can lead to leakage of forest degradation in areas outside the project area. Anther important challenge is how to ensure that carbon benefits from the project's forest conservation is not lost through elements such as fire, extreme weather events, pests and disease or dissatisfaction among local communities. It has therefore been important to design project activities that minimise the change of leakage, by for example reducing the risk of fire and bringing additional livelihood benefits to local communities.

Some of the barriers that have been identified in the Mkuwazi Forest project can be used as lessons learned for future projects. Firstly, lack of expertise has been recognised in several areas, including for species selection and tree propagation, and for the development of tourist guide services. Secondly, the successful propagation and harvesting of non-timber products was also challenged by lack of necessary expertise, as well as the lack of funds for purchasing equipment to harvest and the under developed markets for non-timber forest products. Lastly, weak enforcement of forest regulations and the lack of power for communities to enforce forest use regulations highlights the need to empower communities to act against improper forest use by providing monitoring mechanisms and channels of communication with FD.

Experience from the Mkuwazi Forest project has also illustrated how, with the right capacity building, communities can implement the project activities. This was illustrated through the successful establishment of a beekeeping association, and through the community training courses that have built the capacity necessary to quantify and monitor forest carbon stocks to generate carbon credit benefits through forest conservation.

LINKS TO POLICY

In the Malawi's National Adaptation Program of Action (NAPA), developed in 2006, deforestation is recognised as one of the environmental issues. Still, in the prioritised adaptation options identified, focus is on afforestation and re-forestation rather than on forest conservation.

THIS CASE STUDY WAS COMPILED BASED ON

Malawi Environmental Endowment Trust (MEET), 2009. Forest Conservation in Nyika National Park and Mkuwazi Forest Reserve, Malawi. *Plan Vivo Project Design Document.* Blantyre, Malawi. Accessed at http://www.planvivo.org/wp-content/uploads/2009.05.15_MEET_Malawi_PDD_PlanVivo1.pdf (21.09.2011)

Ministry of Mines, Natural Resources and Environment, 2006. *Malawi's National Adaptation Programmes of Action (NAPA)*

http://www.meet.org.mw/

With input from Patson Nthala from the Malawi Environment Endowment Trust (patson@naturetrust.mw)

9.7. CASE # 7 SUBTROPICAL THICKET RESTORATION IN PROTECTED AREAS IN THE EASTERN CAPE, SOUTH AFRICA

Location: Baviaanskloof, Addo National Park and Great Fish River Reserve, Eastern Cape, and Groenefontein, Western Cape, South Africa
Ecosystem: Spekboomveld
Organisations involved: Over the past seven years, the Working for Land programme, of the Natural Resources Management programs of the Department of Environmental Affairs, implemented by the Gamtoos Irrigation Board, has been investigating spekboom with a view to using carbon credits to pay for its restoration. R3G provides the scientific and technical advice, and to date, SANParks and ECPTA and CapeNature are recipients.By demonstrating the feasibility – financially, logistically and ecologically -of restoration using spekboom, the program aims to catalyse widescale restoration across the one million ha of degraded veld which will improve rural economies.

DESCRIPTION

Studies have shown that healthy thicket has remarkably high carbon storage for a semi-arid system, but that carbon is lost with veld degradation. Degraded thicket is not able to recover without intervention. The subtropical thicket has largely been transformed by overgrazing, mainly by Angora goats, and the focus of the thicket restoration program is thus on the restoration of the subtropical thicket, by planting cuttings of the spekboom plant. The program also aims to create large-scale employment for previously unemployed workers ecosystem based work opportunities. The project aims to determine the potential for carbon credits to fund the restoration of degraded farmland via the Voluntary Carbon Market (VCM), while at the same time improving the productivity of their veld. Ultimately, the project aims to catalyse widespread restoration on private land across the one million hectares of degraded veld, thereby improving rural economies.

The STRP is an opportunity to build and expand South Africa's green economy, building social and ecological resilience through thicket restoration and job creation, and holds the potential for long term sustainable funding through carbon credits.

HOW PROJECT INVOLVES LOCAL COMMUNITIES, INSTITUTIONS AND DECISION MAKERS

The project is based on a partnership among farmers, communities, government, ecologists, soil scientists, botanists, ecologists and economists. It contributes to the South African government's Expanded Public Works Program, which aims to alleviate poverty through the provision of work opportunities together with skills training.

How project works to conserve biodiversity and ecosystem services, secure livelihoods and increase resilience through an ecosystem based approach

BENEFITS TO BIODIVERSITY AND ECOSYSTEM SERVICES

Spekboom-rich thicket is a vegetation type unique to the southwestern part of the Eastern Cape in South Africa, and the ecosystem provides a number of ecosystem services whose total value is immense. While sustaining the world's largest mohair crop, it also has a large number of animals and plants with cultural value, it supports the growing industry of nature-based tourism, provides water

and regulates soil erosion and water quality. By ensuring that water infiltrates soils and aquifers, replenishing ground water, healthy thicket thus works to create water security. The Spekboom rich thicket also holds a number of plant varieties that are being grown as ornamentals around the world, and therefore holds potential for horticultural development.

BENEFITS TO LIVELIHOODS AND POVERTY ALLEVIATION

While healthy Spekboom-rich thicket is important for conserving a unique vegetation type, it is also an important ecosystem for the local communities. With the loss off thicket vegetation and subsequent erosion, plant productivity is lowered as soils become depleted, and livestock yields and availability of firewood, wild fruits and medicinal plants decrease, threatening local livelihoods.

Large-scale restoration has the potential to revive the rural economy in the Eastern Cape, and contribute to the three pillars of sustainability: environment, society and economy. The socio-economic benefits include thousands of jobs in the restoration industry, increase in opportunities for ecotourism, generation of income streams from carbon sequestration, business skills and restoration training of rural poor, as well as the revival of natural capital and ecosystem services mentioned above. Healthy thicket also builds ecosystem resilience, thus improving local communities' ability to adapt to climate change impacts.

FINANCIAL ASPECTS

The carbon credits earned through restoration of the Spekboom-rich thicket are aimed at the voluntary carbon market (VCM), where buyers emphasise the sustainability of projects, and the Community, Climate and Biodiversity Standard (CCBS), which ensures benefits for rural communities and emphasises biodiversity in addition to carbon stored. To this point, restoration, which has only taken place on public land, more specifically Baviaanskloof, Addo National Park and Great Fish River Reserve, has been funded through the Expanded Public Works Program.

LESSONS LEARNT

Even before STRP was formally established, there has substantial research into the thicket's rate of carbon sequestration, highlighting how entering the carbon market with carbon sequestration projects requires extensive research also requiring considerable finance. The process before the actual carbon credits can be validated and verified is also long. The origin of the STRP therefore dates back to 1999, with the actual project only being launched in 2004, and with the sale of carbon credits still awaiting.

LINKS TO POLICY

The South African National Climate Change Response White Paper (2011:20) states that "opportunities to conserve biodiversity and extend the conservation estate through the development of carbon off-set programmes will be actively developed, such as those presented by the preservation of Spekboom as part of the Eastern Cape Thicket Biome."

THIS CASE STUDY WAS COMPILED BASED ON:

The following documents were all accessed on the project website: http://www.r3g.co.za/

Mills, A.J., Blignaut, J.N., Cowling, R.M., Knipe, A., Marais, C., Marais, S., Pierce, S.M., Powell, M.J., Sigwela, A.M. and Skowno, A. 2010. *Investing in sustainability. Restoring degraded thicket, creating jobs, capturing carbon and earning green credit*. Published by Climate Action Partnership, Cape Town, and Wilderness Foundation, Port Elizabeth.

Mills, A. J., Cowling, R. M., Mike Powell, M. and Sigwela, A. Restoration of degraded thicket in the Eastern Cape: capturing carbon, enhancing biodiversity and providing employment. (brochure)

Pierce S.M. History of the Subtropical Thicket Restoration Project. www.R3G.co.za

The Government of the republic of South Africa, 2011. *National Climate Change Response White Paper*.

With input from Shirley Cowling from R3G (scowling@kingsley.co.za)

9.8. CASE #8 MOUNTAIN GORILLAS, ECOSYSTEM SERVICES AND LOCAL LIVELIHOODS IN RWANDA, UGANDA AND DRC

Location: Rwanda, Uganda and the Democratic Republic of Congo (DRC)
Ecosystem: Montane cloud forest
Organisations involved: The African Wildlife Foundation worked in close collaboration with EcoAdapt, a US-based NGO providing expertise in adaptation project facilitation and design and the International Gorilla Conservation Program (IGCP). IGCP is the implementing mountain gorilla conservation program supported by AWF, Fauna and Flora International, and the World Wide Fund for Nature. University of California-Davis provided species distribution-modelling support.

DESCRIPTION

Through its relatively new climate change adaptation program AWF has started focusing on vulnerability assessments and ecosystem-based adaptation (EbA). This led to the development of a mountain gorilla climate change vulnerability assessment in the Virunga landscape, the mountain gorilla habitat in Uganda, Rwanda and eastern DRC. The major focus was to assess climate change impacts on gorillas, considering a range of climate change scenarios and socio-economic issues related to livelihoods of local communities.

After the preparation of the vulnerability assessment, "The implications of Global Climate Change for Mountain Gorilla Conservation in the Albertine Rift," the next step is now for stakeholders to implement the top priority actions identified in the report. In order to do so, the assessment outlines a series of steps that need to be taken, including the development of a regional, multi-stakeholder Climate Change Committee or working group that can take the next phase of climate change adaptation forward and coordinate actions and future research.

The adaptation actions identified in the vulnerability assessment address a broad range of aspects that work to conserve biodiversity and ecosystem services, and improve local livelihoods. They form community based natural resource management strategies, which, being grounded in climate projections and impact assessments, can be considered ecosystem-based adaptations (EbA).

HOW PROJECT INVOLVES LOCAL COMMUNITIES, INSTITUTIONS AND DECISION MAKERS

The IGCP recognises that stakeholder engagement is critical to the development of adaptation plans and processes. The development of the vulnerability assessment was therefore a process that worked to include all parties in the region, including those involved in development, climate science, conservation and mountain gorilla science. The team undertook stakeholder engagement with an initial stakeholder meeting, followed by two large stakeholder workshops. The initial meeting included scientists, members of the Transboundary Core Secretariat (TCS) and park directors from all three countries, and, among other things, sought to obtain buy-in from the key officials and to identify additional stakeholders. The workshops were attended by representatives from natural resource agencies, NGOs, foundations, institutions, park authorities, local government and universities.

How project works to conserve biodiversity and ecosystem services, secure livelihoods and increase resilience through an ecosystem based approach

Climate change has the potential to influence the composition, distribution and size of forests, both directly through impacts on tree survival and reproduction and indirectly through changes in the way nearby human populations use the land and extract resources. During the stakeholder engagement workshops it became clear that climate change's greatest threats to mountain gorillas lies in amplifying or increasing the risk of existing stressors. The vulnerability assessment further uncovered the interrelated nature of resilient forest ecosystems, livelihood security and the vulnerability of mountain gorillas, as illustrated in the recommended gorilla adaptation actions outlined below.

Benefits to biodiversity and ecosystem services

The mountain gorilla depends on healthy and vibrant ecosystems for its survival and well-being, and in order to adapt to climate change. The adaptation actions recommended by the vulnerability assessment thus include actions that also work to conserve biodiversity and ecosystem services. This includes: limiting human encroachment on the forest ecosystems, reducing poaching for bush meat by strengthening law enforcement and by reducing the demand for bushmeat by providing alternatives; reducing wood extraction by local communities through the promotion of energy saving stoves; and by improving fire management. Recognizing that the two gorilla populations could be devastated by climate-propelled disease introduction, the team proposed disease modelling to generate scenarios to help forecast threats and develop plans to contain diseases under a range of climatic and socio-economic scenarios.

Benefits to livelihoods and poverty alleviation

The mountain gorilla lives in fertile forests with rich biodiversity, and the area has therefore also attracted dense human settlement. The stakeholder engagement workshops concluded that human communities near the park pose one of the greatest sources of threats to mountain gorillas. It is therefore crucial that the human populations in the area are capable of adapting to climate change without exerting increased pressure on forest resources. Accordingly, one of the main conclusions of the vulnerability assessment was that most larger-scale adaptation actions for mountain gorillas will depend on considerable efforts to help local communities adapt. Recommended adaptation actions aim to improve the livelihoods of local communities or lessen human-gorilla conflict include: limiting human encroachment on the forest ecosystems through the support of initiatives and programs that provide alternative sources of income; reduce crop raiding by gorillas through the construction of physical barriers and crop protection groups; microfinance support to agriculture and off-farm activities; and establishing irrigation systems, watershed management and erosion control.

Financial aspects

The major funding source for the vulnerability assessment was the MacArthur Foundation. The IGCP is now seeking adaptation program implementation funds from adaptation earmarks as well as other earmarks, given that many of the implementation activities also fall under other focuses such as community based natural resource management, agriculture and enterprise.

Lessons learnt

The development of the mountain gorilla vulnerability assessment has created several lessons learned.

Firstly, the lack of knowledge and information, including understanding of the seasonality of rainfall peaks and of flowering and fruiting phenologies, makes decision making difficult, highlighting the

need for immediate focus on research, surveys and monitoring. Many adaptation action ideas can simply not be prioritized or even formulated without more information. Accordingly, establishing systems that can return newly acquired information, quickly and efficiently, to those making decisions on climate change adaptation, is an important next step.

Secondly, there is a strong link between secure livelihoods and mountain gorilla vulnerability, and therefore a need for a holistic focus, rather than one that considers the conservation of mountain gorillas single handedly. Adaptation planning should span across all sectors, including economic, health and conservation sectors.

Thirdly, stakeholder workshops are important as they can help vet vulnerability assessments findings, improve stakeholder buy-in, build adaptive capacity across sectors, and further work to put climate change firmly on the agenda for many organizations and stakeholders.

Lastly, as AWF and IGCP are smaller non-governmental organisations with less internal adaptation capacity and experience, collaboration with external partners, more specifically EcoAdapt and the University of California, while expensive, was valuable. It helped to build the internal capacity to subsequently apply adapted versions of this methodology in other AWF landscapes.

LINKS TO POLICY

Being part of the Transboundary Core Secretariat (TCS), a trilateral governmental body, the mountain gorilla conservation community is in a unique position. Accordingly, the vulnerability assessment, through its stakeholder engagement process, could highlight the need for several possible steps that work towards influencing and shaping policy. Firstly, it highlights the need for each government partner to work within National Adaptation Planning processes, ensuring that the protection of natural resources, such as mountain gorilla habitat, is integrated properly. This would further make it possible to secure international adaptation funding for the protection of mountain gorillas. Secondly, proposals were made suggesting that TCS becomes involved in reviewing existing tourism and environment policy and legislation, in order to see how climate change is integrated in the ongoing policy.

National Adaptation programs of Action (NAPAs) have been developed in Rwanda (2006) and Uganda (2007). Uganda's NAPA recognises that the mountain gorilla is under threat from climate change, further highlighting how wildlife-based tourism is an important source of foreign exchange. Rwanda's NAPA does not mention the mountain gorillas, but includes promotion of non-agricultural income generating activities and development of firewood alternative sources for energy as two of six high priority adaptation options, both of which are also recommended in the Mountain Gorilla Vulnerability assessment.

THIS CASE STUDY WAS COMPILED BASED ON:

African Wildlife Foundation, the International Gorilla Conservation Programme and EcoAdapt, year unknown. *The Implications of Global Climate Change for Mountain Gorilla Conservation in the Albertine Rift.*

Ministry of Lands, Environment, Forestry, Water and Mines, 2006. National Adaptation Programmes of Action to Climate Change: NAPA-Rwanda.

Author unknown, 2007. Climate Change: Uganda National Adaptation Programmes of Action.

With input from David Williams from the African Wildlife Foundation (dwilliams@awf.org)

9.9. CASE #9 COLLABORATIVE ACTION FOR ADAPTING TO CLIMATE CHANGE IN MADAGASCAR

Location: Madagascar
Ecosystem: Marine and terrestrial (forests, mangroves and coral reefs)
Organisations involved: The project was led by Conservation International (CI), with World Wildlife Fund (WWF) and the Wildlife Conservation Society (WCS) taking responsibility for some components of the marine ecosystems work.

DESCRIPTION

The aim of the project was to follow up on the recommendations that came out of a climate change vulnerability assessment workshop in 2008. The workshop, which was hosted by the Madagascar Ministry of Environment, Water, Forests and Tourism, focused on assessing the impacts of climate change on Madagascar's biodiversity and livelihoods. The Government of Madagascar, CI, WWF and United States Agency for International Development (USAID) jointly convened the three-day workshop, with support from the MacArthur Foundation. It brought together more than 130 people from international and regional organisations, including climate, ecology and livelihood experts, conservation practitioners and policy makers, who jointly worked to address the challenges posed by climate change.

Targeting the recommendations produced by the 2008 workshops the project focused on three main activities, namely: terrestrial activities, developing an action plan to achieve forest connectivity in priority areas; marine activities, addressing knowledge gaps critical to building coral reef and mangrove resilience; and policy support, mainstreaming climate change into policy decisions related to natural resource management.

Following workshop recommendations to study the feasibility of large scale forest restoration activities, the project documented and assessed forest restoration efforts in the country to date. To consider human climate change adaptation needs in forest management efforts, the project also reviewed sustainable livelihoods activities that have been used together with forest restoration activities in Madagascar. The project tested forest restoration and sustainable livelihood activities, and developed practical guides in Malagasy to help project developers choose and deliver appropriate restoration techniques and livelihood projects. The information collected and the experiences gained from the test activities were compiled into a document on the lessons learned from past and current restoration efforts, which was presented during a workshop with the Ministry of Forestry and partners.

Following the 2008 workshop recommendations on the vulnerability of marine ecosystems, the project worked to improve knowledge of coral reef resiliency around Madagascar and to understand the vulnerability of mangroves. CI also organized an assessment of the vulnerability of marine ecosystems along the northeast coast, an area for which almost no information on marine biodiversity was previously available. Findings from these research activities were presented to a government convened task force on marine and coastal zone management. The results of the research and outcomes of the workshop were compiled into policy briefs for government and other partners.

How the project involves local communities, institutions and decision makers

The project involved interaction with stakeholders at all levels in Madagascar, from government institutions and policy makers through workshops and presentation, to field visits, surveys and livelihood activities that engaged communities at the grass root level.

The project was based on cooperation between CI Madagascar and several other partners, including WWF and WCS for the marine component. For the project US-based adaptation staff worked together with CI Madagascar staff, allowing for knowledge exchange and mainstreaming.

How the project works to conserve biodiversity and ecosystem services, secure livelihoods and increase resilience through an ecosystem based approach

An important aspect of the project is that it considered the threats posed by climate change to both livelihoods and biodiversity. Accordingly, it worked to generate resilience and climate change adaptations for both ecosystems and human livelihoods. The project further recognises the links between biodiversity, human-well being and access to natural resources.

Benefits to biodiversity and ecosystem services

In order to meet the project goal in relation to terrestrial ecosystems, the project conducted a feasibility study on restoring fragmented forests, analyses based on species' niche modelling to identify potentially important habitat areas under climate change scenarios and a study to assess the current condition of riverine forest corridors. The project thereby worked to recognise priority areas for building habitat connectivity, areas where protection and restoration is important for creating connectivity between existing protected areas. By creating habitat connectivity it will be possible accommodate species responses to climate change. Restoration and conservation of native forests can also work to address flooding and sedimentation problems, thereby preventing crop damage and improving water quality. The project further surveyed different reforestation projects taking place in Madagascar, and actively tested approaches to restoring forests. All the results from the work on forest restoration was presented to the Ministry of Environment and Forests and staff from relevant organisations, with subsequent discussions addressing how the information could be used to advance forest restoration in Madagascar at a large scale.

For its marine component, the project developed a vulnerability index to inform conservation planning, conducted a resilience survey of the coral reefs in Northern Madagascar and a vulnerability assessment of mangroves in western Madagascar. Through this work, the project developed a detailed map of coral reef variability to improve conservation planning for marine protected areas around Madagascar. The mangrove assessment found that fifty percent of the mangrove investigated is highly vulnerable to climate change, thereby highlighting the need for further focus on mangrove vulnerability.

Benefits to livelihoods and poverty alleviation

When assessing the vulnerability of mangrove systems the project recognised the strong relationship between mangroves and the human communities that use the ecosystem goods and services. The study therefore also included social vulnerability. The vulnerability assessment showed that the communities with the highest vulnerability are those that live close to the mangrove systems and use their services, as these communities have high levels of poverty, making them less able to adapt. The assessment thereby identified vulnerable groups and the need for focus on strengthening the resilience of these communities.

The project also surveyed different approaches that have been used to provide alternatives to slash-and-burn agriculture in Madagascar, identifying the approaches that reduced pressure on forests while at the same time providing secure livelihoods for farmers. The project also tested Sustainable Livelihood Activities (SLA) aimed at reducing the pressure on forests, by improving food production on degraded land, intensifying agricultural production to reduce the land that is required and at diversifying production and livelihoods. An evaluation of the SLA found that food production became significantly higher, and that the SLAs are popular with the farmers participating. Lastly, the project looked at the impact of future climate change on crop production in Madagascar, and by identifying the areas and crops most at risk it worked to highlight the need to identify groups that will be affected, so that they can be prioritised for adaptation.

FINANCIAL ASPECTS

The climate change adaptation project, as well as the initial vulnerability assessment, has been funded by the John D. and Catherine T. MacArthur Foundation.

LESSONS LEARNT

A critical aspect recognised in the island-wide vulnerability assessment was the recognition that it is necessary to establish a comprehensive climate monitoring network, as this is currently lacking, and to focus on how monitoring systems can be maintained in remote areas. Further more, it highlighted that the monitoring data should be shared freely and immediately.

From the vulnerability assessment project it was also recognised that there needs to be more direct emphasis on understanding human adaptation. The understanding of human adaptation should then feed into conservation and development planning in the context of enhanced environmental management. This illustrates the need for an integrated approach to securing human livelihoods and to conserving biodiversity and ecosystem services.

The project further found that forest restoration projects need to incorporate planning for invasive control after planting, as invasive plants create a major challenge that constrains the ability to restore forest. It was also found that forest restoration projects should be conducted with participation of local communities, while taking the local socio-economic context and land tenure situation into account. Other important aspects that came up through the adaptation project include that successful projects tend to have invested in providing support for skills training, provision equipment and access to finance, and that most organisations rely on donor funds for implementation of forest restoration. The latter means that projects should make sure that community associations, through which most projects are implemented, are well run and have the necessary administrative skills to deal with the complex reporting and legal requirements linked to donor funding.

Lastly, political turmoil and a coup d'état created some challenges for the project, making it more difficult to advance on the project objectives related to influencing government policy. While CI and project partners, WWF and WCS were able to present its work to relevant government officials, and policy briefings have been compiled and distributed to relevant stakeholders, the transitional government is not mandated to develop long-term policy, nor is the country eligible for donor funding. This thus highlights the political challenges that may arise in a project such as this, but further illustrates that projects can achieve some of its goals despite such challenges.

LINKS TO POLICY

The three-day stakeholder workshop, which was the forerunner to the adaptation project, was attended by policy makers, scientists and practitioners, who together made a number of policy

recommendations. These include establishing an Inter-Ministerial Task Force on Climate Change, developing a rural development policy for the areas most vulnerable to climate change, taking advantage of financing mechanisms under the Kyoto Protocol, exploring possibilities for payment for ecosystem services, developing a national strategy for Reduction in Emission from Deforestation and Degradation-plus (REDD+) and re-examining and include recommendations from the workshop into Madagascar's Programmes d'Action Nationaux d'Adaptation (the National Adaptation Program of Action).

While an inter-ministerial climate change platform was established after the 2008 workshop, this was later disbanded due to the political problems. A lot of progress has on the other hand been made on preparing a national strategy for REDD+. The CI project team has worked closely with the team responsible for climate change policy in the Ministry of Environment and Forests, providing inputs for the National Adaptation Plan of Action (NAPA) and Madagascar's National Communication.

CI presented the project's work on forest restoration to the Ministry of Environment and Forests, and compiled a document with recommendations and lessons learned for action on forest restoration. As a result, the Ministry included forest restoration activities in a new World Bank project.

Project partners and marine-oriented NGOs successfully convinced the government that there was a need for a platform where marine and coastal management issues could be discussed, and in late 2009 the commission for Integrated Coastal Zone management (Commission GIZC) was established. A two day meeting lead by the Commission GIZC gave the project partners opportunity to present their marine related work, which produced a number of recommendations, including recommendations to improve Madagascar's marine related climate change policy documents. The main recommendations were later synthesised into marine policy briefing papers that were distributed to decision makers and donor institutions.

THIS CASE STUDY WAS COMPILED BASED ON:

Conservation International and World Wildlife Fund, year unknown. *Assessing the impacts of climate change on Madagascar's biodiversity and livelihoods*. Workshop report prepared on behalf of workshop organisers and participants, for submission to the John D. and Catherine T. MacArthur Foundation

Conservation International, 2011. *Climate Change Adaptation for Conservation in Madagascar*. Report prepared for the John D. and Catherine T. MacArthur Foundation.

With input from James Mackinnon from Conservation International (j.mackinnon@conservation.org)

9.10. CASE #10 CONSERVATION OF COASTAL ECO-SYSTEMS IN TANZANIA

Location: The Bagamoyo-Pangani and Menai Bay Seascapes in Tanzania
Ecosystem: Coastal forests (mangroves)
Organisations involved: The Coastal Resources Centre of the University of Rhode Island works as the primary USAID implementing partner for the Pwani project. Locally the project is implemented through the Tanzania Coastal Management Partnership (TCMP), in cooperation with local supporting partners, including the local scientific community, the private sector and district, regional and national government counterparts such as the National Environment Management Council.

DESCRIPTION

The aim of the Pwani project is to reverse the trend of environmental destruction of critical coastal habitats, while at the same time sustaining the flow of environmental goods and services and improving the livelihoods of residents in the Bagamoyo-Pangani and Menai Bay Seascapes. The project outcomes are targeted at three main areas: sound natural resource management (nature); strengthened resilience and assets (wealth); and improved governance (power).

Some of the challenges faced in the project area, including overfishing, cutting of mangrove forests and deteriorating water quality due to industrial and agricultural waste, lead to the deterioration of resources that coastal communities and businesses rely on. In order to reduce these challenges, the project assists in creating enabling conditions for coastal governance, supports local participation in natural resource management and works to address socio-economic and other cross cutting issues such as HIV/AIDS, community energy needs and gender equality.

With the broad approach of the Pwani project, the project activities are strategically selected on key leverage points. Accordingly, the project also works at various levels, including at the local and national government level and the local community level.

HOW PROJECT INVOLVES LOCAL COMMUNITIES, INSTITUTIONS AND DECISION MAKERS

The Pwani project works with stakeholders at the grass root level to develop local integrated policies and plans—as well as climate change early actions, livelihoods, and health initiatives. Stakeholder involvement includes the involvement of village governments in the drafting of mariculture maps, village participation in the assessment and profiling of estuaries and creeks, village meetings on health issues and through teacher training workshops. At the same time, the project works with district and national level stakeholders, by for example conducting fieldwork together with district extension officers, involving district councils in the collection and reporting of human/elephant conflict data, and by providing technical assistance to the National Environmental Management Council.

HOW PROJECT WORKS TO CONSERVE BIODIVERSITY AND ECOSYSTEM SERVICES, SECURE LIVELIHOODS AND INCREASE RESILIENCE THROUGH AN ECOSYSTEM BASED APPROACH

The Bagamoyo-Pangani and Menai Bay Seascapes are biodiversity-rich areas, with estuaries, mangrove forests, beaches, sea grass beds, coral reefs, coastal forests and endangered wildlife species of national and international significance. At the same time, these coastal ecosystems provide

income, food and trade opportunities for local communities. Healthy ecosystems are therefore important for both local biodiversity and for the livelihoods of people in the area.

BENEFITS TO BIODIVERSITY AND ECOSYSTEM SERVICES

The Pwani project works to address issues around over-use and misuse in the marine ecosystem, as well as the protection of terrestrial resources linked to coastal and estuarine ecosystems. Accordingly, there is focus on the protection of fish stocks, coral reefs, intertidal resources and sea turtles, as well as threats related to tourism, energy production and agro-industries. The project addresses conservation and development in the northern Tanzania seascape through various activities, including: assessments of creeks and estuaries, identification of critical ecosystems; development of Special Area Management Plans; training in environmental and coastal resource conservation; mariculture zoning for permit purposes; elephant monitoring to develop species distribution maps; improving energy technology to reduce deforestation; monitoring and scale-up of community led no-take zones for biodiversity conservation and livelihood strengthening; improving the sustainability of Dolphin Tourism through discussions with the Menai Bay Conservation Area authority and through fisherman focus group discussions; and protection of sea turtles through monitoring and engagement with locals on issues around turtle slaughter and nest poaching.

After one year (end of 2010) the work done through the Pwani project had: led to the improved management of 56 414 hectares of biologically significant areas; strengthened 18 local organisations ability to manage endangered ecosystems; reached 1 719 people through community outreach and planning that promotes biodiversity; and trained 602 individuals in coastal governance and MPA management.

BENEFITS TO LIVELIHOODS AND POVERTY ALLEVIATION

The project works to create wealthier and more empowered communities by considering climate change adaptation, economic growth and HIV/AIDS. As such, the project sees wealthier communities as more than improved community income. Accordingly, the Pwani project works to improve the livelihoods of people in the project area in various ways, including through: visits and events that facilitate community learning around climate change issues; planting of fruit trees to improve incomes and provide flood protection; engaging in the development of village climate change vulnerability assessments in Zanzibar; supporting improvement in the eco-tourism sector; developing a strategic plan to improve access to microcredit for vulnerable groups; establishing a Fishing Cooperative Association; facilitating set up of community-led savings and credit cooperatives (SACCOs); supporting jewellery entrepreneurship; facilitating fishermen HIV/AIDS training workshops; conducting condom outlet survey and marketing research; and focusing on gender awareness in workshops and training.

For livelihoods and poverty alleviation the Pwani project had at the end of 2010: increased the economic benefits derived from sustainable NRM for 301 individuals; improved 104 households' access to finance; reached 66 244 people through community outreach promoting HIV/AIDS prevention; strengthened 18 local organisations ability to support sustainable livelihoods; reached 1 719 people through community outreach and planning that promotes improved gender equity; and trained 602 individuals in HIV/AIDS action planning.

FINANCIAL ASPECTS

The Pwani project is funded by USAID.

LESSONS LEARNT

Lessons learned at this point in the Pwani project include a number of aspects. One overall finding is that local processes and policy development is important, but not enough for some issues. Large-scale issues such as spatial planning related to industrial development of national significance (e.g. oil and gas exploration and development of sugar plantations for ethanol), wildlife management, climate change requires coordination and collaboration with stakeholders at district, regional, and national level. In relation to work done with HIV/AIDS, it has been found that when working to support HIV-affected households it is hard to avoid increased dependency. Furthermore, project work has shown that it takes time to create an understanding of the linkages between environmental resources and HIV/AIDS. It has also been found that participation in project activities sometimes create expectations of support for other community development. Other challenges that have come up through the first year of the project include accessibility to remote villages, lack of capacity to manage GIS systems at the government's district level and the fact that literacy level among fishermen is very low, requiring alternative training and workshop methods.

To succeed in implementing development and conservation work in coastal communities, one has to be serious about community involvement. This includes communicating with the communities about what the project has to offer, the roles and responsibilities of the community vs. the project, including the roles of the community in implementation, cost-share, and monitoring of progress. Monitoring can be a great aspect of community involvement as it enables both the community and project staff to assess outcomes and impacts and identify adaptations to the implementation design. Participatory monitoring can also be a tool for sharing project successes and failures with leaders and community members.

LINKS TO POLICY

The project is also supported by the development of a NAPA in Tanzania. The project has also been working together with the government of Tanzania through various policy engagements. This includes contributing to the national process of developing an Artisanal Fisheries Development Plan under the fisheries division, contributing to the national process of developing a Regional Protocol on Integrated Coastal Zone Management (ICZM), leading the Tanzanian delegation to the Eastern African Regional ICZM working group and supporting the National Environmental Management Council with the review of the National Integrated Coastal Environment Strategy. The Pwani project can therefore be seen as engaging directly with stakeholders in government to influence and build capacity in the sphere of coastal policy making.

THIS CASE STUDY WAS COMPILED BASED ON

Author unkown, 2010. Year Two Work Plan for the Pwani Project.

Torell, E. and Jeremiah, D. 2011. *Quarterly Report for the Pwani Project*. Prepared for review by the United States Agency for International Development (USAID)

With input from Eline Torell from the Coastal Resources Centre (elin@crc.uri.edu)

9.11.

9.12. CASE #11 SOUTH AFRICA'S ENVIRONMENTAL EXPANDED PUBLIC WORKS PROGRAMMES GROW THE GREEN ECONOMY

Location: South Africa (national)
Ecosystem: All
Organisations involved: All the environmental public works programs form part of the government's Expanded Public Works Program. The different programs are associated with a number of government departments, including the Department of Water Affairs (DWA), the Department of Environmental Affairs (DEA), the Department of Agriculture, Forestry and Fisheries (DAFF), the Department of Energy (DE), the Department of Tourism (DT), the Department of Trade and Industry (DTI) and the Department of Public Works (DPW). The different programs and their respective projects also work with numerous organisations, municipalities and stakeholders across the country.

DESCRIPTION

The Working for Water Program was South Africa's first government-led public employment program focusing specifically on environmental rehabilitation. The Program aims to improve water supplies through better catchment management, focusing on removal of invasive alien species, and on conserving biodiversity and improving the productivity potential of land. Since the initiation of Working for Water, several other environmental public employment programs have been developed, including Working for Wetlands, Working for Land, Working on Fire and Working for Energy.

All the different programs are based on the same model, which works to maintain, rehabilitate or restore ecosystems and natural landscapes, while at the same time creating benefits for the most marginalised communities. The programs thus work to address two political priorities, job creation and water scarcity, while at the same time expanding South Africa's green economy. The programs also have a specific focus on employment for women, youth and people with disabilities. By maintaining and restoring different ecosystems, the different "Working for" projects further work to support human adaptation to climate change, and are thus important examples of ecosystem based adaptation (EbA). Climate change is expected to worsen the problems related to food security, biodiversity loss and water stress through the spread of invasive alien plants, loss of habitat, land degradation and increased fire hazards. By addressing these issues, while simultaneously creating work-opportunities, the "Working for" programs play a crucial role in reducing South Africa's environmental and social vulnerability to climate change.

While all address the same broader issues, their specific focus is slightly different: Working for Wetlands facilitates the conservation, restoration or rehabilitation and sustainable use of wetlands[6]; Working for Land creates livelihood opportunities for rural communities through restoration of degraded landscapes; Working on Fire works with integrated veld and forest fire management, in

[6] Note that Working for Water will not be outlined in any further detail here, as it is also presented as a separate case study

order to enhance the sustainability and protection of ecosystem services, natural processes, life and livelihoods; and Working for Energy aims to transform energy provision in rural South Africa.

An example of one of the projects associated with the "Working for" programs, is the Eco-coffin project. The project aims to reduce the cost of funerals that are often crippling for the poor, while at the same time creating employment opportunities and facilitating the control of invasive alien plants. Having recognised how funeral costs tend to worsen the grip of poverty, the project found that providing coffins at cost price could work to ease the financial burden of the bereaved. The Working for Water program, which works to clear invasive alien plants across South Africa, yielding large amounts of biomass, provided the opportunity for a multi-benefit project. The project is labour-intensive at all stages, from the clearing of invasive aliens to the coffin manufacturing, and provides opportunities for long-term employment. The project therefore provides environmental benefits, through alien clearing, as well as socio-economic benefits through training and employment of the previously unemployed, and through the provision of inexpensive coffins. The project further funds the growing of indigenous trees, assisting the rehabilitation of cleared areas. Through cooperation with faith-based organisations, tree planting has also become part of the grieving process, with trees planted in remembrance of those who have passed away.

How project involves local communities, institutions and decision makers

The programs create working partnerships involving multiple local stakeholders at the different project sites.

How project works to conserve biodiversity, secure livelihoods and increase resilience through an ecosystem based approach

Benefits to biodiversity and ecosystem services

It has been estimated that invasive alien plants have infested 20% of South African land surface area, further spreading at a rate of 3% a year. Invasive alien plants threaten biodiversity and natural catchment water yields, and they increase fuel loads, thus causing more intense and destructive fires. While three of South Africa's biomes, Grasslands, Fynbos and Savanna, depend on fire to maintain biodiversity patterns and ecological processes, factors such as human activity and alien invasive plants have severely disrupted their natural fire cycles. Increase in the intensity and frequency of fires has a damaging affect on natural habitats and can damage important ecosystem functions. Climate change is predicted to further increase these destructive trends.

Working for Water and Working on Fire are addressing these challenges, the former through clearing of invasive alien plants and the latter through training and equipping personnel to work together with existing fire-fighting services. Through its different projects Working for Water has cleared over 2 million hectares of invasive species, thereby increasing runoff by 48-56 million m^3 every year, and thus increasing country-wide water security. Working on Fire has established 64 fire-fighting bases and employs 1 753 fire-fighters, enhancing the national capacity to manage fires, and thus the potential for natural vegetation to maintain biodiversity patterns and ecological processes.

By addressing bush encroachment and by restoring degraded wood- and grassland, the Working for Land program further contributes to the restoration of natural ecosystems and the many ecosystem services they provide. Working for Land thereby works to restore important ecosystem provisioning, such as food and natural products, and ecosystem regulations, such as carbon sequestration. The program also works to improve natural species diversity and restore landscape stability and resilience.

Working for Energy provides somewhat more indirect benefits to biodiversity and ecosystem services, through its focus on renewable energy. By providing renewable energy, the program works to reduce reliance of fossil fuels, whose extraction and usage have numerous impacts on biodiversity and ecosystems. The program's focus on deriving charcoal from invasive alien plants and bush encroachment also works to remove biomass which, if left to dry in the cleared areas, can exacerbate the risks and negative impacts of fire, soil erosion and floods.

BENEFITS TO LIVELIHOODS AND POVERTY ALLEVIATION

All the "Working for" programs have a special focus on using labour-intensive processes that create jobs, employing the previously unemployed from marginalised communities, particularly women, youth and people with disabilities. The different programs also focus on poverty alleviation and socio-economic development, and emphasise elements of skills development and on building self-esteem. Working for Water is for example involved in HIV/AIDS education, reintegration of rehabilitated drug offenders and provision of childcare facilities, while Working on Fire puts a lot on emphasis on economic empowerment, skills development and social equity. Accordingly, Working for Energy has a special focus on developing and installing biomass ceiling materials for installation as energy efficiency improvements for poor and rural households. Working for Land aims to address rural poverty by promoting the development of a market for ecosystem services, enhancing the sustainability of livelihoods and the productive potential of land, and by promoting economic empowerment in rural areas.

Finance

The different "Working for" programs are all part of the environmental cluster of the Expanded Public Works Program, directed through the national Department of Environmental Affairs, and so receive their core funding through a three-year rolling allocation from National Treasury. The different programs also receive various other funding: Working for Water receives funding from the private sector, water boards, municipalities and international donors; and Working on Fire receives funding from the commercial forestry sector. Projects under the different programs sometimes also receive other funding, as is the case with the Eco-coffin project, which received funding for a two-year pilot project through the World Bank's Development Marketplace awards that was won by Working for Water.

LESSONS LEARNT

The various "Working for" projects face various challenges. From the environmental perspective one of the greatest challenges is to maintain rehabilitated or restored ecosystems in a healthy state, while from a socio-economic perspective there is a need to focus on creating more long-term employment opportunities, employment for more people and higher salaries that allow people to be lifted above the poverty line.

Still, the "Working for" programs have made significant progress towards achieving their goals, and some of the reasons for success include: the win-win model which provides environmental, social and economic gains; that the development of the different programs has been underpinned by rigorous scientific research; that restoration, rehabilitation and clearing of invasive aliens are labour intensive, but require few skills at entry level; that the programs address the national government priorities of job creation, rural development and environmental sustainability, and are funded via the National Treasury; that the programs represent multi-departmental relationships, making it possible for them to simultaneously deliver on a number of policy objectives; and the flexibility of the institutional

models through which the programs have been implemented, which have made it possible to apply the programs cross-institutionally and in a range of contexts.

An example of more specific lessons learned can be made by looking at specific projects. For example, for the Eco-coffin project, marketing has proven to be a challenge, with the intention of the program to reduce the cost of bereavement for the poor often clashing with the profit-driven motives of the funeral industry. The fact that a basic (rope-handled) coffin can be sold for about $35 – one-quarter or less of the price that people often have to pay for a basic coffin – also has had a marketing challenge in terms of a perception that the coffins are "cheap". The irony is that the coffins are solid wood, and better made than most coffins available at a higher price. Even the name, *Eco-coffin*, had an unintended misperception of being an "Economy Coffin".

LINKS TO POLICY

The programs are government initiatives, and they address several political priorities, including rural development, environmental sustainability and job creation. They form part of the South African government's adaptation responses, which, as highlighted in the National Climate Change Response White Paper (2011), include job creation and growth strategies, particularly in the green economy, and the protection and support of vulnerable groups.

The different "Working for" programs are all part of the environmental cluster of the Expanded Public Works Program, which has in the National Climate Change Response White Paper (2011) been recognised as effective in building climate resilience and relieving poverty. The White Paper has therefore flagshipped the program as a near-term priority, set to consolidate and expand into the Climate Change Response Public Works flagship program.

THIS CASE STUDY WAS COMPILED BASED ON

Cadman, M., Petersen, C., Driver, A., Sekhran, N., Maze, K. And Munzhedzi, S. 2010. *Biodiversity for Development: South Africa's landscape approach to conserving biodiversity and promoting ecosystem resilience.* South African Biodiversity Intistue, Pretoria.

The Government of the republic of South Africa, 2011. *National Climate Change Response White Paper.*

http://www.environment.gov.za/workingforwater/index.html

http://www.saneri.org.za/working_for_energy.html

http://wetlands.sanbi.org/

http://www.workingonfire.org/

9.13. CASE #12 RESTORATION OF THE MANALANA WETLAND IN MPUMALANGA, SOUTH AFRICA

Location: South Africa (national)
Ecosystem: Wetlands
Organisations involved: The Working for Wetlands program forms part of the government's Expanded Public Works Program. It is implemented by the South African Biodiversity Institute (SANBI) on behalf of the Department of Environmental Affairs (DEA), the Department of Agriculture, Forestry and Fisheries (DAFF) and the Department of Water Affairs (DWA).

DESCRIPTION

The focus of the Working for Wetlands Program is on the rehabilitation, protection and sustainable use of South Africa's wetlands. The program came into being as a part of the Working for Water program, as there was a need to restore wetlands' ability to regulate the improved water flows resulting from the removal of invasive alien plants. The program was later moved to the Department of Environmental Affairs as a fully-fledged program. The Working for Wetlands Program is built on the model of Working for Water, focusing on poverty alleviation and labour intensive processes. Accordingly, it operates in wetlands that have been identified in terms of ecological importance and accessibility to communities that need support.

Working for Wetlands is a multi-benefit program, creating short-term green jobs in wetland restoration for people from marginalised communities, while at the same time recovering the health and ecosystem services of degraded wetlands. By recovering the health and ecosystem services of degraded wetlands the program works to strengthen resilience to climate change through increased water security, reduced impacts from flooding or droughts, protection of livelihoods that rely on water and creation of work opportunities and thus income that works to strengthen local livelihoods. The program makes use of ecological infrastructure, combining engineered and natural solutions, such as building of structures to arrest erosion, trap sediment and re-saturate drained wetland areas, and plant propagation, revegetation and bio-engineering.

Working for Wetlands has conducted, and is currently managing, a number of projects throughout the country. One such project is the Manalana Wetland project, which came about as it was found that the Manalana Wetland in Mpumalanga Province was under considerable threat from headcut erosion. If left to deteriorate, the degraded wetland would directly impact the many people whose livelihoods depend on the wetland. Working for Water therefore initiated a rehabilitation project, consisting of the construction of two erosion control structures. The project also formed part of a much broader long-term initiative, facilitated by the Association for Water and Rural Development (AWARD), that looked at the governance of natural resources as well as cultivation practices in the area. A subsequent assessment has found that the project appears to have been successful in halting the advancement of the two major headcuts.

HOW PROJECT INVOLVES LOCAL COMMUNITIES, INSTITUTIONS AND DECISION MAKERS

The program creates working partnerships involving multiple local stakeholders at the different sites, in order to ensure that the maintenance of wetlands becomes an ongoing process.

How project works to conserve biodiversity, secure livelihoods and increase resilience through an ecosystem based approach

BENEFITS TO BIODIVERSITY AND ECOSYSTEM SERVICES

Wetlands provide a number of essential ecosystem services, they regulate water purification and flooding, they provide food and natural products and they support high biodiversity and nutrient cycling. In the period between 2004 and 2009 Working for Wetlands has rehabilitated 427 wetlands, ensuring, among other things, restoration of water flows and quality, reduced sediment loads, protection of agricultural services, improved carbon storage, flood control and drought attenuation, enhanced biodiversity and stabilization of erosion. These are all ecosystem services that are likely to be ever more relevant with climate change.

In the case of the Manalana project it was found that the interventions made contributed significantly to the health of the wetland, and thus to the delivery of ecosystem services such as erosion control, sediment trapping and streamflow regulation.

BENEFITS TO LIVELIHOODS AND POVERTY ALLEVIATION

The many Working for Wetlands projects have worked to ensure that wetlands continue to yield economically productive and socially beneficial flows of ecosystem services. Healthy wetlands work to reduce the vulnerability of communities in water-limited and drought-prone areas, creating water security and protecting livelihoods that rely on water. Healthy wetlands also reduce impacts from flooding, strengthening the resilience of for example farmers prone to flooding impacts.

Some of these benefits were reflected in the Manalana project, where it was found that the rehabilitation of the wetland provided very favourable conditions for crop production and significantly increased the retention of water, making water much more readily available for domestic use.

The Working for Wetland program also works to secure livelihoods and alleviate poverty more directly through temporary job creation. In the period between 2004 and 2009 the program created close to 10 000 short term work opportunities for people from marginalised communities, and 214 small, medium and micro-enterprises were established by rehabilitation contractors.

FINANCE

As one of the environmental programs of the Expanded Public Works Program, Working for Wetlands receives its core funding through a three-year rolling allocation from National Treasury, directed through the national Department of Environmental Affairs. Working for Wetlands is also exploring the potential for funding from sources outside the public sector, including wetland mitigation banking, which works by compensating for unavoidable loss of wetland through rehabilitation of other wetlands.

LESSONS LEARNT

While the structural aspects, such as the creation of ecological infrastructure, are important components of wetland rehabilitation, the Manalana project further brought out the need to recognise that rehabilitation takes place in dynamic ecosystems, subject to dynamic patterns of human usage. Through its association with the broader and longer term initiative facilitated by AWARD, the Manalana project uncovered the need to also address important deficiencies in the local governance of natural resources and the need to improve the sustainability of local cultivation practices. This highlights how rehabilitation is a long-term process, rather than a once-off event, and

how rehabilitation should incorporate the different components that make up dynamic social-ecological systems.

LINKS TO POLICY

The Working for Wetland program works as a vehicle for delivering on a range of policy objectives, including the creation of green jobs.

The Working for Wetlands program is part of the environmental cluster of the Expanded Public Works Program, which has been chosen as one of the flagship programs in the very recent National Climate Change Response White Paper (2011). In the White Paper the Expanded Public Works Program has, through its many environment and sector programs, been recognised as having proven effective in building climate resilience and relieving poverty. It is therefore been chosen as a near-term priority, set to consolidate and expand into the Climate Change Response Public Works flagship program.

THIS CASE STUDY WAS COMPILED BASED ON

Cadman, M., Petersen, C., Driver, A., Sekhran, N., Maze, K. And Munzhedzi, S. 2010. *Biodiversity for Development: South Africa's landscape approach to conserving biodiversity and promoting ecosystem resilience.* South African Biodiversity Institute, Pretoria.

Kotze, D. and Ellery, W. 2009. WET-OutcomeEvaluate: An evaluation of the rehabilitation outcomes at six wetland sites in South Africa. *Wetland Management series*, Water Research Commission report TT 343/09.

The Government of the republic of South Africa, 2011. *National Climate Change Response White Paper.*

http://wetlands.sanbi.org/

9.14. CASE #13 PAYMENT FOR ECOSYSTEM SERVICES IN MALOTI DRAKENSBERG MOUNTAINS, SOUTH AFRICA

Location: Maloti Drakensberg, South Africa
Ecosystem: All
Organisations involved: While the feasibility assessments were conducted by the Institute of Natural Resources, Future Works, School of Bioresources Engineering & Environmental Hydrology and Jabenzi, Working for Water now acts as the implementing agent.

DESCRIPTION

Based on sustainable trade in ecosystem services, this project has developed a model for investment in water security. The model is a win-win solution, creating better water flow regulation and water quality, improved water security, land management and livelihoods, and reduced vulnerability.

The Maloti Drakensberg mountains supply water to large parts of the sub-continent, forming South Africa's most strategic water source. The main engine for maintaining high quality, regular water flow is the natural vegetation in the mountains. Due to inappropriate land use and transformation of the natural vegetation, this water flow has become threatened. Land degradation leads to reduced veld production, reduced, or even ceased, stream flow in the dry season, and exacerbated summer flows that result in flooding, soil erosion and poor water quality.

Given the high value of the water that Maloti Drakensberg supplies, and South Africa's growing water scarcity, there was thus a growing need to incentivise mountain catchment management in the area. This project came about as a response to this need, looking at possibilities for paying mountain communities to supply ecosystem services, most particularly so for provision of water.

An initial assessment of the feasibility for developing a payment for ecosystem services (PES) system for two sites in the Maloti Drakensberg mountains found that there needs to be a combination of both market based trade in ecosystem services and state funded natural capital restoration programs. Currently, the South African government is working to catalyze market based trade by paying small contractors for rehabilitation and clearing of aliens. This is aimed to unlock payment for ecosystem services, thus facilitating a shift towards paying contractors for ecosystem services through market based trade.

HOW PROJECT INVOLVES LOCAL COMMUNITIES, INSTITUTIONS AND DECISION MAKERS

While a government project implemented through Working for Water, it works with a number of small, local contractors who are currently doing the rehabilitation.

How project works to conserve biodiversity, secure livelihoods and increase resilience through an ecosystem based approach

BENEFITS TO BIODIVERSITY AND ECOSYSTEM SERVICES

The Maloti Drakensberg Area supplies a large number of ecosystem services. In addition to water, ecosystem provisions include food, grazing and raw materials. Ecosystem regulations include climate and disturbance regulations, carbon sequestration, water regulation and erosion control. The area also supports pollination and biological control, waste water treatment, soil formation and nutrient cycling.

The feasibility assessment that was done shows that changes to land management, more specifically biennal spring burning, grazing at recommended stocking rates and restoration of degraded grassland, will be good for water production, carbon sequestration and soil protection. More specifically, the changes have the potential to significantly increase infiltration, winter base flows and soil carbon content and to reduce run-off and summer river base flows, thereby reducing erosion. One of the sites assessed showed that good management practices can result in an additional 12.8 million m^3 in winter river base flows.

At another site assessed, the land management changes result in reduction in annual runoff due to the addition of improved basal cover. Here, runoff is converted to green water, thus plant biomass, which is of great value to residents in local areas of expanding desertification. It also works to support local biodiversity conservation.

BENEFITS TO LIVELIHOODS AND POVERTY ALLEVIATION

Improved land management practices, and the subsequent improvement in the wide range of ecosystem services that the area supplies, will benefit local residents through for example reduced erosion and more reliable water supplies.

More directly, the project is currently benefitting people by creating jobs for small contractors who work with alien clearing and rehabilitation. When fully rolled out, the project has the potential to create 1800 restoration-related jobs per year over the first seven years, and almost 500 permanent jobs in veld management.

FINANCIAL ASPECTS

The feasibility assessments showed that payments for ecosystem services as a market based mechanism is feasible at some sites, but that the income from water is generally not enough to pay for restoration actions. There is thus a need for state funded natural capital restoration programs, and these are currently underway in the Maloti Drakensberg area. These initial restoration programs are further needed in order to unlock payments for ecosystem services.

The feasibility assessments were funded by Emzevelo KZN Wildlife, the Maloti Drakensberg Transfrontier Project and the Development Bank of Southern Africa (DBSA). Being in its initial stages of implementation the project is now funded mainly through the South African Government. A budget of just over R5 million has been allocated this financial year, some of which originates from private sector investors.

LESSONS LEARNT

The feasibility assessment showed how costs vary between different sites, and how some sites might require public funding for restoration while other may not. What is more, the feasibility assessment showed that for some areas trade is only feasible when more than one ecosystem service is traded. It seems that either way, initial capital, as well as time, is required to get a project of this kind off the ground.

LINKS TO POLICY

The National Water Act makes provision for either raw water charges to include the costs of a water supply scheme, which can include both management and restoration of water supply assets, or for levies to be charged for catchment management. The institutional laws, resources and systems for the implementation of a PES system are thus readily available in South Africa.

THIS CASE STUDY WAS COMPILED BASED ON

Maloti Drakensberg Transfrontier Project (2007) Payment for Ecosystem Services: Developing an Ecosystem Services Trading Model for the Mnweni/Cathedral Peak and Eastern Cape Drakensberg Areas. Mander (Ed) INR Report IR281. Development Bank of Southern Africa, Department of Water Affairs and Forestry, Department of Environment Affairs and Tourism, Ezemvelo KZN Wildlife, South Africa.

9.15. CASE #14 PARTNERING WITH THE PRIVATE SECTOR IN NAMIBIA'S BUSH-TO-FUEL PROJECT

Location: Namibia
Ecosystem: Savannas and grassland
Organisations involved: The Bush-to-Fuel project is funded by Energy for Future (EFF), which was started by the Schwenk Group. Ohorongo Cement, to which the wood chips are supplied, is owned by Schwenk Namibia, Industrial Development Corporation, the Development Bank of Namibia and Development Bank of South Africa.

DESCRIPTION

The Bush-to-Fuel project aims to produce wood chips, made from native invader bush that is encroaching on wide areas in Namibia, to be used as an energy source in a cement factory. EFF produce the wood chips, which will be used to supply the Ohorongo Cement plant, in substitution for the plant's current coal powered energy. The project is an example of a private sector investment in renewable energy through an innovative approach that works to create multiple societal benefits. While mitigating climate change by reducing the carbon dioxide emissions from heavy industrial plants, the project simultaneously addresses the issue of bush encroachment, which has become a big problem across Namibia. The bush encroachment has not only lead to loss of biodiversity, it is also degrading grazing land, becoming a big problem for livestock farmers. EFF will offer a service to farmers to cut and remove encroacher bush, enabling farmers to increase their cattle ranching activities. The project therefore has the potential to not only reduce Namibia's energy imports, but to further increase the country's meat export.

The aim is for EFF to be in full production by 2012, to de-bushing an area of 330 000 hectares around the cement plant. EFF will de-bush approx. 5,000 hectares per year, supplying 85,000 tons of woodchips per year to Ohorongo. EFF cuts the native invader bush selectively, and excludes all protected species and trees higher than four meters, ensuring that not all trees and shrubs are cut.

HOW THE PROJECT INVOLVES LOCAL COMMUNITIES, INSTITUTIONS AND DECISION MAKERS

Energy for Future has conducted a public participation process in the farming communities where cutting takes place. Farmers received information documents, and meetings were organised at different locations.

How the project works to conserve biodiversity and ecosystem services, secure livelihoods and increase resilience through an ecosystem based approach

BENEFITS TO BIODIVERSITY AND ECOSYSTEM SERVICES

Soil moisture balance determines the productivity and distribution of grasslands and savannas. Invader bush has worked to disturb this balance, resulting in poor water use efficiency. Three times the amount of water is required to produce the same amount of grass on a veld in poor condition, compared to a veld in healthy condition. There are also many indications that the bush encroachment has led to declining groundwater levels over the past few decades. De-bushing works to increases groundwater levels through the removal of thirsty invader species, re-establishing the soil moisture balance and thus the productivity and distribution of grassland and savanna. The project is also

supporting climate change mitigation as the cement factory will reduce the fossil CO2 emissions by 130,000 tons per year by replacing coal use with the wood chips.

BENEFITS TO LIVELIHOODS AND POVERTY ALLEVIATION

In Namibia overall cattle numbers have decreased to 36%, compared to numbers prior to the problem of bush encroachment. The Bush-to-Fuel project improves the conditions for Namibia's livestock farmers by making more land available for meat production. By utilizing a local energy source whole Namibia will become less dependend on convential energy markets with an positiv influence on the trade balance.

EFF will create about 50 direct workplaces in a region with approximately 50% unemployment rate. Furthermore, around 200 workplaces will be created indirectly through outsourced non-core businesses like transport of woodchips, transport of staff, cantine and security work, aftercare businesses, manufacturing and washing of workwear. The project also supports a payment for ecosystem services approach as Energy For Future (EFF) will pay the farmers to remove the encroaching bush and by cutting the bush the production capacity of the farm land will increase.

FINANCIAL ASPECTS

EFF has invested about 150 million Namibian Dollars in the Bush-to-Fuel project. EFF has signed a contract to supply Ohorongo Cement with bush chips for the next ten years.

LESSONS LEARNT

The environmental impact assessment (EIA) produced in preparation of the project recognises that aftercare will be required following the cutting conducted by EFF. With cutting largely taking place on private land, and with no financial support provided for farmers for aftercare, the EIA highlights how EFF might be required to re-cut some of the areas after some years. This is due to the fact that some farmers will not have the financial capacity to manage their lands to achieve the desired ecological balance.

LINKS TO POLICY

A feasibility study and the EIA lead to the subsequent approval from the Ministry of Environment and Tourism and the Ministry of Agriculture, Water and Forestry.

The private sector initiative of EFF is aligned with the strategic priorities of Namibia's proposed Climate Change Policy (2009), which emphasises the need to focus on sustainable energy and low carbon development through, among other things, development and improvement of renewable energy.

THIS CASE STUDY WAS COMPILED BASED ON

Colin Christian & Associates CC, 2010. *Energy for Future: Bush-to-Fuel Project, Environmental Impact Assessment.* Prepared for Energy for Future, Windhoek, Namibia

Mfune, J. K., Ruppel, O. C., Willemse, N. E. and Mosimane, A. W. 2009. *Proposed Climate Change Strategy and Action plan.* Prepared for the Ministry of Environment and Tourism, Namibia

http://allafrica.com/stories/201109011093.html (accessed 01.10.2011)

With input from Tobias Konzmann from Energy for Future (konzmann.tobias@eff.na)

9.16. CASE #15 CLIMATE CHANGE RISK AND INSURANCE PREMIUMS IN THE INSURANCE INDUSTRY IN SOUTH AFRICA

Location: Eden Municipality, the Southern Cape, South Africa
Ecosystem: Water catchments
Organisations involved: The pilot study was conducted by the University of Cape Town (UCT), the Council of Scientific and Industrial Research and the WWF, together with the short-term insurer Santam.

DESCRIPTION

Although water risks are normally associated with a shortage of water or the deterioration of water quality, water risks can also be associated with *too much* water, as is the case in flooding. Globally, the insurance industry is coming under increasing pressure due to rising claims resulting from natural disasters. This has been linked to an increase in the frequency of severe weather events as a result of climate change, as well as a decrease in the natural buffering capacity of ecological systems. To date the global insurance industry has responded to this challenge by mainly focusing its efforts on developing ever-finer scale risk assessments, with a view to better pricing and contracting of risks.

Within this context, the CSIR, UCT and WWF embarked on a pilot study with South Africa's largest short-term insurer, Santam. The pilot study was conducted within the Eden municipality in the Southern Cape of South Africa. This area has been devastated by a number of severe floods, linked to intense rainfall events (so-called 'cut-off low pressure cell' phenomena) over the past decade. Focusing on three major risks, wild-fire, flood and sea-storms, the objectives of the study were to:

- To understand the current risk regime
- Identify the key systemic drivers of risk
- Understand how these drivers are changing over time and affecting future risk exposure
- Define how the insurance industry can best respond to ensure its own viability and build the overall resilience of the area.

The study revealed four major findings: risks are higher than ever before and will continue to increase; changes in local land-use had an equal effect as climate change on flood risk; in complex systems, fin-scale risk assessment has its limitations; and traditional risk assessment approaches need to be complemented with risk management activities at the local scale. It is therefore recommended that to complement its risk assessment processes, the insurance industry should work with risk-management aimed at the underlying drivers of risk in the landscape. Through proactive management of local drivers of risk, which can also be termed ecosystem-based adaptation (EbA) to climate change, the insurance industry can contribute to offsetting most of the increased risks associated with climate change.

HOW PROJECT INVOLVES LOCAL COMMUNITIES, INSTITUTIONS AND DECISION MAKERS

If the insurance industry is to engage in actively reducing the drivers of risk in the landscape it will be necessary for them to engage with the stakeholders that share the risks.

How the project works to conserve biodiversity, secure livelihoods and increase resilience through an ecosystem based approach

BENEFITS TO BIODIVERSITY AND ECOSYSTEM SERVICES

Recommendations for proactive management strategies for the insurance industry to engage with include the control and eradication of invasive alien trees, as these are the key driver of wild-fires in the local landscape. By eradicating or controlling the invasive trees there is potential for nullifying the future increase in fire risk associated with increased temperatures, and at the same time benefitting local biodiversity. To deal with the risk of flooding, recommendations include active rehabilitation of natural vegetation following clear-felling and fires in commercial forestry plantations. While not the focus of the pilot study, rehabilitation of degraded wetlands and riparian river zones can also provide practical risk management responses. Lastly, to deal with sea-storm risk, active rehabilitation of dune vegetation, stabilization and rebuilding of fore-dunes and sand replenishment provide practical risk management options. The different rehabilitation activities will not only work to reduce risks, but will also benefit local biodiversity and ecosystem services as natural habitats are restored.

BENEFITS TO LIVELIHOODS AND POVERTY ALLEVIATION

The insurance industry depends on society and government for regulations and management systems critical to the insurance industry's risk exposure. At the same time, it is in the interest of both government and society that the private insurance industry remains affordable and able to cover as broad an aspect of society as possible. The increased risk resulting from climate change and ecological degradation can therefore be seen as posing a shared risk to the insurance industry, society and government, creating incentive for collaboration. By working together with the insurance industry, society can help reduce and manage different risks, which will work to increase the resilience of society while at the same time ensuring that insurance remains affordable.

FINANCIAL ASPECTS

Without a viable insurance industry, or with a reduction in the insured portion of society, governments and societal structures would have to take a greater responsibility, increasing the financial burden of governments and society. Collaborative, proactive risk management can therefore work to the financial benefit of all parties.

LESSONS LEARNED

A crucial point that came out of this pilot study was that it was possible to identify drivers of change in the local landscape that had the same effect on risk compared to climate drivers. This shows how it can to some extent be possible to reduce risks through EbA, despite concerning climate change projections.

LINKS TO POLICY

While the need to actively collaborate with the insurance industry has not been highlighted, the National Climate Change Response White Paper (2011) recognises that climate change will require more effective disaster management in order to deal with an increasing number of extreme events. Developing mechanisms for the poor to recover after disasters, including micro-insurance, is one of the response strategies outlined in the National Strategy.

THIS CASE STUDY WAS COMPILED BASED ON:

Nel, D. 2011. The insurance industry and flood risk. Unpublished

Nel, D., Shearing, C., Nel, J., Reyers, B., Archibald, S., Otto-Menz, V., Le Maitre, D., Forsyth, G. Theron, A., Engelbrecht, F., Herbstein, T. and Faccer, K. year unknown. *Risk in a Changing World: Lessons from the Insurance Industry.* Unpublished

The Government of the republic of South Africa, 2011. *National Climate Change Response White Paper.*

10. ANNEXURE 3: NAPS, NAPAS AND EBA IN AFRICA

Across Africa a number of National Adaptation Programs of Action (NAPAs) have been developed in Least Developed Countries (LDCs)[7] in order to address urgent (short term) adaptation needs related to climate variability and climate change. The NAPA works as a vehicle through which countries communicate their urgent and immediate developmental needs, as related to the effects of climate change.

Considering the NAPAs for the countries in which this report's case studies are based[8], it was found that the process through which the different adaptation plans have been developed include different degrees of inclusion of civil society and grassroot organisations. Both Malawi and Uganda included participatory rural appraisal (PRA) methodologies in the NAPA development process, thus incorporating the perspective of rural communities. In Malawi the process also entailed consultative workshops with various stakeholders from the private and the public sector, including NGOs, faith groups, media, traditional leaders and Universities, and in Uganda's the NAPA preparation incorporated several committees and teams that represented a wide spectrum of stakeholders. For the preparation of the NAPA in Rwanda, public consultations were carried out in all provinces, making it possible to include both the traditional and modern climate change adaptation activities. These consultations included interaction with local communities, including the association of women and youths. In Tanzania the NAPA process was based on literature reviews and consultation with different sectors, including community level consultations. NAPA team members gathered the perceptions of different communities, in terms of climate change impacts on sustainable rural livelihoods and different coping and adaptation mechanisms that have evolved through indigenous knowledge and initiatives in modern science and technology. In Zambia the preparation of the NAPA included vulnerability assessments conducted through stakeholder consultations in the two provinces that are most vulnerable to droughts and to some extent floods. The consultations worked to identify vulnerability and impact, and to further create an understanding of communities' adaptive capacities to climate change.

Neither of the NAPAs mention EbA, and the degree to which they emphasise conservation of ecosystems varies widely. The NAPAs from Tanzania, Rwanda and Uganda all regularly point to the important role played by functioning ecosystems, and, in various ways, how different ecosystems contribute to their respective economies. For Zambia and Malawi, the NAPAs only briefly mention ecosystems, with the former pointing to the fact that Zambia's National Biodiversity Strategy Action Plan aims to ensure conservation of a full range of the country's natural ecosystems.

In South Africa, which is not a LDC, the National Climate Change Response white paper (2011) reflects the country's most recent strategy with regards to climate change. This white paper has recently been gazetted. In terms of EbA, the White Paper points to the importance of functioning ecosystems, as well as the potentially negative effects of climate change on ecosystem services. While not addressing EbA specifically, the paper does mention the need to address climate change challenges by targeting adaptation programs in order to build resilience amongst the vulnerable sections of the rural

[7] Including Benin, Burkina Faso, Burundi, Cape Verde, Central African Republic, Chad, Comoros, Democratic Republic of Congo, Djibouti, Eritrea, Ethiopia, Gambia, Guinea, Guinea Bissau, Lesotho, Liberia, Madagascar, Malawi, Maldives, Mali, Mauritania, Mozambique, Niger, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Sudan, Tanzania, Togo, Uganda and Zambia.

[8] This is with the exception of South Africa, Botswana and Namibia, which are not LDC countries, and Madagascar and the Democratic Republic of Congo, for which the NAPAs are in French.

population, through, among other things, enhancing knowledge to ensure sustainable environmental conditions and optimising the ecosystem services that this provides.

In Namibia, the proposed Climate Change Strategy and Action Plan (2009) was prepared by environmental consultants, with input from various stakeholders. The plan emphasises the importance of ecosystem services, and points to the National Biodiversity Strategy and action Plan (2001), and how it was developed to operate in the context of vulnerability of the Namibian ecosystems, species and rural livelihoods to climate change.

Finally National Adaptation plans are also being discussed under the UNFCCC at present as plans that should be created for developing countries for their medium to long term adaptation approaches which will require financing.