Projects in development

Restoring the Drakensberg mountain ecosystems and providing water catchment services

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A three-year old project in the World Heritage region of the Drakensberg Mountains of eastern South Africa aims to restore and maintain indigenous vegetation cover, retain soil, and to pay for it by developing a market for water services. This project is not unlike the well known Delaware-Catskills watershed project linking New York city to upper New York State and adjacent lands (Elliman and Berry 2007; cf. Open Space Institute website www.osiny.org). The Drakensberg Mountain range is one of only a handful of UN-designated World Heritage sites that qualify for this status on two accounts. Firstly, in terms of its unique and endangered biodiversity, including 2,520 species of higher plants, of which 334 are endemic to the Drakensberg range (13%), with a further 594 near-endemic species (representing 56 families and 188 genera). In all, 37% of the angiosperm flora is only found in southern Africa, and 11% of these endemic and near-endemic species are currently listed as red data species (*i.e.* highly threatened or localised).

Secondly, it qualifies on cultural grounds, as it is one of the richest areas in the world for prehistoric art. It hosts more than 40,000 Bushman (Khoisan) Rock Art paintings at more than 600 locations. Today, large-scale commercial farmers occupy the area and several rural Zulu communities largely engaged in subsistence farming.

With approximately 50 000 km^2 in area, mostly above 1,800 m.a.s.l., the Drakensberg mountain range occupies less than 5% of the total surface area of South Africa, but produces 25% of the country's surface runoff, and it has a 'water footprint', or reach, covering about 60% of the country (see Figures 1a and 1b). The national importance of the mountain range for a country as dry as South Africa cannot be over-emphasised. It also acts as the border with the independent kingdom of Lesotho, which is a small, entirely landlocked and very poor country situated entirely above 1000 m. It has a rapidly growing population of approximately 2.1 million people,

most of whom are young, uneducated and largely dependent on natural capital for their livelihoods. Linkages with the government of Lesotho are being actively sought in connection with this restoration project.

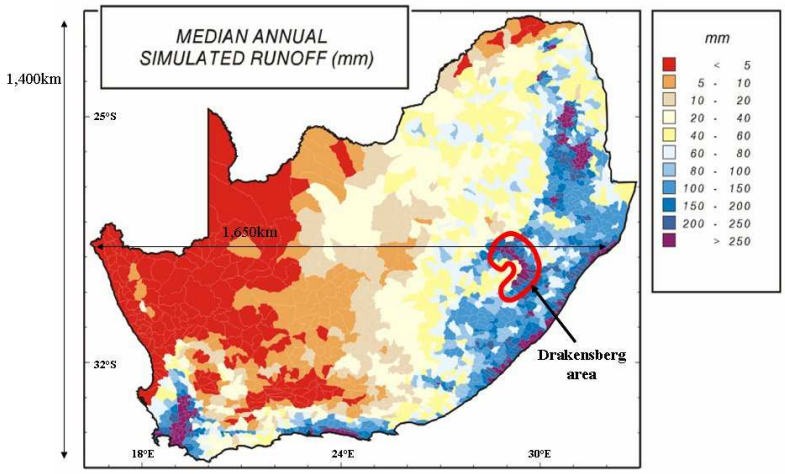

Figure 1: Indicating the Drakensberg Water Catchment and World heritage site. Source: Maluti-Drakensberg transfrontier project: *Developing an Ecosystem Services Trading Model for the Mweni/Cathedral Peak and Eastern Cape Drakensberg Areas*

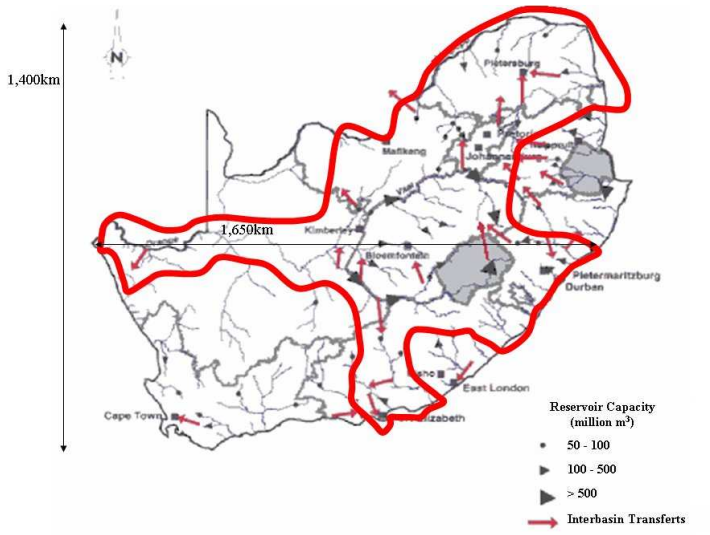

Figure 2: Indicating the "water footprint" of the Drakensberg Water Catchment. Source: Maluti-Drakensberg transfrontier project: *Developing an Ecosystem Services Trading Model for the Mweni/Cathedral Peak and Eastern Cape Drakensberg Areas*

Currently a regional project is under development in the Drakensberg range, co-funded by the Development Bank of Southern Africa and the World Bank, to develop a market for water catchment services. The aim is to provide adequate and appropriate economic incentives for landowners in the upper reaches of the catchment to change their land use practices to more prudent ones, and for the downstream and more distant water users to pay for such change over a still to be determined long-term, but at least ten years, contract period. Discussions as to the most appropriate market and institutional mechanism to affect this change and transfer payment are ongoing. The landowners are mainly conservation agencies, such as the Ezimvelo KZN-Wildlife, as well as commercial farms and communal areas. The water users are primarily water utilities, the Department of Water Affairs and Forestry, and a large number of municipalities. For example, in the Thukela catchment, which is only 1800 km^2, it is anticipated that by changing the land use practices of land owners in the Drakensberg catchment area – including rotational grazing instead of unmanaged, extensive grazing, and by changing the current annual winter burning regime to a bi-annual spring burn – at least 13 million m^3 of additional winter baseflow - or 12% of the winter MAR - will be added to the system. Not only will these minor interventions contribute towards improved water security, but also to increased income for the local people through direct payments and employment since they are the producers of the water services being the major landowners. One critical issue at the national level is that of "winter water" when much of the country is without rain. This project therefore should contribute to improved water resource management in general, leading to more reliable supply of water in wintertime, and improved water quality as well. Such investment in both the restoration and maintenance of natural capital is now recognised by the water engineers of the Dept of Water Affairs to be functionally equivalent to an investment in any other water supply scheme, including those in the 'built' environment. Therefore, the payment for the services rendered by restored natural capital in the Drakensberg, and even elsewhere, could easily be catered for through existing legislative and institutional structures set-up for payments to the water schemes in the built environment. However, considerable investment in research and development is required to refine restoration techniques and build greater social capital among the local stakeholders. Much goodwill already exists among the partners, and a shared vision for the region is gradually being defined.

Indications are that the implementation phase of this regional project could commence within the next two years. RNC-Africa is playing a role in this exciting venture.

Photo 1: Wetland restoration on commercial farmland by labour intensive technologies, courtesy Myles Mander.

Paper cited:

Elliman, C. and N. Berry 2007. Protecting and restoring natural capital in New York City's Watersheds to safeguard water. Pages 208-215 *in*: Aronson, J., S. Milton and J. Blignaut, eds. 2007. *Restoring natural capital: The science, business, and practice*. Washington, D.C.: Island Press.

Payment for water services

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Generally speaking, natural resources – aka natural capital - are increasingly recognized as the limiting factor to sustainable development. In South Africa, an arid/semiarid country, water is another limiting factor to development. The question therefore arises, given the supply constraints, what can be done to augment the water supply in the best possible manner? Historically, water resource managers met rising water demands through the establishment of a complex system of engineering supply-side solutions, but this is no longer viable due to the limited number of rivers that can still be exploited in this way and the increased costs of infrastructure.

The Government, as trustee and custodian of the nation's water resources, is responsible for the protection, development, and management of the resource in an equitable and sustainable manner for the benefit of all people. To be able to affect this objective, the National Water Act makes provision for the use of economic incentives for water management. The Act states that *the Minister may establish a pricing strategy for charges for any water use* (DWAF 1998). While increases in water tariffs are usually viewed as a market-based demand-side intervention, it could also be used to pay for the delivery of watershed services.

Long term hydrological research has shown that invasive alien tree species (very often escapees from commercial plantations) reduces stream flow and water yield within a water catchment. A charge aimed at preventing and eventually controlling, invasive alien tree species from watersheds (mountain catchment areas), rivers, and wetlands will therefore render both an ecosystem service (increased water flow to augment the ecological reserve) and water as an utilisable resource.

More recent research has further shown that an optimum vegetation cover could increase low flows (dry season flows) that will improve run of river use, reduce soil movement that leads to siltation of dams, and reduced water quality. Large parts of South Africa are fire prone (savannahs, grasslands and Fynbos shrublands). To optimise the watershed services from natural and semi natural landscapes sustainable fire and grazing regimes need to be established and maintained. Payments for watershed services can make it worth the while for land users in the upper catchments of the country (very often the rural poor) to provide the services through sustainable land management practices. The communities can benefit through livelihood opportunities in supplying veld and forest fire management services, the clearing and maintenance of invasive alien plants, and the restoration and maintenance of mountain catchments/watersheds, riparian areas, and wetlands.

The Working for Water initiative entails the changing of South Africa's water pricing strategy and hence policy and practise to include an invasive alien plant charge as part of the water tariff. This charge is to be paid by water users to enable the removal of invasive alien plants from especially riparian zones and mountain catchments areas.

This charge is to be seen in conjunction with legislation that forces landowners to remove such species from their land, but, where such a task is deemed too onerous or expensive and not affordable to the landowner, the income from the invasive alien plant charge could be used to support landowners' actions. Both the charge and the legislation are in recognition of the fact that there is an increasing demand for water and that the removal of invasive alien plants constitutes a supply augmentation programme and that water users have to pay for such service delivery but that landowners are also responsible for prudent land use management practices.

Photo 2: Workers clear invasive water hyacinth in Mpumalanga province, South Africa, courtesy of Working for Water

Mining, its water licence, and invasive alien plant clearing

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The development of most of the mines in South Africa is in the water scarce areas in the country. Such a mine to be developed is the Blue Ridge Mine Project in the Mpumalanga Province. The mine will produce 152 400 tonnes of platinum carrying ore a month and will require 1,828,000 m^3 of water per year for 18 years. Approximately 1200-2000 permanent new job opportunities will be created.

Water needed

The most important factor/element for the development of a mine is water and if there is no water there is no mine. As mentioned the mine is situated in an area with very little water, and what water there is will have to be used very economically. Using an industry standard of 0,6 to 0,8 m^3 per ton of ore mined, this would mean that the fresh water demand for the mine would be between 30 000 to 40 000 m^3 of water per day. It is possible to decrease this water demand to between 15 000 and 25 000 m^3 per day with new technology. The Blue Ridge Mine will therefore require 5 000 m^3 per day.

Options available

The possible water resources available to the company are as follows:

- Ground water found within the harvest capacity of the mining properties only approximately 250,000 m^3 are available.
- Water from the farming activities in the area and to be used for mining purposes by agreement. The water from agricultural land is however a very risky option for there is many obstacles to overcome before such water would be available to be licensed for mining purposes.
- Raise the Loskop Dam. This will yield about 20 million m^3 per annum. However this would be very expensive and will cost approximate R600 million.

The first two options would not yield enough water to sustain the development and operation of Blue Ridge West Mine and the third option are too expensive.

Taking into account the amount of water needed to mine 1,500,000 tonnes of platinum and gold or, it means that there is a shortage of available water. Eradication of alien vegetation is therefore being considered to secure water in Loskop Dam.

When the mining company applied to the Department of Water Affairs and Forestry they were informed that the only way that water could be made available for them to start any mining activities was to participate in the project for the removal of alien tree species. This is also acknowledged in the Pricing Strategy for Raw Water Use Charges ensuring an efficient allocation of scarce water resources.