

Payment for ecosystem services: A feasibility assessment

The availability of quality water is predicted to be the single greatest development constraint facing South Africa. With virtually all surface waters in South Africa already allocated to users, the adoption of new supply enhancement strategies is urgent. The payment for ecosystem services supplied by mountain communities has been shown to be a feasible option for supply augmentation.

The Maloti Drakensberg mountains are the most strategic water source in South Africa, supplying much of the sub-continent through rivers and inter-basin transfers. The mountain grasslands, which are the engine for maintaining a regular and quality water flow, has been and is continuing to be transformed through inappropriate land use. The costs of this land transformation have strategic national implications. Stream flow in the dry season is reduced or may cease to flow, while summer flows are exacerbated leading to flooding, soil erosion, reduced veld productivity, seasonal water scarcity, poor water quality and increased water vulnerability. In addition, the life span of water storage and abstraction infrastructure is seriously reduced through sedimentation.

Several mountain catchments in South Africa have been managed in the past for water on an intuitive basis. However, this project has for the first time quantified the benefits and costs of mountain catchment management. Research in the Upper Thukela and the Umzimvubu catchments confirmed that biennial spring burning, grazing at recommended stocking rates, and restoration of degraded grasslands can make significant impacts in reducing run-off, increasing infiltration, reducing summer storm flows, increasing winter base flows and maintenance of the ecological reserve in rivers. This further results in significant reductions in soil erosion and increases the soil carbon content. In essence, improved management and restoration can shift destructive summer flows in periods of water abundance or excess, to the winter months when water is scarce and when value can be added to the water. The reduced storm flows also diminishes soil erosion, reducing the sedimentation of water infrastructure, and improving productivity and carbon sequestration of the associated land. It is therefore in the interests of broader society to ensure that mountain

grasslands are managed effectively and paying land owners to do so has been proven to be efficient and equitable. This may be one of the cheapest and socially equitable water augmentation options available to South Africa. A trade in ecosystem services in marginal agricultural areas will result in large positive externalities, with more ecosystem services, less water vulnerability, more jobs in the region, and improved land quality that can stimulate the development of a host of other economic options, such as tourism, game farming, improved grazing and natural products harvesting (Figure 1).

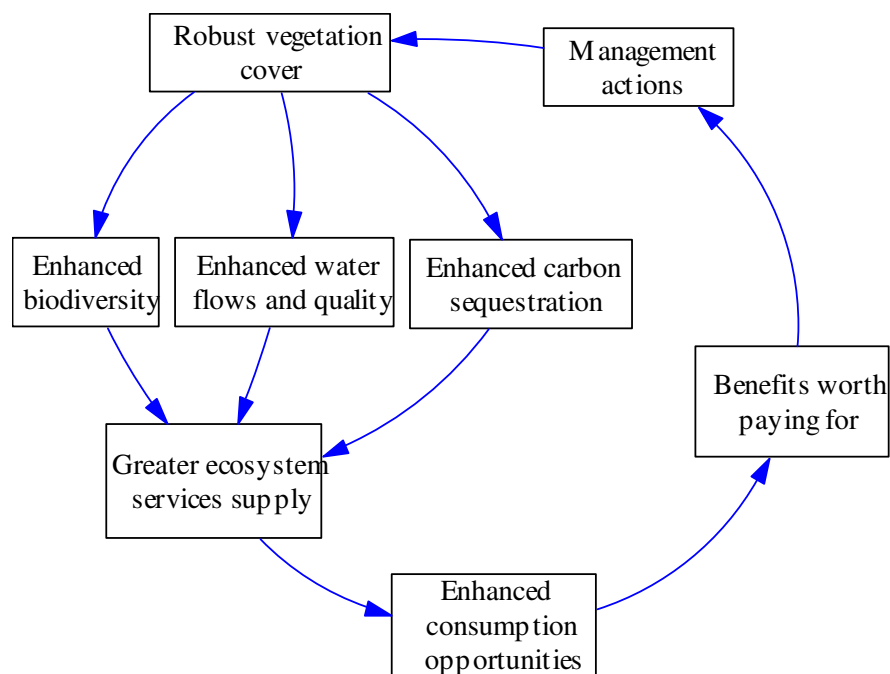


Figure 1: A model of the payment for ecosystem services

In the Thukela, good management practice can result in an additional 12.8 million m³ in winter river baseflows, with a sales value of R3.8 million per annum and can add value to the economy by between R18 million and

R88.7 million per year. With only 4 million m³ surplus currently available in the Upper Thukela, the additional water represents a 320% increase in surplus or allocable water. In terms of the whole Thukela basin, the additional water represents a 23% increase in surplus. The same action can reduce sediment yields by 1.2 million m³, with a value of R4.1 million per annum in cost savings, while carbon sequestration could be worth R8.7 million per annum. In total, the sales of services from the upper Thukela can generate R16.7 million per annum. The costs of management on the other hand are R3.8 million per annum and restoration could cost R31.9 million over the first 7 years.

In the Umzimvubu, good management practice can result in an additional 3.9 million m³ in winter river baseflows, with a sales value of R2.7 million per annum. The additional water can add value to the economy by between R5.7 and R27.1 million per annum. Importantly, access to water in periods of scarcity reduces rural household vulnerability, especially in the Eastern Cape where a high percentage of households rely on river water for their primary water source. In terms of erosion, the reduction in sediment is 4.9 million m³ per annum and this has a value of R16.2 million per year. Carbon sequestration is worth R21.9 million per annum. In total, potential sales of services could amount to R40.7 million per year. Management costs are estimated to be R9.2 million per annum, with restoration costs reaching R260 million for a 7 year period. These two upper catchments have the potential to generate 1800 restoration-related jobs per year for the first seven years of the intervention and almost 500 permanent jobs in catchment management.

There are significant benefits to be gained by both local ecosystem services producers (the mountain communities) and by the broader user or catchment community in implementing a payment for ecosystem services system. However, costs are varied, with some catchments showing that restoration and management is financially feasible with only base flow being marketed, while other catchments require baseflow enhancement, sediment reduction and carbon sequestration to be traded they are financially feasible. Importantly, catchment management becomes increasingly feasible when more than one of the services is traded.

Institutionally, the systems, laws and resources are available in South Africa to facilitate a payment for ecosystem services system. While payment for ecosystem services is new as a concept, the component parts are not new. Consequently, the requisite resources are available to effectively implement a payment system in South Africa.

This assessment shows that a payment for water and carbon services is economically and institutionally feasible. It is also desirable from a rural development and social equity perspective, rewarding those who maintain a water supply engine but who are spatially and economically marginalised. This opportunity could equally apply to other mountain communities in high rainfall regions in southern Africa.

For more information go to

http://www.futureworks.co.za/maloti_drakensberg_pes.htm to download the full report or contact Myles Mander from Futureworks at myles@futureworks.co.za or 031 764 6449



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