



AGRICULTURE GLOBAL PRACTICE NOTE

Valuing Ecosystem Services in Zimbabwe



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Valuing ecosystem services—the benefits humans obtain from earth’s many life-support systems—is an important step in devising interventions to achieve sustainable livelihoods and climate resilience. The services provided by healthy ecosystems are essential for supporting life. Their loss would have a disproportionately large impact on developing nations.



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Zimbabwe is highly dependent on natural resources, including forests, highly variable underground water, and related sectors for livelihoods and economic growth. However, the country is experiencing high levels of land degradation, which threatens the resource base on which most of the nation's population depends. Already, land degradation costs up to 6.3 percent of the country's gross domestic product (GDP) annually, and this will worsen with climate change.

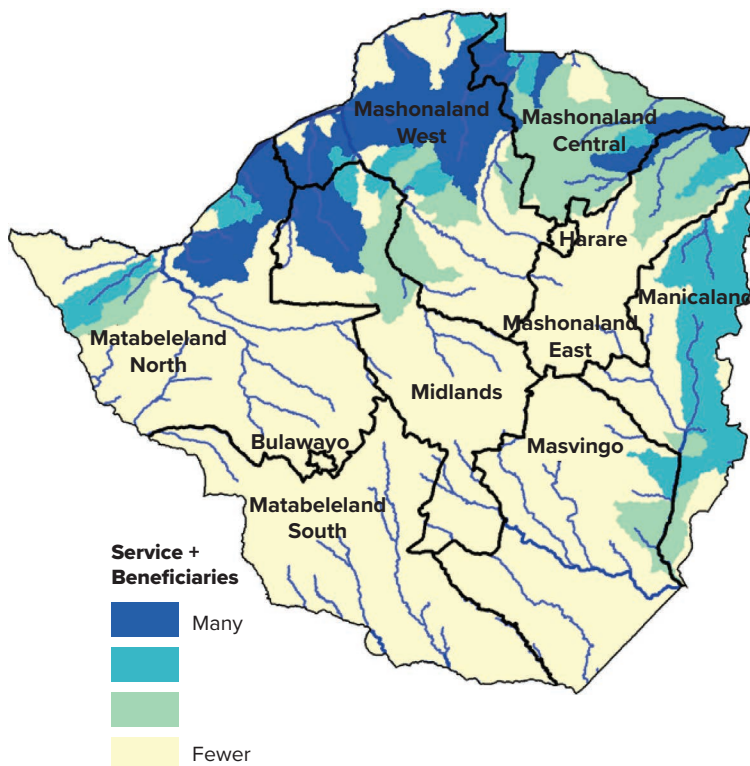
In response, the World Bank is supporting Zimbabwe to sustainably manage the ecosystem services provided by critical landscapes. The Technical Assistance (TA) funded by the Global Partnership for Sustainable and Resilient Landscapes (ProGreen) entailed a Whole-of-Government collaboration between the Environment Directorate of the Ministry of Environment, Climate, Tourism and Hospitality Industry (MECTHI) and counterparts in the Ministry of Lands, Agriculture, Water, Fisheries and Rural Development. The TA aims to generate the evidence base for the development of a scaled-up, integrated biodiversity and sustainable production landscapes investment project in the country. A national screening

assessment was undertaken to rapidly identify areas in Zimbabwe providing a high level of key ecosystem services that are benefitting communities, as well as areas experiencing, or at risk of significant land degradation. The assessment expanded on and added granularity to previous mapping of ecosystem services under the Land Degradation Neutrality Framework of the United Nations Convention to Combat Desertification (UNCCD). The national screening identified several candidate focal landscapes for more detailed assessment, including the 40,000 km² Mazowe Catchment north of Harare, which was estimated to provide a high level of ecosystem services and thus good opportunities for conserving and enhancing services provision. Drawing on the findings of the national-level screening assessment, the selection of the Mazowe Catchment north of Harare (figure 1) as a focal landscape was undertaken by the government, considering its local knowledge of the candidate areas.

Detailed assessment indicates that productive natural ecosystems in the Mazowe Catchment are being lost and degraded by poorly planned and managed commercial and small-scale livelihood activities, and the threats will be further exacerbated by climate change. The catchment lost over 1,100 km² of its dense woodland and over 400 km² (90 percent) of its wooded grassland, mostly to dryland cultivation, in the last 25 years. Cropland expansion, fuelwood harvesting, and illegal mining associated with poverty, population growth, and lack of secure property rights are the major drivers of land degradation. Cropland extensification as the main strategy for increasing food production, land scarcity and poor land management practices lead to high erosion rates, particularly in communal areas, contributing to water quality and sedimentation issues. Population pressure has also increased the harvesting of firewood and other natural resources and worsened grazing pressure on the increasingly small areas of remaining grazing land. Climate change could contribute to significant reductions in crop yield due to greater heat stress and more erratic rainfall patterns. Climate change is expected to reduce groundwater recharge and surface runoff in the Mazowe Catchment. Although this is expected to be moderate relative to other areas in Zimbabwe, water availability for agriculture and domestic use will be negatively affected by increased evaporation losses and unreliable rainfall patterns.

The TA also reveals that the ecosystem services supplied by natural ecosystems are more valuable than the agricultural production value of cultivated areas. Within the Mazowe catchment, cultivated areas contribute a gross margin value of US\$68 million per year, while the remaining natural areas support a range of provisioning, regulating, and cultural ecosystem services amounting to \$429 million per year. Ecosystem inputs to livestock production are estimated at US\$65 million per year. Wild resource harvesting is estimated to be worth at least US\$106 million per year. Rural tourism attractions in the

FIGURE 1 Results of the national screening analysis of five key ecosystem services: food, erosion control, water, carbon, and ecotourism), and their potential beneficiaries



This map shows the overlap of ecosystem services and benefit 'hotspots'—watersheds that provide the most services and where the most beneficiaries potentially rely on them.

TABLE 1 Summary of the current values of selected ecosystem services assessed in this study, US\$, millions per year.

Types of services	Explanation	Value to whom	Value per year (US\$, millions)
Wild resources	Value of wild harvested foods, fuel, and raw materials net of human inputs	Rural households	105.7
Cultivated production	Production value net of human inputs	Communal farmers	38.0
		Commercial farmers	30.2
Livestock production	Production value net of human inputs	Communal farmers	43.1
		Commercial farmers	21.6
Sediment regulation	Cost savings due to vegetation capacity to hold soil in place or trap eroded soils before entering streams	Water utilities and private dam owners	166.3
Flow regulation (base-flow and groundwater)	Cost savings in water resources infrastructure due to facilitation of recharge by vegetation	Water utilities and/or direct water users	83.9
Tourism	Net income generated from nature-based tourism to natural attractions	Tourism sector	42.9
Carbon retention	Avoided climate change damages from avoided carbon dioxide emissions from ecosystem degradation	Zimbabwe	30.0
		Rest of world	1,230.0

Mazowe Catchment were estimated to generate about US\$43 million or 4.6 percent of national attraction-based tourism. Maintaining natural ecosystem cover in the study area saves about US\$250 million per year in water supply costs, while maintaining the remaining forest cover avoids billions of dollars of global climate change damages and offers a potential source of income for Zimbabwe (table 1).

Public investment to scale up sustainable landscape management will make economic sense with every dollar invested in landscape interventions generating \$1.7 benefits (table 2). At the whole Mazowe catchment level, restoration of degraded habitats is estimated to cost \$200.5 million over a 25-year period, whereas climate-smart agriculture (CSA) implementation will cost \$179.7 million. Changes in land management following adoption of CSA is estimated to generate the largest ecosystem services benefits for the whole Mazowe catchment (\$258.7 million), followed by revenue from carbon credits (\$191.9 million). Interventions to maintain soil, vegetation cover, biodiversity, and agricultural productivity are mutually supportive and include supporting, regulating, and/or incentivizing (a) CSA practices which increase the productivity of land and reduce rates of land conversion, soil loss, and water consumption; (b) limiting the use of grazing and wild resources to sustainable levels to maintain their productivity as well as other services; and (c) restoring and protecting key natural areas and their biodiversity to capitalize on their regulating and cultural services.

TABLE 2 Present value of costs and benefits of landscape interventions in Mazowe.

	\$ million
Costs	422.0
Restore degraded natural habitats	200.5
Establish conservancies	0.8
Implement climate-smart agriculture (50% adoption)	179.7
Install riparian buffers	41.0
Benefits	709.9
Avoided dredging (sediment)	107.8
Avoided dam costs (change in recharge)	125.0
Gains in wild harvested resources	21.1
Changes in agricultural production	258.7
Revenue from carbon credits	191.9
Tourism gains	5.2
Net present value	287.9
B:C ratio / ROI	1.7
ROI for farmland interventions	1.44
ROI for natural land interventions	1.86

Duration is 25 years at 4.56%.

Some of the policy actions to support effective scaling up of sustainable landscape management include

- (a) Support the upscaling of CSA interventions in the Mazowe Catchment following the recommendations of the Zimbabwe's CSA Investment Plan (CSAIP) which aims to strengthen the country's agriculture sector's resilience to climate change. Priority investments recommended by the CSAIP include on-farm investments in improved crops, fertilizers, irrigation, and animal management to increase farmer production and build resilience; off-farm investments in storage, processing, marketing, and research & development to increase the agricultural value chain's productivity and efficiency; and cross-cutting investments in land reform and water management to help the country realize its full agricultural potential.
- (b) Invest in Sustainable Forestry Management (SFM) across the Landscape. The high rate of deforestation observed in this study requires investment in sustainable forest management to maintain the health and integrity of forest ecosystems, conserve biodiversity, mitigate climate change, and provide livelihoods for communities that depend on forests. Investing in sustainable forest management will also help conserve ecosystem services, provide social and community benefits, and align development efforts with the growing trend of green investments and impact investing for a green economy. Key investments for consideration in this regard include reforestation and afforestation of severely degraded land, conversion, and passive reforestation of marginal agricultural land into silvo-pastoral systems for adapted livestock species or community conservancies and

encouraging private investments in commercial forestry for all socioeconomic category of farmers down to smallholder commercial woodlots thereby enhancing household income diversification and resilience.

- (c) Design and pilot payments for ecosystem services (PES). The analysis has generated first-order evidence to support the design and implementation of two pilot schemes for payment for ecosystem services (PES) based on appropriate global examples. The first is sustainable landscape management to reduce land degradation and soil erosion on catchments of water-supply dams for urban settlements in Mazowe Catchment. Candidate urban settlements include Bindura, Murewa and Mutoko. The second is sustainable landscape management scheme to verifiably generate and sell emissions reduction through carbon funds. A carefully selected catchment such as the Mazowe could include hard investments and governance arrangements to generate and sell carbon credits from an integrated combination of climate-smart agriculture, sustainable forestry management, biodiversity conservation and sustainable landscape management.

In conclusion, the TA highlighted the role of the private sector in biodiversity conservation and sustainable landscape management in Zimbabwe through i) financing projects that contribute to the conservation, restoration, and sustainable use of landscape; and ii) directing financial flows away from projects with negative impacts on biodiversity and ecosystem services. However, government holds the key to harnessing the power of the sector to mobilize the needed private finance at scale to protect nature. Government can support the integration of biodiversity criteria in private sector decision making by adopting natural capital accounting and making relevant data available as public good. Secondly, environmental fiscal policy reforms that value natural capital can provide incentives for the private sector to co-invest in the sustainable use of natural resources and contribute toward net domestic resource mobilization. Thirdly, government can drive the green transition by promoting policies such as greening the supply chain to drive changes in corporate behavior. Lastly, there is a need for multi-sectoral, people centered approach to natural resources management by ensuring the integration of natural capital consideration into planning, budgeting, implementation, and decision-making at the national and local levels to help build climate resilience.



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