The Economic Benefits of Forest Conservation in the Udzungwa Mountain National Park and Kilombero Valley, Tanzania

George Jambiya

To the east of the Udzungwa Mountain National Park (UMNP) lies the Kilombero District of Morogoro Region, and to its west is Iringa Region. The tributaries from the Udzungwa Mountains drain into the Kilombero River into the Kilombero Valley, the northwestern sides of which form a rich farming area. Here, in one of Tanzania's most productive agricultural areas, a variety of food crops (such as maize, rice and beans) and cash crops (such as sugar) are grown.

The UMNP is one of Tanzania's newer National Parks, formally designated in 1992 and managed by the Tanzania National Parks. It is endowed with hundreds of different species of trees, shrubs, climbers and herbs, of which around 50 are endemic to the area. Other important species include the Red Colobus monkey, elephant, lion and leopard. There is no doubt about the high degree of biological endemism and the biological richness of the area.

The UMNP has both economic and ecological importance, including regulating microclimate due to the existence of the forest reserve (this assists in bringing adequate rainfall and moisture throughout the year). It also serves as a source of water for many rivers and tributaries, especially into the Kilombero River. The National Park provides employment for a range of secondary and tertiary economic activities such as Tanzania National Parks, ecotourism ventures, Tanzania Electricity Supply Company, the Ilovo Kilombero Sugar Company and the Kilombero Teak Company. Through a community conservation programme, UMNP is a source of funding for local schools, health facilities, transport and staff houses. It generates a wealth of agricultural income and food security, and generally contributes significantly to district and national economies.

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A survey was recently carried out to assess the economic value of UMNP in terms of its provision of all these goods and services. Unlike many of the economic valuation surveys carried out in Europe and North America (which typically cost up to US$ 250,000 and require many months, much highly specialized technical expertise and equipment), this survey was more appropriate to the case and conditions of a developing country such as Tanzania. It took just one week, and few financial, material or staffing resources. And yet this survey has yielded extremely valuable information for conservation and land use planning, funding and implementation.

Valuing the UMNP had a number of very practical applications and uses, including demonstrating the high values associated with conservation of the area's biological resources and natural habitats. It showed that conservation provides tangible and quantifiable economic benefits to individuals, households, government, the private sector, the national economy and the global community. Basically everyone benefits from the conservation of UMNP, although for too long few have appreciated these economic and ecological benefits. Valuation also helped to highlight that significant and wide-ranging costs will be incurred if UMNP is not conserved. These costs will accrue in terms of a decrease in economic efficiency, equity and growth, as increases in private and public expenditures, as losses in local livelihood security and particularly will detract from the economy of the highly productive Kilombero Valley. Valuation shows that the conservation of UMNP is justifiable in economic terms, not only as an ecological "bank" but also as an economically beneficial investment and land use option for local communities, for central and local government, and for all the private companies operating within the northwest Kilombero Valley. UMNP constitutes a valuable piece of natural capital that it is well worth conserving. It also highlights that it is necessary to take steps to provide incentives for conservation in the UMNP area by ensuring that adequate benefits from the park accrue to the groups who are responsible for, and bear the costs of, conservation. Last, but not least, it shows the need to identify sustainable sources of finance and funding mechanisms to ensure that UMNP can be conserved.

The Economic Value of Forests in Udzungwa National Park

The conservation of UMNP has traditionally been justified on the basis of the significant biodiversity that the Park possesses within its boundaries. These, however, represent just one of a wide range of benefits associated with the ecosystem. There also exist a host of economic benefits and values that accrue more widely, and stem from the conservation of the Park — direct, indirect, option and existence values. A variety of methods are available for valuing these benefits.

Matching Valuation Methods to the Economic Benefits of UMNP

Products/Services	Valuation methods
Forestry products	Demand/supply analysis Market prices Surrogate market prices
Carbon sequestration	Reduction in expected future damage cost from climate change Market valuation of physical effects Defensive expenditure –Avertive behaviour – Cost of illness
Plants used in traditional medicines	Substitute prices Contingent valuation methods
Biodiversity conservation Ecotourism Non-use values Potential medicinal plants	 Travel cost method Contingent valuation Market prices Contingent valuation Expected value of a plant as source of medicinal substances
Agricultural Production from down stream water supply	Demand/supply analysis Market prices Surrogate market prices
Protective services provided to property and production activities (e.g. against soil erosion and flooding)	Reduction in expected future damage cost from climate change Market valuation of physical effects Defensive expenditure – Avertive behaviour (cost of replacement, rehabilitation cost methods, cost of relocation, additional establishment costs) Demand/supply analysis Market prices
Generation of electricity	Demand/supply analysis Market prices Surrogate market prices

The monetary values calculated for UMNP show that the secondary benefits stemming from conservation are indeed substantial, especially when compared with the current levels of investment being made in the Park. Just taking the direct financial and economic benefits accruing to large agro-industrial concerns in the Kilombero Valley shows TSh 17 billion accruing to Ilovo Kilombero Sugar Company, TSh 20 billion projected income for exports from teak, and TSh 4 billion to local maize and rice production. There are also other incomes such as tourist gate fees, which amount to TSh 12 million. And these figures do not even take account of all the other downstream benefits related to

Photo by Francis Karanja

The Distribution of the Benefits and Costs of Conserving UMNP

	Benefits	Costs
Global beneficiaries	Carbon sequestration functions. The present value of future damage is between $11.4 and 83.6 million (9,120,000,000/= - 66,880,000,000/=).	Investment costs – through international conservation partners about $900.000 (720,000,000/=) over 5 years
Government budget	Royalties, taxes and licence fees. Water use (Tanesco) 125,000,000/= per year Land use (KVTC) 9,503,662.50 per annum Other fees include livestock feeding fees of 100/= per head of livestock in the flood plains during the dry season – payments accrue to District Council	Investment costs from (TANAPA) 300,000,000/= (1999/2000)
Commercial profits	Income from tourist visitors as TANAPA gate fees T.Shs 12,377,696.50 - last year (minus Travel Cost) Income from the production and sale of electricity worth 7,000,000,000,000/= T.shs a year. Income from the sugar industry worth (17 billion) or 17,120,000,000/= a year Fisheries Livestock incomes worth. Potential incomes from teak exports T.shs 20,160,000,000/= a year.	Energy substitution costs (costs of producing the same energy through thermal generation = higher production costs and less profits). Introduction of alternative technologies Importation of sugar/substitutes: These could be cheaper but inferior products
Household livelihoods	Agriculture output worth (almost 4 billion) – T.shs 3,970,425,000/= a year Domestic energy inputs. Fisheries production from the streams and rivers Maintenance of soil fertility and agricultural productivity. Other biological resources.	Costs of participating in biodiversity conservation activities Unsustainable fuel wood use forgone. Loss of land and resource use opportunities in protected areas.

water supplies and use, which — although currently unquantifiable — are immense.

These values provide extremely important information about the economic value of forests, especially regarding the relative ease of carrying out valuation studies in developing countries such as Tanzania, and in terms of generating recommendations for the implementation and funding of funding conservation in UMNP. The study shows that it is possible to conduct a low cost (in terms of funding and time) study that can generate useful data for real-world planning and management. It also highlights the distribution of UMNP's "externalized" benefits within the Kilombero Valley. The groups that enjoy the benefits from the conservation of UMNP are nor necessarily the ones who bear the costs associated with its conservation. Most of the costs of conservation are borne by local communities (opportunity costs) and the Tanzania government (management expenditures). Meanwhile, the major benefits of conservation accrue to other, downstream and commercial, groups. The valuation study shows that there is a strong economic justification for conserving UMNP, which can prove attractive and convincing to decision-makers and policy-makers. It also highlights groups that can be targeted to participate in (and even fund) conservation activities. The information generated by the study raises the need for new and additional funding mechanisms for the conservation of UMNP, and can be used to present a rationale for increased central government budget allocations as well as possible contributions from large commercial companies such as Ilovo Kilombero Sugar Company, Tanzania Electricity Supply Company, Kilombero Valley Teak Company and others. Finally, there are benefits — such as those associated with the conservation of biodiversity of global significance, and carbon storage — that accrue internationally, and can be used to seek external assistance for the conservation of UMNP.