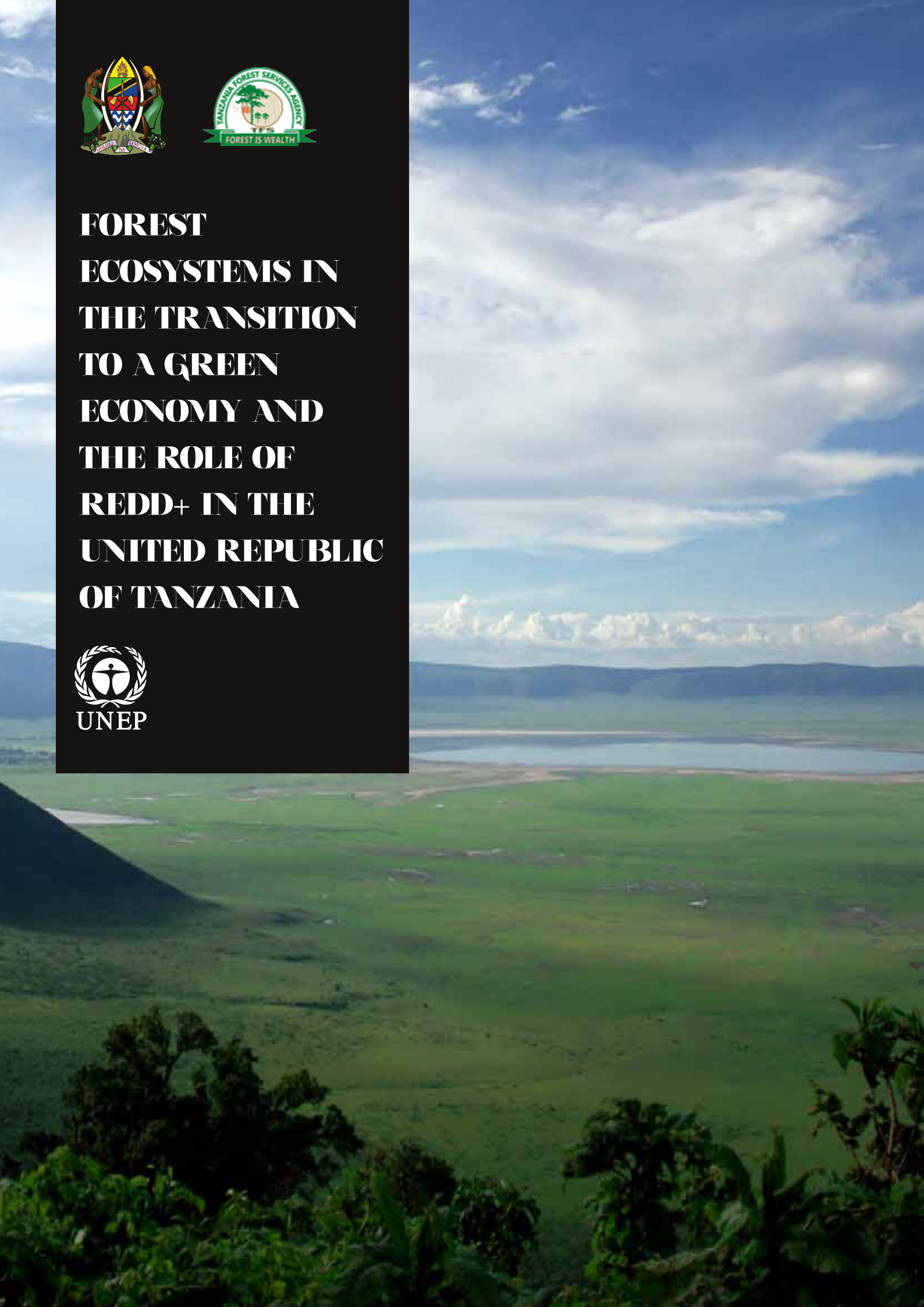




**FOREST
ECOSYSTEMS IN
THE TRANSITION
TO A GREEN
ECONOMY AND
THE ROLE OF
REDD+ IN THE
UNITED REPUBLIC
OF TANZANIA**



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We regret any errors or omissions that may have been unwittingly made.

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Foreword

Goods and services provided by ecosystems, including forests, are consistently undervalued in standard economic indicators such as gross domestic product (GDP). As a result, forests and other ecosystems are degraded and used unsustainably, which impacts many groups in society, not least the rural poor, who often depend on timber and other ecosystem goods and services for their livelihoods. A growing recognition is developing, of the urgent need for action to halt the degradation and loss of this natural capital.

One of the key policy recommendations of the Millennium Ecosystem Assessment was to integrate sustainable ecosystem management in national policies, plans and programmes to ensure human well-being, while acknowledging that all sectors of the economy benefit directly and indirectly from nature in terms of added value through links with other sectors. The adoption of the outcome document during the UN Conference on Sustainable Development (Rio+20) further reiterated the need to better account for natural capital and critical ecosystem services towards a transition to a Green Economy.

The System of Environmental-Economic Accounting – Experimental Ecosystem Accounting (SEEA – EEA) of the United Nations, published in 2013, provides an important first step in the development of a statistical framework for ecosystem accounting. The SEEA-EEA framework was used for this report to assess how deforestation affects the economy of Tanzania, both by looking at the limited ecosystem goods and services currently reflected in GDP and by looking at the effects on the economy if the full suite of forest ecosystem services are taken into account. Based on current available data (NAFOMA 2014), the results show that current deforestation levels are unsustainable from a macro-economic point of view. The effect on the economy is stronger if degradation of currently unaccounted for ecosystem services – such as water provisioning for agriculture, hydropower, domestic and industrial, water for environment and non-wood forest products – are integrated in the country’s national accounts.

This work is part of a range of activities offered by the UN-REDD programme to support the Government of Tanzania by enabling it to build the economic case for sustainable management and conservation of the country’s forest ecosystems as part of REDD+ implementation. The analysis provides insight for the National Bureau of Statistics, the Ministry of Finance and President’s Office Planning Commission on how to start accounting for Tanzania’s natural capital and how this can be linked to the country’s national accounts.

The findings show that investment in the forestry sector has a disproportionately positive impact on the incomes of rural households in comparison to stimulating output from other sectors, meaning that investment in forestry could contribute to alleviating poverty. Taking these findings together, this report presents a solid case for Tanzania to integrate REDD+ policies into key economic sectors such as energy, agriculture, livestock, industries, transport and water to address the drivers of deforestation and forest degradation while identifying how the implementation of REDD+ can be part of Tanzania’s broader economic and development strategy, as the country plans to move towards REDD+ results-based actions that could lead to results-based payments and then towards Green Economy pathways to sustainable development and poverty eradication in Tanzania.



Juma S. Mgoo

Tanzania Forest Services

Ministry of Natural Resources and Tourism

July 2015



Achim Steiner

UNEP Executive Director

United Nations Under-Secretary General

Executive summary

Key messages

- **The main objective of this study is to assess whether there is an economic rationale for the reduction of deforestation in the United Republic of Tanzania, by calculating the economic costs and benefits based on current levels of deforestation.** The study is part of a range of activities offered by the UN-REDD Programme in support of the Tanzanian Government. REDD+¹ is a concept designed to reward developing countries for their verified reductions or removals of forest carbon emissions compared to a forest reference level or forest reference emission level that complies with the relevant safeguards.
- The Tanzanian mainland is estimated to have a total of 48 million hectares (ha) of forest, which is 51 per cent of the total area, with woodlands occupying about 90 per cent of the total forest area and the remainder being shared by mangrove forests, montane forests, small patches of coastal forests, and plantations of softwood and hardwood. Annual deforestation on the Tanzanian mainland is estimated by the National Forest Monitoring and Assessment (NAFORMA, 2014) at 372,816 ha between 1995 and 2010.
- **A cost-benefit analysis revealed that the present value of net economic losses from deforestation to the Tanzanian economy over the next 20 years (2013–2033) is TSh 273 billion (US\$ 171 million).** This analysis only included those provisioning forest ecosystem services that are captured by the system of national accounts and which can therefore be reflected in the gross domestic product (GDP). A discount rate of 5 per cent was used, which is the rate that the Bank of Tanzania uses in analysing long-term investments. This means that based on available data, it makes **economic sense to reduce deforestation and implement policies and measures that tackle the direct and underlying drivers of deforestation.**²
- A second scenario analysis using data from Catchment Forest Reserves took into account the economic effect of deforestation not only on timber resources, but also on other provisioning services, including non-timber forest products, regulating services such as water provisioning for domestic use and livestock, and supporting services such as biodiversity. **The present value of net losses from deforestation to the Tanzanian economy in the period 2013–2033 amounts to TSh 5,588 billion (US\$ 3.5 billion). This shows that the present value of net losses are an order of magnitude higher when taking into account the effect of deforestation on the full range of forest ecosystem services.**
- Lastly, additional analysis also highlighted that **investments in the forestry sector lead to comparatively higher income for rural populations than the same investments in the sectors of agriculture and wood, paper and printing.** Hence, investments in the forestry sector could potentially also be beneficial from the perspective of poverty alleviation.
- These findings highlight that it is economically interesting for the United Republic of Tanzania to invest in conserving its forests, and therefore present a case for the Government to tackle the direct and underlying drivers of deforestation and transition, moving towards an economic model that stimulates sustainable use and conservation of forest ecosystems by implementing REDD+. In that sense, this report provides further rationale for efforts to accelerate the implementation of the REDD+ National Strategy and Action Plan.

1 “REDD” and “REDD+” refer to the mechanism called “Reducing emissions from deforestation and forest degradation in developing countries”, which emerged in 2008, building in the roles of conservation and sustainable management of forests, forest restoration and reforestation. REDD+ is an enhanced version of the mechanism.

2 It should be noted however, that the cost-benefit analysis does not take into consideration the potential alternative income from activities after land is deforested (e.g. agriculture).

Introduction

The United Republic of Tanzania is one of the 60 partner countries of the UN-REDD Programme and one of the 21 countries with a national programme (as of May 2015). The United Republic of Tanzania has made progress in a range of areas that are part of the Warsaw Framework for REDD+, or the so-called “REDD+ Rulebook”. The valuation of the country’s forest ecosystems and their contribution to its economy was one of the activities that continued after its national programme closed in 2013 as part of the UN-REDD support for national actions.

The country is highly biodiverse and is renowned for the richness of its wildlife. Approximately 38 per cent of the country’s mainland is set aside in protected areas for conservation. The Tanzanian mainland is estimated to have a total of 48 million ha of forest, which is 51 per cent of the total area, with woodlands occupying about 90 per cent of the total forest area and the remainder being shared by mangrove forests, montane forests, small patches of coastal forests, and plantations of softwood and hardwood (NAFORMA, 2014).

Forests provide a range of ecosystem services, of which some can be reflected in market prices, such as timber and derivative products like paper. Other services that are also important for the economy, such as the ability of forest soils to purify water for domestic and industrial use, regulate run-off to support hydroelectric power generation, sequester carbon, etc., are usually quantified using shadow prices as opposed to market prices (see figure 1 for an overview of some ecosystem services that forests provide to the Tanzanian economy and society). The current contribution of the forestry sector to the country’s gross domestic product (GDP)³ is 3 per cent (National Bureau of Statistics, Ministry of Finance 2013).

Deforestation in the United Republic of Tanzania is driven by the expansion of agricultural activities, including through shifting cultivation, wildfires, lack of clearly defined boundaries, illegal logging, livestock grazing, unsustainable charcoal production for domestic and industrial use, lack of systematic management, introduction of alien and invasive species, etc. These driving forces are depreciating the country’s natural capital or stock of forest ecosystem assets, because, as forests disappear, so may the benefits that these provide in terms of regulating water run-off, reducing soil erosion, capturing and sequestering carbon, etc. Deforestation rates range from 130,000 to 500,000 ha per annum (FRA, 2010), with different sources setting the rate at 142,720 ha in 2013 (GFW, 2015) and 372,816 ha per annum between 1995 and 2010 (NAFORMA, 2014). The NAFORMA figure has been used for the analysis in this study.

The primary goal of this study is to provide an insight into the economic costs and benefits of deforestation in the United Republic of Tanzania. The analysis focuses both

on the specific effect of deforestation on the GDP of the forestry sector, and also on the impact of deforestation on the broader economy. One way to look at this is as follows: If deforestation affects the water cycle it will have a negative impact on the value added of the hydropower or energy sector if energy generation is impaired. In a similar fashion, agriculture can be affected if deforestation increases soil erosion or impairs the irrigation system. This can lead to higher costs (e.g. additional fertilizers) or lower yields (due to poorer soil quality). In that way, this analysis provides a broader perspective of deforestation on the economy. The System of National Accounts (SNA) is used by governments around the world for macroeconomic policy making and defines how GDP is calculated.

As a second step, the report gives policy makers in the Tanzanian Forest Service (TFS), the National Bureau of Statistics (NBS), the Ministry of Finance and Economic Affairs, the Ministry of Natural Resources and Tourism and other public and private stakeholders in the United Republic of Tanzania more visibility about the important roles that the forest sector plays in supporting the welfare of households across the country and its direct and indirect contribution to the economy in terms of added value through interlinkages with other sectors. In doing so, the study provides the rationale for the United Republic of Tanzania to move ahead with the implementation of REDD+ through actions, policies and measures that could generate results-based payments.

Costs and benefits of deforestation for the Tanzanian economy

1. Monetary costs and benefits of deforestation captured by the System of National Accounts

The first scenario analysed how the monetary benefits that society obtains from cutting down forests (in terms of obtaining useful provisioning services such as timber) compare to the monetary costs to the economy of the lost value added of the forestry sector. In doing so the interlinkages that the forestry sector has with other sectors were taken into account by using an input-output analysis and social accounting matrices. The social accounting matrix is an extension of an input-output table, which, in addition to income and expenditure flows of industries and their outputs which are captured by input-output tables, contains detailed information that captures all transfers and real transactions between industries and institutions in the economy. The values presented below can be directly captured by the SNA⁴.

1. Benefits of deforestation: The benefits are one-off financial benefits from provisioning services (mainly

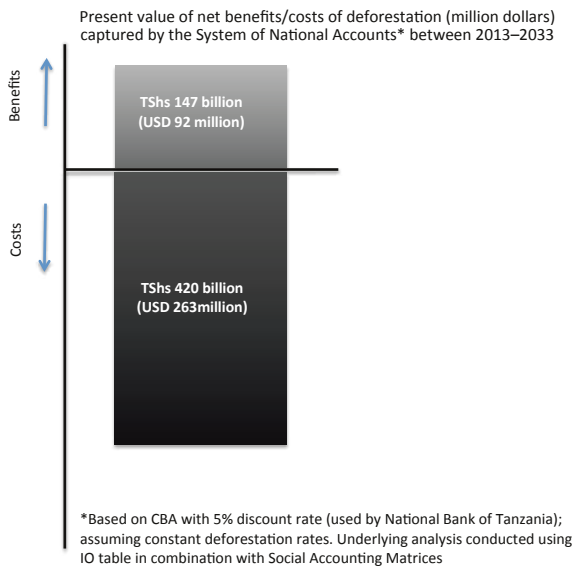
³ The contribution was 3.10 per cent at 1992 prices and 2.70 per cent at 2001 prices.

⁴ The analysis assumed that deforestation levels, which on average were 372,816 ha per year between 1995 and 2010 (NAFORMA, 2014), would remain constant for the next 20 years: 2013–2033. A discount rate of 5 per cent was used, which is the rate that the Bank of Tanzania uses in analysing long-term investments (see Sanga and Mungatana, forthcoming).

timber). These are TSh 29,233 per hectare per year (2013). Based on deforestation levels of 372,816 ha per year, **the discounted benefits over the period 2013–2033 are estimated at TSh 147 billion (US\$ 92 million).**

2. Costs of deforestation: There are two types of costs. First, once a hectare of forest has been cut down that same hectare does not contribute any more to the value added of the forestry sector the following year. Second, there are multiplier effects as investments in the forestry sector contribute to the value added of other sectors in the country. In other words, deforestation will reduce this positive indirect effect on other sectors. Combining these two costs results in total costs of TSh 83,771 per hectare per year (2013). Based on deforestation rates of 372,816 ha per year, **the discounted costs for the period 2013 to 2033 amount to a total cost of TSh 420 billion (US\$ 263 million).**

Figure 1. Present value of net benefits and costs of deforestation captured by the System of National Accounts (SNA) between 2013 and 2033



In conclusion, the present value of net losses from

2. Visualizing the economic costs and benefits of deforestation on the broader economy

The second scenario assessed how the one-time monetary benefits that society obtained from deforestation compared to the monetary costs of lost provisioning, regulating and supporting ecosystem services. The analysis is based on data from catchment forest reserves (CFRs) issued by the Ministry of Natural Resources and Tourism (MNRT, 2003). The CFRs in the survey covered 677,203 ha and are found in Morogoro, Tanga, Kilimanjaro and Arusha. The survey includes services produced by the forestry sector that supports value added in other sectors (e.g. agriculture, tourism, energy) such as:

- Provisioning services (timber-related): timber, poles, firewood, withies
- Provisioning services (non-timber forest products): wild fruits, traditional medicines, wild vegetables, bushmeat, mushrooms, ropes
- Other provisioning, cultural and regulating (intermediate) services: water provisioning for domestic use and livestock, water for irrigation, water for electricity generation (hydropower), fisheries, prevention of soil erosion and tourism.

The benefits of managing CFRs on a sustainable basis, extracting timber resources, non-timber forest products, and intermediate services, amount to TSh 1 million per hectare per year. The decision to cut down a hectare of forest in the CFRs has costs and benefits. There are 'one-off' benefits in terms of the economic value of timber forest products of about TSh 102,993 per hectare. The costs can be computed as lost timber (after a hectare is cut down it does not deliver any timber-related products from the next year onwards), non-timber forest products and regulating and supporting services, which on an aggregate basis are TSh 1 million per hectare. Discounting the costs and benefits for the next 20 years leads to net benefits of **TSh 38 billion (US\$ 24 million)** and net costs of **TSh 5,627 billion (US\$ 3.5 billion)**, see figure 2.

This shows that when taking into account the full range of forest ecosystem services, it is even more economically unattractive to continue current deforestation rates. Please

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