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# Accounting for the value of the environment

An environmental accounting study from Ethiopia

### Abstract

In Ethiopia, as in many African countries, policy makers are trying to make their nation's economic development more sustainable. One of the challenges they face is that traditional economic accounting does not adequately take into consideration the services that the natural environment contributes to a country's economy. Natural resources are, all too often, viewed as a "free gift of nature". To address this issue, a new CEEPA study from Ethiopia looks at how environmental resources – and their depletion or degradation - can be properly incorporated into national economic accounting.

The study finds that the economic contribution of forests to Ethiopia's economy is significantly underestimated in the country's current economic accounts. It also shows that there is not sufficient information available to construct full physical and monetary accounts for Ethiopia's forestry. The study therefore recommends a number of steps that should be taken to allow full forest accounts to be created. For example, it recommends that Ethiopia needs an information system that tracks both the acreage of land under forestry and the physical quantities of forest goods that are extracted.



Ethiopia's forest is undervalued.

A summary of CEEPA Discussion Paper No. 47: 'Forestry Resource Accounting: The Experience of Ethiopia,' by Sisay Nune, Menale Kassie and Eric Mungatana, from the Environmental Economic Policy Forum for Ethiopia (EEPFE), Addis Ababa, Ethiopia and the Centre for Environmental Economics and Policy in Africa (CEEPA), University of Pretoria, South Africa.

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## **Report Summary**

In Ethiopia, as in many African countries, policy makers are trying to make their nation's economic development more sustainable. One of the challenges they face is that traditional economic accounting does not adequately take into consideration the services that the natural environment contributes to the country's economy. Natural resources are, all too often, viewed as a "free gift of nature". To address this issue, a new CEEPA study looks at how environmental resources – and their depletion or degradation - can be properly incorporated into Ethiopia's national economic accounts. To do this it makes an initial attempt to construct accounts for the country that include the full benefits that forests provide to the economy.

The study is the work of Sisay Nune, Menale Kassie and Eric Mungatana from the Environmental Economic Policy Forum for Ethiopia and CEEPA. It finds that the economic contribution of forests to Ethiopia's national economy is significantly underestimated in the country's current accounts. It also shows that there is not sufficient information available to construct full physical and monetary accounts for Ethiopia's forestry. The study therefore recommends a number of steps that should be taken to allow full forest accounts to be created. For example, it recommends that Ethiopia needs an information system that tracks both the acreage of land under forestry and the physical quantities of forest goods that are extracted.

#### **Promoting Environmental Accounting**

This study is part of the Natural Resource Accounting in Eastern and Southern Africa (NRAESA) project. The NRAESA project aims to help governments in the eastern and southern Africa region adopt environmental accounting and use it for policy purposes. The project is focused on four countries (Tanzania, Uganda, Ethiopia and Mozambique) and is managed through the Centre for Environmental Economics and Policy in Africa (CEEPA), which is itself based at the University of Pretoria. In Ethiopia, the NRAESA project has been implemented on a pilot basis in both the forestry and the land cover/land use sectors.

Ethiopia's forest resources cover about 50.6% of the country's total land area and fall into six broad categories: forestlands, woodlands, shrub lands, bush lands, plantations (manmade forest) and bamboo. Ecologically, the forest provides habitats for a multitude of animal and plant life. Partly because of its forests, Ethiopia is a key global centre of diversity for both fauna and flora.

The country's forestry sector offers employment opportunities for both urban and rural communities. The country's Central Statistics Authority estimates that the forestry sector absorbs 0.29% of the nation's total employed persons (31.44 million). However, this figure does not include the employment opportunities for households in the collection and sales of biomass fuel and exudates. For instance, more than 15,000 urban-based women carry approximately 35% of the wood fuel requirements of Addis Ababa city. For 82% of these women, this is their only source of income.

#### Valuing Forest Services and Resources

As said, this study is an attempt to construct forest resource accounts in Ethiopia and to identify gaps that must be filled to complete these accounts. To do this, the study focuses on the key goods and services that Ethiopia's forests provide. Among the 'direct value' resources that the study considers are: timber, poles, charcoal, firewood, fodder, medical plants, honey and beeswax, forest (wild) and semi-forest coffee, exudates, thatch and bamboo. The choice of resources for assessment was based on the availability of data for each resource and on their importance to the economy of Ethiopia.

Two indirect forest services were considered: carbon sequestration services and watershed protection benefits. The carbon sequestration services were considered because of their increasing importance to climate change science. Watershed protection benefits were considered because changes in forests' watershed functions can have such significant impacts. These impacts include soil erosion, altered downstream water flows, flooding and sedimentation and consequent damage to agriculture, fisheries, dam storage, and power generation.

#### **Assessing Quantity and Value**

Forest assets were first assessed in physical terms (i.e. area and volume). The extent of each of the six forest category was assessed. Any alterations in the area of each were calculated by assessing positive and negative changes such as afforestation and depletion. The primary sources of information used to construct the physical forest accounts were the Woody Biomass Inventory Strategic Planning Project (WBISPP) data for 1995 and 2005. WBISPP is a comprehensive data base that was used to inform the National Strategic Plan for the Biomass Energy Sector in Ethiopia. Production levels of non-wood forest products were calculated using relevant data from other sources. For example, the annual amount of honey and beeswax produced from forests was estimated using information on the number of beehives in Ethiopia and data on average production per beehive.

Once the physical forest assets had been assessed, they were converted into monetary values using information from a variety of sources. For example, as part of the valuation of forest products, the net prices (stumpage prices) of construction wood, fuel wood and charcoal were used to turn production volumes of these resources into monetary values. The stumpage price information was obtained from computations done by the Ministry of Agriculture and other researchers. Some of the calculations posed particular challenges. For example, the valuation of carbon sequestration services was difficult because the market for carbon is at a rudimentary stage. To attempt to get a monetary value for these forest services, the study used the market price for tradable emission permits and the World Bank Biocarbon fund rate for purchased carbon. This was just one area where information was rudimentary or inadequate. For this reason, many assumptions had to be made to compile the final forest accounts.

#### **Ethiopia's Forests are Undervalued**

The study results suggest that between 1995 and 2005 the pressure of forestry land was reduced (although the area of forestry land lost increased). The same is true for woodland and shrub land vegetation. For bush land vegetation, the pressure of destruction has increased by about 75% in the same ten year period. The pressure on bamboo vegetation category has remained constant over this time, while the overall extent of plantation forests have expanded. This means that from a conservation perspective bush land vegetation presents the greatest challenge.

The total value of the wood and non-wood forest products harvested from Ethiopia's forests was ETB 6.21 billion in 1995 and ETB 10.45 billion in 2005. This tallies with the recorded increase in forest resource utilization. The watershed benefits of the forest sector in 1995 were ETB 8.54 billion and ETB 11.27 billion in 2005. This increase is due to the impact of afforestation, which was not included in the 1995 figure due to a lack of data.

	Forestry	Woodland	Bush land	Shrub land	Bamboo	Plantation	Total
Opening Area	(-) by 18%	(-) by 4%	(-) by 8%	(-) by 2%	No Change	(+) by 15%	(-) by 4%
Afforestation	No Change	No Change	No Change	No Change	No Change	(+) by 100%	(+) by 100%
Regeneration	(-) by 18%	(-) by 4%	(-) by 8%	(-) by 2%	No Change	No Change	(-) by 4%
Deforestation	(-) by 26%	(-) by 8%	(+) by 71%	(-) by 6%	No Change	No Change	(-) by 5%
Net change	(-) by 27%	(-) by 8%	(+) by 75%	(-) by 6%	No Change	(+) by 100%	(+) by 8%
Closing Area	(-) by 18%	(-) by 3%	(-) by 11%	(-) by 2%	No Change	(+) by 24%	(-) by 3%

#### Percentage increase (+) or decrease (-) between 1995 and 2005

Overall, the study finds that if Ethiopia was to do a total wealth accounting exercise, then the value of its forest resources was worth 89 billion ETB in 1995 and 83 billion ETB in 2005. When compared to Ethiopia's overall economy, the economic contribution of the forestry sector was11.60% of the country's total GDP in 1995 and 9.0% in 2005. Its economic contribution including watershed services was 27.5% percent in 1995 and 18.8% in 2005. The percentage contribution of forests to the national economy climbs further still if the following services are taken into account: the value of wild edible plants, spice resources, and the contribution of protected areas to the national economy.

It is important to note that the economic contribution of forestry sector listed in Ethiopia's existing national accounts was 6.4% in 1995 and 4.7% in 2005. This strongly indicates that the economic contribution of forests to the national economy is significantly underestimated.

#### Steps Towards Full Environmental Accounting

One partial reason for the undervaluing of Ethiopia's forest resources is the fact that the economic value of extractive forest products such as fodder, forest coffee, honey and beeswax is currently not attributed to the forestry sector. Instead, they are wrongly attributed to other sectors of the economy. The study therefore recommends that these accounting inaccuracies should be addressed. So, for example, the agriculture GDP for 1995 should be reduced by a value of 86 million ETB and this value added to the forestry GDP for that year.

The major finding of this study is that the forestry information currently available in Ethiopia is insufficient for the construction of full physical and monetary accounts for the country's forestry. Because of this, Ethiopia needs an information system that tracks the acreage of land under forestry by year and the physical quantities of forest goods extracted by year (and their associated accounting prices). The study therefore recommends that the country's forest sector sets up and manages a forestry information system that will eventually provide data in a form that can be used for forest resources accounting.

#### Looking to the Future

The study also recommends that an information system should be put in place to collect data on the value of natural forests and woodlands so that, in the long run, a time series of these values can be produced. This can be done by incorporating questions related to the use of natural forests and woodlands in one of the regular surveys done by the Central Statistics Authority (CSA). This should be able to be done at no significant additional costs to the CSA.

One of the main uses for forest resources accounting is to properly account for the contribution of the forestry sector to national income. The study therefore suggests that corrections for the true value of the country's forests should be incorporated into national income accounts on a regular basis. This will serve as a foundation for the development of the country's accounts so that they can incorporate other environmental resources in the future.

#### **CEEPA**

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#### **Research Sponsors**





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