NTFP-PFM
South-West Ethiopia
Forested Landscapes and Livelihoods

Briefing Note 5

Economic Assessment of the Costs of Deforestation in South-West Ethiopia

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Summary

This policy briefing note summarises the findings of a major study of the economic costs and benefits associated with deforestation in south-west Ethiopia (Sutcliffe, 2009). This part of the country is a unique area with national, regional and global significance. Deforestation has been progressing here for centuries as populations expand andmore recently in response to the allocation of forest land for investment. Loss of forest often occurs in part because forests are undervalued in policies and in decision making and this appears to be true in this area. Calculation of extractive, non-extractive and preservation values lost through deforestation are made along with the benefits from deforestation. These show that the average annual net loss through deforestation in the Baro-Akobo basin is US$42.5m. This suggests that there are major policy reforms needed to ensure the forest resources of this area are best used for the country, while major funding for the environmental services provided should be sought in order to reduce the costs borne by communities due to the halting of deforestation. It is suggested that funding for weredas should not be based only on population but should also consider natural resources, such as forests and their value. The study shows that active forest management through PFM arrangements can greatly increase the development contribution of the forests of south-west Ethiopia.

Introduction

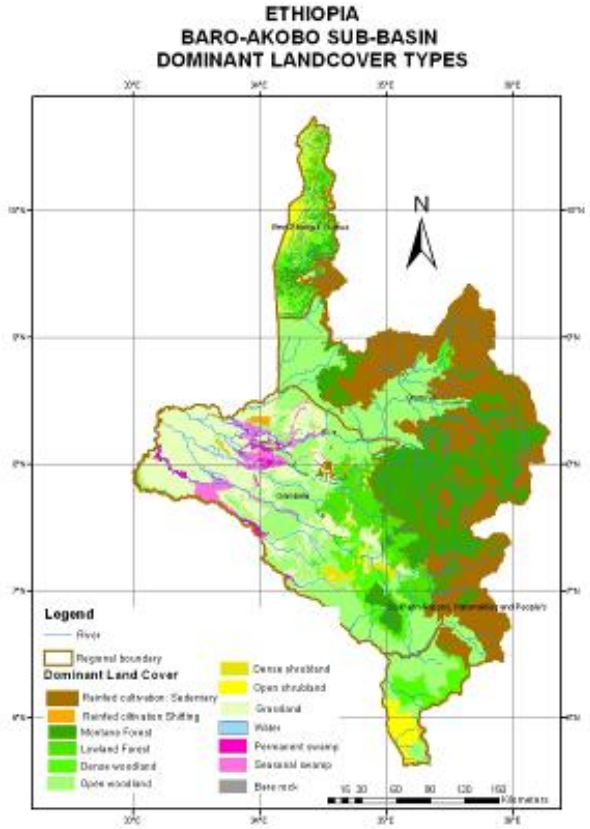
Often one of the fundamental causes of deforestation is that forests are undervalued. The total economic value of not only the timber products they produce but also the non-timber products, the environmental services and the existence values they provide are not fully considered when policy and investment decisions are made to destroy forests.

The forests of south-west Ethiopia are one case where deforestation is occurring at an increasing rate because the true value of the forest is not recognised.

Study Area

This discussion refers to the Baro-Akobo Basin, a much larger area than the NTFP-PFM project is working in. The Baro-Akobo Basin covers some 76,103km^2 of south-west Ethiopia. The western half of the basin comprises flat lowlands below 800m amsl whilst that to the east comprises dissected highlands between 1,100 and 3,200m amsl.

Forest vegetation exhibits broad altitudinal relationships with Montane Broadleaf *Aningeria* Forest dominant between 1,500 and 2,500m amsl. Wild *Coffea arabica* is found mainly between 1,100 to 1,900m amsl. Within the basin the extent of the Montane Forest is some 14,090km^2. There were some 596 km^2 of Bamboo Forest and 544 km^2 of bamboo with Montane Forest in 1978 (Chaffey), most of which was found within the Baro-Akobo Basin.



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Besides the national value of these forests and their products, this area is of regional (multi-country) importance because of the Baro-Akobo river system, which rises in these forests, provides half the flow of the White Nile at Malakal in the Sudan. In addition, of global importance is the fact that these forests and woodlands sequester c 300m tons of carbon dioxide / year, a major greenhouse gas, while the forests contain 1.4m ha of wild coffee forest, with the greatest genetic variability in the world.

Rates of Deforestation

While there has been no specific monitoring of land cover changes across the basin as a wholein response to smallholder agricultural expansion and new resettlement and agricultural investment programmes, three specific studies provide some indication of the rate of deforestation in parts of south-west Ethiopia.

Table 1: Estimated Rates of Deforestation

Period	Rate of deforestation	Area of Study	Source
1987 to 2010	1.6%	B-A Basin excl invest & resettlement _	WBISPP 2001, 2003
1987 to 2005	1.2%	N. Bench, Sheko, Yeki& Dime	DerejeTadesse, 2007
2001 to 2005	3.6%	ditto	ditto
1987 to 2005	1.5%	Gesha, Masha, Sheko, N. Bench &Anderacha	Sutcliffe, 2008
2001 to 2005	3.0%	ditto	ditto

While the predominant rate of deforestation over the last two decades is less than 2%, the rate in the most recent periods seems to be accelerating to 3% or above. According to the Woody Biomass Inventory & Strategic Planning Project (WBISPP) average annual deforestation is 28,916ha.

Deforestation for farming near Masha

Types of Forest Economic Values

Lampietti and Dixon (1995) provide a framework for estimating the total economic value (TEV) of forests in terms of three categories:

1. Extractive, consumptive or direct use values, such as timber and non-timber products that can be harvested;
2. Non-extractive, non-consumptive or indirect use values, such as watershed functions, soil nutrient cycling, soil conservation, carbon sequestration, recreation and tourism; and
3. Preservation values, “option” value which people may pay for conservation of forest, and “existence” value which people may place on knowledge that the forest exists.

Such an assessment of the values lost due to deforestation must also consider the alternative land uses to forests which are be created and the benefits which they can bring, such as new crop production and fertile sediment on downstream farmland.

Estimating the Costs and Benefits of Deforestation

Estimating the costs and benefits of deforestation is complex and various procedures are needed to estimate these values. In addition, because many forest products are sustainably harvested every year and thus provide a stream of benefits into the future, it is necessary to discount the future net income to create Net Present Value (NPV) of these products (See Sutcliffe, 2009). (The NPV is the net benefit stream over 20 years discounted each year at 10% to reflect the reducing perceived value of a benefit the further into the future it is received.)

Loss of Extractive and Direct Use Values

The main extractive or direct use values of forests in the Baro-Akobo Basin include:

- Sustainable harvesting of wood products (timber, poles and fuelwood);
- Sustainable harvesting of non-wood products (honey, spices, palm leaves, tree ferns, bamboo, wild coffee and medicinal plants).

With an average annual deforestation rate of 28,916ha this amounts to an annual (NPV) loss of US$ 320 million.

Loss of Non-Extractive or Indirect Use Values

There are five potential sources of non-extractive value:

- Carbon sequestration;
- Watershed (hydrological) services;
- Soil conservation;
- Soil nutrient cycling;
- Biodiversity (especially coffee gene pool)

None of these values, except for carbon offsets, are traded in the market place at present.The total annual value of non-extractive services lost due to deforestation of 28,916ha of forest this amounts to an annual NPV loss of US$ 22.1million.

Loss of Preservation Values

The aggregate annual NPV value the loss of Preservation Values of this forest is $427,000, most of this being potential pharmaceuticals.

Benefits of Deforestation

Benefits are found in additional crops which can be grown on deforested land, reduced crop losses due to wild animals living in the forest, and downstream benefits from sediment deposited on irrigated fields. The total annual net present benefits of deforestation of 28,916 ha are US$ 40.25 million.

Finding

Using estimates of these various values and alternative land uses, the total net economic costs of deforestation in the Baro-Akobo Basin is US$ 1,470/ha. This has a net present value of US$ 10,091/ha (benefits for 20 years discounted at 10%). With an average annual rate of deforestation of 28,916ha this amounts to an average annual loss of US$ 42.5 million.

Table 2 Average Annual Costs & Benefits of Deforestn.

COSTS / BENFITS	US$ /ha/yr	NPV US $/ha	Total Annual NPV US$	Ann. Net Value
Extractive				
Timber	1,210.00	10,986	317,687,129	
NTFPs	17.77	161.29	3,205,729	
Total	1,227.77	11.147.29	320,892,858	**35.5m**
Non-Extractive				
Carbon Sequestn	153.75	153.75	3,055,835	
Watershed Cumulative	4.74	363.9	10,522,821	
Watershed Annual	0.03	2.3	45,777	
Soil Consn	1.45	111.59	2,217,890	
Soil Nut	3.98	36.13	718,029	
Coffee Gene Pool	280	280	5,565,097	
Total	443.95	947.67	22,125,449	**12.8m**
Preserv-ation				
Potential Pharmaceuticals	20.00	20.00	397,507	
General Biodiv	1.50	1.50	29,813	
Total	21.50	21.50	427,320	**0.6m**
TOTAL FOREST VALUES	**1,693.22**	**12,116.46**	**343,445,627**	
BENEFITS	**223.11**	**2025.18**	**40,254,874**	**6.4m**
NET	**1,470.11**	**10,091.28**	**303,190,753**	**42.5m**

(Annual Net Cost of deforestation = $1,470.11 x 28916 ha = US$ 42.5m)

The extractive values: timber and non-timber values clearly dominate the measurable values presented in Table 2, and the timber values dominate over the non-timber values. It must be stressed that this is partly a reflection of the difficulties of measuring the values of non timber forest products, non-extractive and protection values. It must also be stressed that the relatively small measurable economic value of NTFP's does not reflect their vital importance and value to poor households as livelihood safety net strategies.

Lessons

The key lessons from this study are:

- The scale of the economic losses (US$ 42 million per year) should indicate to the regional government and federal government that activities which involve deforestation need to be considered very carefully.
- At the national level the substantial values of forest to the national economy, in terms of its natural capital of some US$ 11,147/ha, are not reflected in development budget priorities both at Federal and regional level.The criteria for establishing these budgets should not be based only on population size alone, given the incentive to deforestation this creates.
- The scale of the regional and global economic values of the forest indicates the potential for tapping into payment for environmental services that conserve forest values. In this way regional and global beneficiaries can reimburse local communities who bear the costs of conserving these regional and global environmental benefits.
- However, a key problem is that many of the indirect use values do not accrue to the south-west region or even to Ethiopia: for example the low sediment loads in the Baro-Sobat system that benefit Sudan and Egypt, and the value of the CO2 that is sequestered and thus contributes to restraining global warming.
- The relatively low economic value of NTFPs does not reflect their vital importance and value to poor households as a livelihood safety net strategy which contributes to their nutritional levels.

Conclusions

This paper has shown that the value of the forests of south-west Ethiopia, within the Baro-Akobo Basin is much greater than is normally recognised. While this is mostly due to the value of the timber resources in that area, there are significant values from the watershed services provided by the forest and the coffee biodiversity. It is also important to note that the value of benefits from forest converted to farm land is much lower than has often been assumed, being less than 10% of the value of keeping the forest.

This analysis raises questions about the need for a specific policy towards the forests which recognises these values and incorporates them into a strategic plan of how best to manage this area. Clearly these forests have a considerable potential to contribute to national and regional development goals and active forest management through community-based Participatory Forest Management, which will make the forests productive and ensure they are maintained is one essential step.

The scale of the economic losses outlined in the paper should indicate to the regional and federal governments the true economic values of forest landscapes to the economy. The regional and global economic values indicate the potential for tapping into payments for environmental services to conserve the forests. In this way the forest resources have the potential to earn foreign exchange. These regional and global transfers, which could mitigate the costs communities face in avoided deforestation, are in the order of US$ 365/ha through regional forest values and US$ 455/ha for global values.

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South-West Forest and Landscapes Grouping

This grouping brings together three partners who have being working in this part of Ethiopia for more than 12 years: University of Huddersfield, Ethio-Wetlands and Natural Resources Association and Sustainable Livelihood Action. They have recognised the need for serious attention to be given to the forests and forested landscapes of the south-west highlands of Ethiopia. At present the grouping has two other projects in this area besides the NTFP-PFM Project.

NTFP-PFM Project Summary

The “Non-Timber Forest Products – Participatory Forest Management (NTFP-PFM) Research and Development Project in South-west Ethiopia” started in July 2003. Its first phase ran until July 2007 and a second phase, for six years, will continue until mid 2013.

The project has a “research and development” orientation, in which it combines an integrated technical approach to the sustainable use and management of forest resources with a participatory and gender/equity sensitive strategy for improved rural livelihoods.

The project tries to explore and disseminate successful ways of applying Participatory Forest Management in Ethiopia so that forests can pay their way and become viable and competitive land uses which are sustainably managed by rural communities. This involves policy support, PFM institutional development, forest enterprise development and the economically viable marketing of forest products

Through the direct involvement of government institutions and communities in project implementation and the dissemination of project findings, the project aims to ensure the sustainability of its initiatives and their scaling up.

Briefing Notes **(produced or in preparation)**

1. Challenges and Opportunities for Sustainable Forest Management in South-West Ethiopia
2. Collective Forest Land Certification: a milestone for tenure security and sustainable PFM in Ethiopia
3. PFM Institutional Development: experiences from the NTFP-PFM Project
4. Bamboo Forest Restoration through PFM: experiences from Masha
5. Economic Assessment of the Costs of Deforestation in South-West Ethiopia
6. Forest Policy Development : engaging PFM with the policy process in SNNPRS
7. Evolving Interpretation of Participatory Forest Management in South-West Ethiopia
8. Forest-Based Enterprise Development: comparative experience of cooperatives and PLCs
9. Land use change in the highlands of south-west Ethiopia, 1973-2012
10. The *Korerima*Value Chain: enhancing the value of forest products
11. Competitive and SustainableForests: making forests pay their way in south-west Ethiopia

Project Funding Agencies

European Union, Environment Budget

Royal Netherlands Embassy, Ethiopia

Royal Norwegian Embassy, Ethiopia

Project Partners

The University of Huddersfield: With 18 years experience of field research, project management and consultancy / advisory work on natural resources in Ethiopia.

Ethio-Wetlands and Natural Resources Association: The first Ethiopian NGO to focus on forest and wetland issues. It has worked with most of the donors in the country and has run projects in three of the country’s eight rural regions.

Sustainable Livelihood Action: A European Economic Interest Grouping which focuses on capacity building to support local NGOs and organisations in developing countries. Its staff have over 25 years of experience in Africa, Asia and Latin America.

Southern Nations, Nationalities & Peoples Regional State

For further details see: www.hud.ac.uk/wetlandsandforests/