

Counting the costs of conservation

Rural communities throughout the developing world depend on forests for shelter, fuel and food. But the rising global demand for agricultural land and timber has led to many being cut down. How can we place a price on the complex relationship between communities and the intact forests they depend on, asks environmental economist CHARLENE WATSON.

Crawling out of my tent, pitched in a glade of the montane forest, and making my way down to the small river running from the afro-alpine plateau, my field assistants snigger at my brightly coloured, ergonomic, super-grip, plastic toothbrush. More than content with their frayed twigs from the fig-like mettii tree to clean their teeth, I am ever reminded of the developed world's shift towards an increasingly artificial environment.

We're in the Bale Mountains, which lie in the Ethiopian Highlands, 400km southeast of the capital Addis Ababa. Topographically diverse, a central plateau rises 4,000m above sea level. With giant *Lobelia* species and ericaceous heath lands, this is the largest Afroalpine habitat on the African continent. It is also home to half of the global population of the rarest canid in the world, the Ethiopian wolf (*Canis simensis*) and the entire population of the giant mole rat (*Trachyoryctes macrocephalus*). Go south of the plateau and altitude falls rapidly – between



Charlene Watson

Bale is home to the rare Ethiopian wolf.

3,700 and 1,500m above sea level, the second largest stand of moist forest in Ethiopia is home to giant forest hogs (*Hylochoerus meinertzhageni*), lions and endangered African wild dogs (*Lycan pictus*), as well as threatened trees such as *Prunus africanus*. To the north of the central plateau, juniper-hagenia woodlands provide habitat for the endemic mountain nyala (*Tragelaphus buxtoni*) as well as antelope such as Menelik's bushbuck (*Tragelaphus scriptus menelikii*) and reedbuck (*Redunca redunca bohor*). With a high number of rare and endemic species living in the Bale Mountains, it has been identified as one of 34 global biodiversity hotspots.

With few alternative opportunities to generate income, households in the Bale Mountains are highly dependent on forests for their well-being. Although the traditional way of life is agro-pastoral, every household also gathers resources from the forest. Households harvest a variety of forest products, including those for shelter and housing construction, cooking fuel, medicines, and food. Results from my research so far shows that two-thirds of this total harvest is consumed within the home, with cash savings and income from sales amounting to US\$407 per household, annually.

However, Bale's communities face changes in access to these resources as regional government, heavily supported by international non-governmental

organisations, seeks to reduce the current levels of environmental degradation in the area.

This means that my research comes at a critical time: establishing the dependence of local households on direct forest products will assess what they stand to lose if forest access is restricted. Discovering local ambitions and concerns will allow better mechanisms for alternative income generation to be designed. Finally, taking stock some of Bale's forest benefits will identify markets through which to generate economic incentives for conservation.

WHAT ITF IS DOING IN ETHIOPIA

In the Wuf-Washa Forest area, ITF works with our partner organisation, Sunarma, to help establish nurseries and raise indigenous tree seedlings. This is an ongoing project with the long-term objective of helping farming families move from subsistence farming, with its unremitting pressure on forest remnants, to a market economy where income can be earned outside the forest area. Alternative income generation is an important part of the process of alleviating poverty. Community-based forestry management also takes the pressure off the remaining indigenous forest where this project is based.

Ethiopia

VALUE JUDGEMENTS

Forests provide us with a wide array of benefits, some more familiar than others. Harvesting fruits, gathering wood for fuel, or getting pleasure from looking out across a tree-covered landscape are all direct benefits that are easy to relate to. Indirect benefits, on the other hand, are much harder to observe. These can include soil fertility, natural disaster prevention, and climate regulation.

In the developing world, human dependence on forests is much more

ETHIOPIA

- Ethiopia is Sub-Saharan Africa's second most populous nation with over 75 million residents. This population is primarily agrarian, with only 15 per cent living in urban centres. It is also poor with 78 per cent of the population living on less than US\$2 a day.
- Biologically rich, the country is part of two biodiversity hotspots: the Eastern Afro-montane hotspot and the Horn of Africa hotspot. It is also home to a number of rare and endemic species as a result of its highly variable topography.
- Protracted civil war and political instability in the 1970s led to degradation of natural areas and neglect of national parks. The end of political suppression in the early 1990s led to extensive economic reform focused on alleviating poverty through increased agricultural productivity. The resulting large-scale conversion of natural areas to agricultural lands has exacerbated the degradation of natural ecosystems in Ethiopia.
- In 1999 Ethiopia was 34 per cent forested. Now only 3.6 per cent of the country's total land area is forested. In response to this dramatic decline in natural forest, severe woody biomass shortages and water scarcity, eucalyptus and cupressus have been planted to meet construction and wood fuel needs. With short rotations and fast growth rates, these non-native species are preferred over indigenous species.



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Forest honey helps to raise incomes.

obvious than in the environmentally disconnected developed world. Rural communities use forests to obtain building and shelter materials, to gather fuelwood, and to find medicinal plants and edible products. For the poorest households, as well as saving cash by harvesting forest resources, forests act as a safety net by providing supplementary sources of food and income in times of drought or low crop productivity.

Around 150 non-timber forest products reach international markets, including rattan, bamboo, honey, nuts and essential oils, but many more are sold on informal local markets. While it is easy to observe and account for the economic value of internationally traded products, those consumed within households or traded informally do not appear in systems of national accounting. Nor do the economic values of the indirect benefits of forests, such as carbon storage or the prevention of soil erosion. As a result, the true value of intact, standing forests, is under-represented in forest management decisions. This makes alternative land uses and revenues from timber appear more financially attractive than intact forest, when the long-term costs of the loss of these benefits are not accounted for.

It is true that when countries become richer the focus tends to move away from the value of timber towards that of intact forests. This shift of emphasis can be seen in the campaigns to slow

the global rate of deforestation in order to delay the impacts of global climate change. The reasoning goes that the costs of conserving forests now are predicted to be significantly less than mitigating or adapting to climate change in the future. The economic impact of declining soil and water quality along with the rise of climate change up political and social agenda have focused more attention on these indirect benefits of intact forests. This means that the wide-reaching effects of global forest losses are becoming harder to ignore.

However, with the majority of intact forest remaining in the developing world, a way to convert indirect forest benefits into cash flows must be found if these countries are to be persuaded to forego lucrative timber revenues. If we can capture values previously unaccounted for to generate alternate revenue streams, communities will have an incentive to preserve forest resources. Not only will this kind of preservation mean that forests can continue to provide food security for subsistence households, it will also conserve habitats, protect biodiversity, and safeguard the less familiar indirect benefits of forests.

Capturing forest values involves creating markets for forest goods, often where no market previously existed. A simple example would be eco-tourism, where visitors pay fees to enjoy an intact forested landscape and its flora and fauna. Other examples are carbon offsets or biodiversity offsets, both of which generate environmentally favourable behaviours through transfer of wealth from a buyer to a seller.

But the promotion of markets for conservation is a delicate science. Competitive markets for forest products have been known to lead to overexploitation, degradation and social stratification. Harvesting and marketing commercial quantities of bush meat, for example, can have a negative impact on the structure and dynamics of forest animal populations. The challenge of making this market-based approach to conservation successful is multi-staged. First, the true values of forests need to be demonstrated. Second, a complete market must be created for



The road that runs through Rira village, in the centre of the Bale Mountains National Park, is the highest all-season road in Africa, which makes it a good place to sell market produce such as cabbages, onions and eggs.

COFFEE

- Coffee is believed to originate from Ethiopia with *Coffea arabica* spreading across the globe after being taken to Yemen in the 13th century.
- *Coffea arabica* constitutes approximately two-thirds of the world's commercially traded coffee and is considered superior to other cultivated species such as *Coffea canephora* (*robusta*) that originated from West Africa.
- The coffee ceremony is an important part of Ethiopian culture. It involves the roasting of the green coffee beans over hot coals, after which they are ground, boiled in a special clay pot and served. The process allows the appreciation of the roasting coffee aroma which is complemented by burning incense and cooking popcorn!
- Although domestic consumption of coffee is high, accounting for half of the crop, it is still Ethiopia's major export and the country is vulnerable to variation in world coffee prices.
- Ethiopian government has plans to increase the value of coffee by finding new, high value outlets for the premium varieties that are found in Ethiopia. The increasing demand for speciality and organic coffee varieties is helping make this plan a reality.

the providers of the benefits to capture these values and not overexploit them. Finally, we must ensure that the people whose habitual activities in the forest are restricted – often local rural communities – are provided with adequate livelihood alternatives or compensation for restrictions on their forest use.

BEES AND BEANS

Back in Bale, forest honey and coffee are two products that are notable for their contribution to household value, and that offer exemplary opportunities to raise incomes, thus reducing the household's need to clear forests for agriculture or grazing.

With a strong tradition for bee keeping, Ethiopia is the fourth biggest producer of beeswax and tenth biggest producer of honey in the world, and Ethiopian hive density is thought to be the highest of any country on the African continent. Bale is no exception, and



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An Ethiopian woman conducts the traditional coffee ceremony.

traditional beehives constructed from bark, climber and bamboo can be seen tied high in trees. In Bale, the honey harvest is used for local consumption and to brew mead. In one community the annual harvest is equivalent to US\$155 for each household. At present, although production more than satisfies local demand, the honey is too crude to compete in international markets. Increasing honey production or quality, through modern beehives or purification methods, could increase the sales of this honey in the region.

Harvesting of forest coffee beans is another significant source of income for communities at lower altitudes in Bale. Coffee was first discovered in the highlands of Ethiopia in the ninth century, and drinking it is an important part of Ethiopian culture. In areas where the climate is suitable for *Coffea arabica* to grow, this forest product was found to provide US\$550 per household. *Coffea arabica* is a shade lover, and in rural forest areas there are no fertilisers or pesticides used on these plants. This raises the opportunity for organic certification of Bale's coffee. And, with increasing demand for more speciality coffees, the opportunity to get a price premium for uniquely flavoured Bale coffee could again raise incomes.

NEXT STEPS

So far, my research has provided a better understanding of the economic benefits of the Bale Mountains' forest, but there is still a long way to go. Not all values have been accounted for. Traditional medicines, such as *Hagenia abyssinica*, used to treat tapeworm, hold significant value, as expensive modern medicine is beyond the reach of most Ethiopians. Eco-tourism, too, is on the increase in Bale, with tourists

coming to observe internationally rare animals, migratory and endemic birds, or to enjoy sport-hunting, fishing, and trekking. Research into the value of carbon storage is also underway, but methodologies to place a value on all the indirect benefits of the forest ecosystem are yet to be developed. Despite the need for more research, it can already be seen that a traditional 'fence and fine' restriction to the forest in the Bale Mountains will have an adverse impact on communities if they are not provided with alternative sources of income or livelihood generation.

Armed with an estimate of the income that locals derive from forest products, the next stage of my research will be to establish which forest values could be marketed to generate a tangible and sufficient source of financing. A lot of work will also be needed to explore which mechanism would distribute payments most equitably and efficiently with maintained incentives for effective resource protection.

The extraction and use of forest products has been practised for generations, with humans reaping diverse and substantial benefits as a result. The rising global demand for agricultural land and timber, coupled with the decline of cultural ideals that once played a role in the management of forests, has led to the valuation of forests merely by the commodities produced as they are cut down. By creating viable market opportunities for previously 'free' benefits of forests, we can create economic incentives to maintain healthy forests. Understanding the relationship between people and forests is crucial for this market-based approach to work, but designed and implemented carefully there are numerous benefits: protecting biodiversity, habitats, and indirect forest functions; promoting sustainable development; and alleviating poverty through the transfer of wealth from rich to poor countries.

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