

Malawi Poverty and Environment Initiative: Economic Study

A Presentation to PEP

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Study Objectives

- Provide evidence on the costs and benefits of sustainable and unsustainable natural resource management of forestry, fisheries & wildlife resources and soils in Malawi
- Establish linkages between natural resource management on the one hand, and poverty reduction, economic well-being and development on the other
- Draw on case study and other evidence to assess the net benefits of key interventions to encourage more sustainable natural resource use in each selected NR sector

How much are NR resources worth in Malawi?

GDP: The Narrowest Definition

NR Sector	Official Statistics	Additional contribution identified	Total share of GDP	Sources of new evidence
Forestry	1.8%	4.3%	6.1%	BEST (2009) – charcoal & firewood
Fisheries	4.0%	-	4%	
Wildlife	-	2.7%	2.7%	WTTC (2009) – nature-based tourism
Total	5.8%	7.0%	12.8%	

1. The large contribution of charcoal and firewood is omitted in official statistics – derived from BEST (2009)
2. Analysing Malawi's 2009 WTTC satellite accounts we estimate that roughly half of Malawi's total travel and tourism spend is accounted for by overseas visitors undertaking nature-based tourism - around 2.7% of total GDP

Calculating the cost of unsustainable NR use: Soils

- **On-site impact on agriculture** – soil & yield loss based on literature review with link to poverty via IFPRI CGE model estimates
- **Off-site impact on hydropower** – based on case study data from ESCOM on mitigation costs of reducing siltation, weeds & trash
- **Off-site drinking water treatment** – link between turbidity and increased drinking water treatment costs based on international literature
- **Off-site impact of turbidity on fisheries** – potentially important but no scientific evidence available

Calculating the cost of unsustainable NR use: Forests

- **Unsustainable roundwood use (excluding fuelwood):** sustainable cut – actual cut from World Bank/Forestry Department data
- **Unsustainable fuelwood use:** growth projections by area – estimated fuelwood use from BEST (2009)
- **Flood prevention** (indicative only) – Range of likely impacts from international literature, costs of previous floods from CRED database, deforestation rates from case study data

Calculating the cost of unsustainable NR use: Forests & Outdoor air pollution

- **Indoor air pollution (Forests):** We estimate health costs based on health system & patient financial costs, loss of productivity from increased sickness (morbidity) and loss of work years from early deaths (mortality). This involves analysis of regional data presented by Hutton et al (2006) as well as other published data.
- **Outdoor air pollution** – This updates estimates for PM10 damage presented by World Bank (2002) to 2007 prices

Calculating the cost of unsustainable NR use: Fisheries

- **Cost of unsustainable fishing** – Analysis of data for various water bodies supplied by Department of Fisheries. Indicative estimates obtained by comparing a fishery with apparently better practice against others

Calculating the cost of unsustainable NR use: Wildlife

- **Cost of unsustainable wildlife** – We estimate the cost of poaching over a ten year period based on detailed animal number & financial data from two National parks provided by the Wildlife Department

The economic cost of unsustainable NR use

NR sector & source of cost – base case	Annual cost (2007 prices)		
	MK Million	US\$ Million	% of GDP
Soils:	8,988	65	1.9%
On-site impact on agriculture	7,540	54	1.6%
Off-site impact on hydropower	1,433	10	0.3%
Off-site drinking water treatment	15	0	0.0%
Forests:	12,983	93	2.4%
Unsustainable roundwood (excl fuelwood)	3,100	22	0.4%
Unsustainable fuelwood	6,089	44	1.2%
Flood prevention (indicative only)	232	2	0.2%
Indoor air pollution	3267	23	0.7%
Outdoor air pollution - WB 2002	327	2	0.2%
Fisheries:	3,906	28	0.8%
Unsustainable use (lower bound)	3,906	28	0.8%
Wildlife:	665	5	0.1%
Poaching loss (indicative only)	665	5	0.1%
Total	26,573	191	5.3%

Adjusted Net Savings

- Adjusted net savings (ANS, sometimes known as genuine savings) is a green accounting measure that takes the standard measures of physical and financial savings, adds human capital formation and subtracts NR use that is not renewed (e.g. deforestation)
- The World Bank provides estimates for all countries but we have been able to significantly improve these for Malawi
- **We find that the country's ANS for 2006 falls to 7.14% of GNI (WB estimate was 12.24%). What is particularly troubling is that the contribution to national wealth from educating the nation is outweighed by the loss of wealth from natural resources degradation**

What does this mean for poverty in Malawi 1?

- Overall, unsustainable NR use costs a minimum of MK 26.6 Billion a year (US\$ 191 million) \approx 5.3% of 2007 GDP
- To understand the impact on poverty it is useful to consider the impact of reduced yields from soil loss. This accounts for 28% of the estimated total economic cost in the Table presented earlier
- From the literature a very conservative estimate is that **this** environment impact reduces agricultural yields by 6%

What does this mean for poverty in Malawi 2?

- The work of Benin et al (2008) who use the IFPRI computable equilibrium model indicates that recovering **six percent growth in agricultural yields** during 2005-2015, would increase overall GDP growth from 3.2 to 4.8 percent per year leading to the **proportion in poverty falling to 34.5 percent by 2015** i.e. the incidence of poverty falls 12.5% resulting in an **additional 1.88 million people being lifted above the poverty line by 2015**

What does this mean for poverty in Malawi 3?

- If the lost economic value from unsustainable resource use each year across **all** NR sectors (5.3% of GDP) is converted into economic growth, the impact on poverty would be much larger
- Benin et al (2008) consider GDP growth 4.2% per annum above the baseline case. Over the period 2004 – 2015, the proportion in poverty would be halved from its 1990 level – to 25.2 per cent i.e. that **sustainable NR use could have enabled the MDG1 target to be reached**

What kind of interventions make economic sense?

Example 1: Increasing the supply of woodfuel

- The forestry component of the EU-funded Income Generating Public Works Programme (IGPWP) aims to reduce poverty by:
- increasing local production of fuelwood, timber and poles through planting community (forestry club) woodlots **and** planting on individual club member farms
- 23.3 million trees planted on 8600 Ha by 27,150 club members during 3 years of phase 1

What kind of interventions make economic sense?

Example 1: Increasing the supply of woodfuel

- Our detailed economic cost benefit analysis (CBA) of 3 years of Phase 1 of this project incorporates:
- Project costs;
- Costs of farmers labour;
- Private benefits (wood supply to those growing trees); and
- Social benefits (primarily carbon sequestration but also modest contributions to reduced hydro-electric generation losses, reduced drinking water treatment costs and flood prevention)

Increasing the supply of woodfuel – Results 1

- The economic CBA finds an internal rate of return of 62%
- Worth “ground truthing” to confirm farmers coppice trees in subsequent five year periods without project payments

It is also very important to do a Financial CBA from the farmer’s point of view & this indicates that:

1. Tree planting schemes that rely **only** on the financial returns from poles or time savings from producing wood fuel will not get widespread uptake

Increasing the supply of woodfuel – financial CBA 2

1. Adding carbon payments (US\$6/ tCO₂e) makes things more attractive to farmers. **Regular** annual payments **may not** be enough to encourage highly risk averse farmers to invest in tree planting. Yet by raising carbon payments by 50% in the first three years and compensating with a 10% reduction in years 4 – 20, total payments are slightly reduced & it becomes very attractive to even those farmers with very high discount rates (e.g. 400%)
2. IGPWP incentive payments (US\$6/club member) in each of the first two years makes tree planting financially attractive to poor farmers with very high discount rates

What kind of interventions make economic sense?

Example 2: More sustainable charcoal production

- Demand for charcoal in Malawi will double in the next 15 years
- Any successful strategy for tackling deforestation will have to address how to produce and market charcoal from sustainably grown wood
- The current policy of banning charcoal has not only proved ineffective but encourages inefficient illicit charcoaling, produces incentives for corruption and deprives the Government of Malawi of tax revenue
- Interventions to strengthen policy and institutional capacity building are the most urgent but interventions amenable to CBA show:

More sustainable charcoal production – Results 1

- The annual estimated value of bribes paid on charcoal in 2008 was MK 1.3 Billion (US\$9 Million) – based on analysis of published data on the charcoal trade from Kambewa et al (2007)
- The total potential value of annual carbon payments for charcoal produced is approximately MK 2,451,131,387 (US\$ 16,790,250)
- A holistic solution that addresses the **whole** charcoal supply chain is needed rather than a technical fix in any one area. E.g. improved charcoal kilns can play a useful role in reducing the 2.25 million cubic metre excess demand for fuelwood in urban catchment areas but by themselves are likely to provide less than 15% of this excess demand

More sustainable charcoal production – Results 2

- Subsidising electricity consumption will not solve the charcoal problem & is anti-poor
- Increasing the rate of domestic electrification implies switching supply from industrial and commercial sectors (which would lower growth)
- With an average domestic consumption of 3285 kWh and a current tariff of US\$0.043/kwh substituting 883 kg of charcoal and 30 litres of paraffin will save the electrified urban consumer around US\$105 a year. Even at full cost tariffs (0.065/kWh) urban consumers will save around US\$60 year
- Helping urban customers pay their grid connection charge requires clever financing not subsidy e.g. micro-finance or paying this from the fuel savings made – lessons from green energy finance in the UK

A personal perspective on what made similar previous international projects successful

Ghana (DFID)	International consultant provided design & review. Leading academic economic institution, closely managed by their director, a lot of work done by postgrads, institute director was a highly influential advocate for results
Uganda (DFID)	International consultant worked with motivated local private sector consultant who was widely respected by policy makers (previous Director of Wildlife). Sector working groups for PRSP helped channel findings to policy makers
Uganda (PEI)	Narrow focus & good partnership with motivated private sector consultant

Intended process

Gil Yaron (GYA)

- International lead consultant
- Responsible for advising on design, reviewing outputs of CC & BC and undertaking cost-benefit analysis

Chancellor College (CC)

- Premier Economics Institute in Malawi
- Lead local consultants
- Directly contracted to UNEP-UNDP PEI
- Responsible for literature review, data analysis in each NR Sector & championing findings

Bunda College (BC)

- NR specialists
- Contracted to (CC)
- Responsible for detailed case study data in three areas to inform economic analysis

Lessons learned from Malawi PEI work 1

Incentive problems:

1. Excess demand for academic economists & sector specialists in Malawi – a lot of donor-driven consultancy
 2. Academics are already time-constrained
 3. Topic was not intrinsically interesting to some local team members
- This led to less time input than I expected & this project being slotted in around other work (delaying outputs by a year)

Lessons learned from Malawi PEI work 2

It has proved very difficult to overcome these incentive problems through the project management options available:

1. The local lead consultant found it very difficult to require team members to deliver as he is not their line manager
2. Exhortations & offers of co-authored publications by the international consultant carried little weight
3. Payment in advance limited leverage
4. The Bunda College team are physically distant from Chancellor College & inclined to “do their own thing”