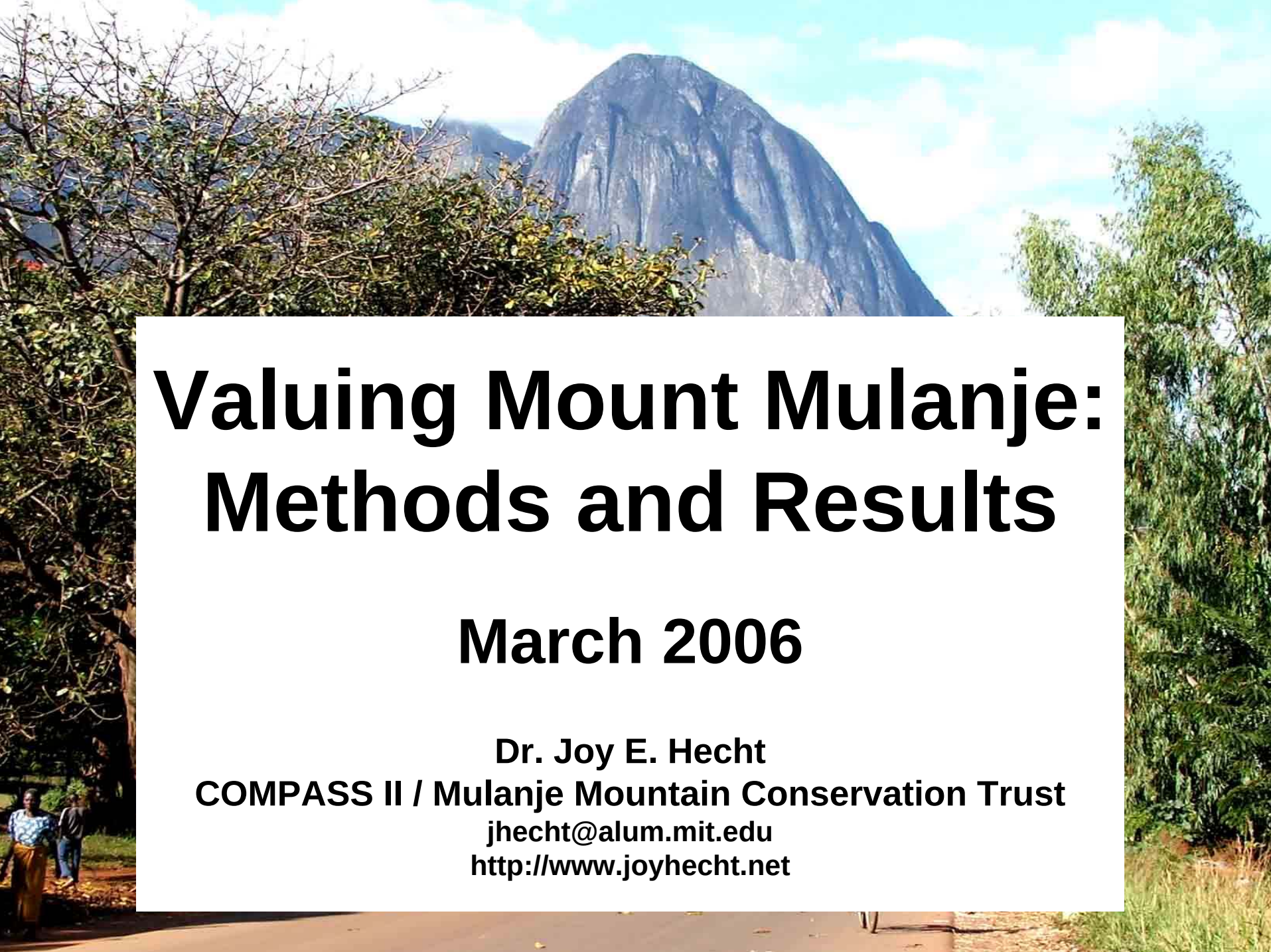

Valuing Mount Mulanje: Methods and Results

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What are we studying?

- **Estimate economic value of resources now used from mountain**
- **Project their value under several alternate management scenarios**
- **Our hope: Make an economic case for better environmental management.**
- **Our findings: Alternative energy may be more effective than better environmental management.**

Four Scenarios:

- **Business as usual**
- **Scenario 2: Improve forest management and reduce demand**
- **Scenario 3: More effective management by Forest Department**
- **Scenario 4: Eucalyptus plantation for local fuelwood use in vacant protected area land**


Current Value
of Resources
from the
Protected Area

Current uses to value

- Crafts sales
- Household fuelwood use
- Fuelwood use for bricks
- Thatch for domestic use
- Rope
- Poles for home construction
- Honey cultivation
- Drinking water
- Aquaculture
- Smallholder irrigation
- Tea irrigation
- Ecotourism
- Plantation sawlogs
- Plantation poles
- Plantation fuelwood
- Cedar (legal and illegal)
- Ag output on converted land
- Mushrooms gathered
- Charcoal
- Grazing
- Honey gathering - wild
- Gathered fruits
- Medicinal plants
- Hunting

Introduction to Valuation

- Major subject in environmental economics
- Many methods used to estimate values for environmental assets and services
- Total value of an asset is the sum of the values of the different services it can provide at the same time
- Asset value vs. flow value
- BUT: those services must be compatible with each other!

Basis for Valuation

- Studies provide prices for honey, fuelwood, NTFPs, other items
- Survey current market prices for building materials, expenditures by tourists, etc.
- Market data for maize, etc.
- Forest Department and Water Board have fixed prices for water, timber, permits
- Ask people who might know

Basis for estimating quantities

- Published studies for some products
- Government records for drinking water, tourist nights, permits sold
- Data provided by users – tea estates, farmers, etc.
- Government surveys – integrated household survey, etc.
- Ask people who might know – “experts”
- Informed estimates

Activity	Community	Forest Dept.	Elsewhere
Household fuelwood use	323,190,649	29,345	
Gravity-fed drinking water	71,843,416		
Cedar sales	74,299,847	3,923,852	
Thatch for domestic use	32,371,059		
Agriculture	30,944,000		
Tea irrigation	20,157,587		
Poles	17,789,401		
Beekeeping	2,008,920		18,180,000
Fuelwood use for bricks	4,526,003		
Tourism	1,396,600	1,411,000	?
Smallholder irrigation	1,332,000		
Crafts sales	1,280,000		?
Charcoal	784,750		
Aquaculture	734,310		
Rope	145,916		
Plantation sawlogs		371,840	
Plantation poles		1,278,584	
Plantation fuelwood		1,727,757	
Mushrooms gathered	NO DATA		
Grazing	NO DATA		
Honey gathering - wild	NO DATA		
Gathered fruits	NO DATA		
Medicinal plants	NO DATA		
Hunting	NO DATA		
Total value	583,112,058	8,742,378	18,180,000

Scenario 1: Project Business as Usual (BAU)

Projecting Business as Usual

- Project growth in use with population growth
- Project forest lost to fire each year
- Project forest lost to unsustainable use
- When is forest gone?
- Anticipate impacts on water supply, NTFPs, household use of resources
- Not incorporating inflation

Demand for wood

2005 Demand: 145,000 m3

Components of growth in wood use:

- **Household use: population growth between 3 and 3.5% per year**
- **Demand from miombo woodland greater than from afromontane forest**
- **Brick burning: same growth**
- **Charcoal: Relatively modest because some control by MMCT**

Supply of wood

Sustainable yield in 2005: 26,000 m3

Components of change in supply:

- **Fire loss**
- **Demand is six times sustainable yield so capital is being consumed**
- **Agricultural conversion**
- **Natural growth**
- **Rate of natural generation of dead wood**

BAU - Major results

- **Miombo woodland gone: 2010**
- **Afromontane forest gone: 2016**
- **Once forest gone, all other NTFPs will be gone as well**
- **Water supply will decline, not totally gone**
- **Cedar will be gone.**
- **Tourism relatively unaffected**


Scenario 2:
Improved
resource
management

Schemes that increase resource-dependent income and create incentives to conserve:

- Gold standard honey production
- Gold standard aquaculture
- Improved management of gravity-fed water systems
- Cedar certification
- Better markets for NTFPs – mushrooms, fruits, medicinal plants, etc.
- Bottled water or other use of Mulanje water
- Hydropower

Schemes that reduce resource demand

- Increased use of improved stoves

Schemes that aim to increase MAI of miombo

- CBNRM, forest co-management

Key assumption:

All forest in the protected area will increase mean annual increment from degraded level of 2.0 m3/hectare to optimal level of 4.5 m3/hectare, over five years.

Scenario 2: Major results

- **Miombo woodland gone: 2011**
- **Afromontane forest gone: 2018**

Improved forest management buys one year

Impact of increased incomes on resource use:

- Increased use of cooking fuel
- Metal roofs instead of thatch
- Shift from fuelwood to charcoal
- Shift to from mud and pole house to brick
- Increases in other consumption

Scenario 3: Strengthen the Forest Department

How?

- Privatize plantation management so forest department can spend time elsewhere
- Allow forest department to retain permit and tourism revenues so they have more resources available
- Focus forest department staff on cedar management, CBNRM, preventing forest fires, charcoal production, other management of natural forest

Possible impacts:

- Enforcing headload fees will reduce demand for fuelwood.
- Less ag encroachment
- Less illegal cutting of cedar
- Fewer fires
- Less charcoal manufacture
- More FD Revenue
- NOT - Effectiveness of forest management - this is already included in Scenario 2 at maximum possible level.

Scenario 3: Major Results

- **Miombo woodland gone: 2014**
- **Afromontane forest gone: ?**
- **FD revenues rise due to (theoretically) being able to enforce all permit payments**
- **Imposition of headload fee assumed to decrease demand; hence longer forest life**

Scenario 4: Expanded Plantations

Elements of the Scenario:

- Plant eucalyptus or pine on all low elevation land now cleared or with shrubbery growing back
- Available land: 7,743 hectares
- Assume it takes 6-7 years to reach harvestable level of growth.
- Depends on being able to require people to use plantation woods

Scenario 4: Major results

- **Miombo declining in 2023**
- **Afromontane healthy**

This could protect existing forest until alternative energy sources are developed. It would protect other NTFPs as well.

However:

How would plantation be paid for?

Eucalyptus makes bad fuelwood

Net Present Values

in millions of kwacha

Discount Rate: 10%	Scenario:	Improved Forest Mgmt.	Improved Forest Dept.	Plantations
	BAU	2	3	4
Community Revenue Without Fuelwood	1,610	1,716	1,430	1,501
Community Revenue With Fuelwood	4,216	4,532	4,475	4,546
Forest Department Revenue	65	69	482	482
Community and FD Revenue	4,281	4,601	4,958	5,028

Remarks:

Growth from BAU to Scenario 2:

- **Increased MAI for miombo**
- **Revenue from aquaculture, irrigated agriculture**

Drop from Scenario 2 to Scenario 3:

- **Loss of illegal cedar revenue**
- **Price impacts on fuelwood consumption**

General conclusions

- **Major threat to forests and NTFPs is fuelwood demand.**
- **Improved management of miombo woodland will not solve the problem.**
- **Therefore strengthening economic activities that depend on protected forest will not suffice.**
- **Alternative energy sources could help.**
- **Systematic analysis of energy options required.**
- **Shifting land to additional plantation may buy time to seek energy solutions**

Recommendations

- Need improved data on fuelwood to confirm these results.
- Need to analyze fuelwood availability in same way for whole country.
- Need to analyze strategies for addressing energy needs; fuelwood can never be sufficient in Malawi.