Ecosystem Service Valuation of Key Watersheds in Kenya

Nikola Smith
U.S. Forest Service

A Community on Ecosystem Services
Washington, DC
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Background & Context

Methodology and Findings

Next Steps

Economic Valuation of Ecosystem Services

"A well-functioning environment is the foundation of Kenya's economic future."

Wangari Maathai
Founder, Green Belt Movement
2004 Nobel Peace Prize Laureate

“Undervaluation and inadequate information has resulted in **marginalization of forest ecosystems** in budget allocations, land-use change decisions, leading to **excisions and degradation.”**

~ David Langat, Kenya Forest Research Institute

Ecosystem Service Valuation of Key Watersheds in Kenya

IGAD Climate Prediction and Applications Centre

"Fostering Climate Prediction and Applications"

Alignment with Government of Kenya Initiatives

KENYA VISION 2030

HARAMBEE

"Big Four" Agenda

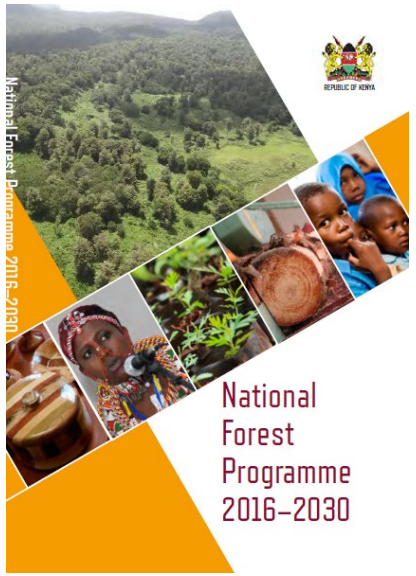
- Food Security
- Manufacturing
- Health
- Housing

Alignment with Government of Kenya Initiatives

KENYA VISION 2030

Goal

To develop and sustainably manage, conserve, restore and utilize forests and allied resources for **socio-economic growth and climate resilience**.



Strategic Objective

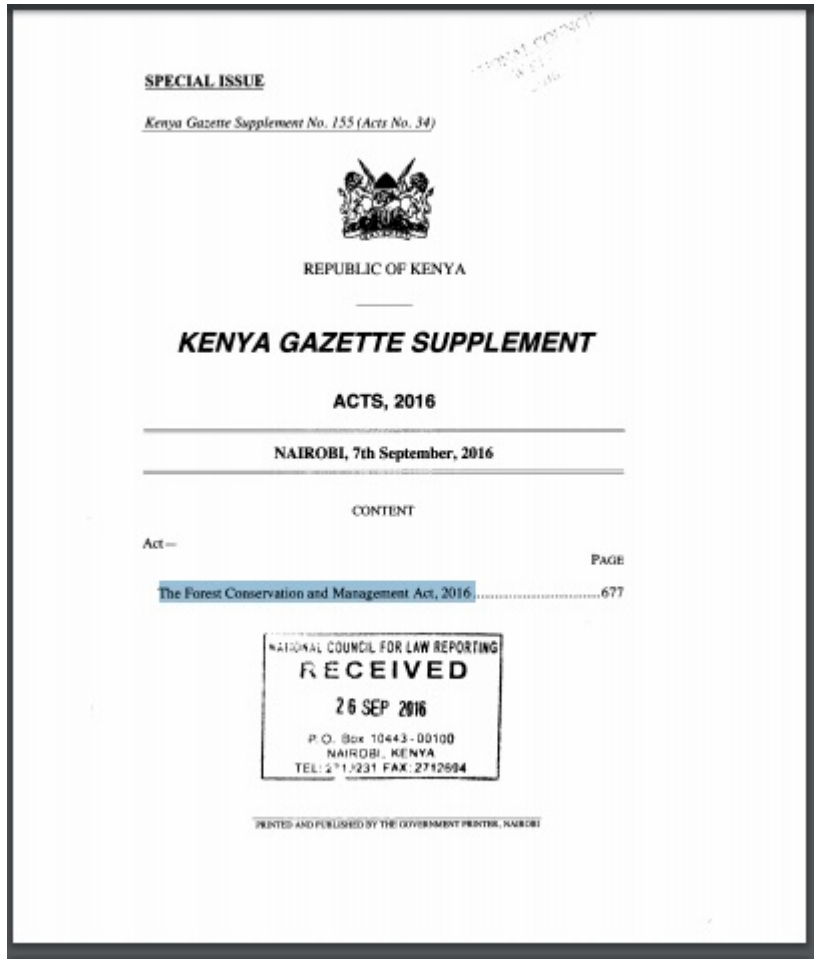
Strategic Objective 2:

"Enhance forest-based **economic, social and developmental benefits**. Need for **valuation** of forests' provisioning of ecosystem goods & services"

Stakeholders

- **Communities**
- Private Sector
- National Government
- County Governments
- Civil Society

Alignment with Government of Kenya Initiatives



SPECIAL ISSUE

Kenya Gazette Supplement No. 155 (Acts No. 34)

REPUBLIC OF KENYA

KENYA GAZETTE SUPPLEMENT

ACTS, 2016

NAIROBI, 7th September, 2016

CONTENT

Act—

PAGE

The Forest Conservation and Management Act, 2016.....677

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Forest Conservation and Management Act

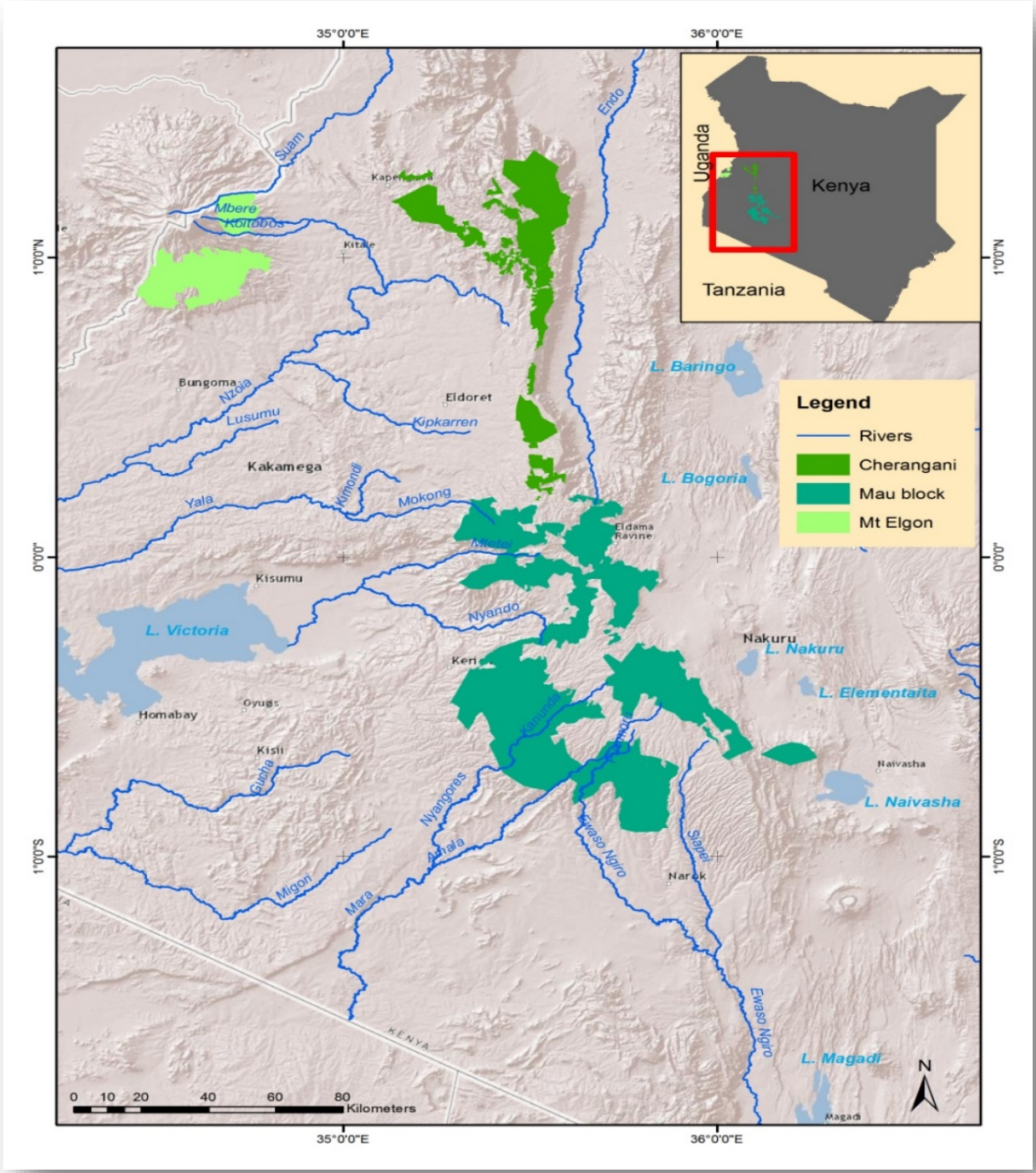
Reporting on the state of forests and forest resource strategies

Incentives to maintain forest cover, including the Forest Conservation and Management Trust Fund (PES mechanism)

Provision for community participation in forest management

Focus on Three Key Watersheds

- Mau Forest Complex
- Cherangani Hills
- Mt. Elgon



Ecosystem Services Valuation (ESV)
purpose and objectives

Systematic assessment of the economic value of the 3 target watersheds, including non-monetary benefits

Model methodology and coordinated database for future use in other watersheds

Inform decision-making and policy at multiple levels (national and county); set the stage for implementation

Literature Review	existing valuation studies in the focus watersheds or related ecosystems
Stakeholder Consultations	identify data gaps and key focus areas
Secondary Data Collection	from natural resource management agencies (Kenya Forest Service, Kenya Wildlife Service, Water Resource Management Authority, etc.)
Primary Data Collection	household surveys
	market and industry surveys
	participatory rural appraisals

Direct Use

Provisioning

Food, water, timber, construction materials, energy, medicinal herbs, fodder

Market Prices

Market Price Proxies

Contingent Values

Replacement Values

Indirect Use

Regulating & Supporting

Flood control, water purification, climate regulation, air quality improvement

Nutrient cycling, soil erosion control, pollination

Replacement Cost

Avoided Cost

Non-Use

Option, Existence & Bequest

Aesthetic, cultural, religious, ritual, heritage

Use by future generations

Contingent Valuation

Benefit Transfer

Primary Data Collection

Household Surveys

over 1,000 surveys conducted

Forest products and economic dependence

Water quality and uses

Relative importance of benefits

- Economic
- Subsistence
- Spiritual / Cultural
- Future use

Threats

- Over grazing
- Land degradation
- Soil erosion

Primary Data Collection

Community Focus Groups

ES type	Ecosystem Services	Relative Importance Value		
		Mt. Elgon	Cherangany	Mau
Provisioning	Water	0.15	0.20	0.18
	Firewood	0.12	0.14	0.08
	Fodder/Pasture	0.10	0.12	0.08
	Maize	0.08		
	Medicine	0.06	0.10	0.10
	Timber	0.05	0.12	0.03
	Bamboo Shoots	0.04		
	Charcoal	0.04		
	Employment	0.04		
	Poles	0.03		0.06
	Vegetables/Mushrooms	0.03		0.03
	Honey	0.02	0.06	0.06
	Game Meat	0.02		0.02
	Salt Lick	0.01		
	Hides and Skin	0.01		
	Fruits	0.01	0.04	0.03
	Twinning Material		0.04	0.03
	Agricultural Tools			0.03
	Thatch Grass			0.02
Sub –total		**0.81**	**0.82**	**0.75**
Cultural, education	Tourism	0.03	0.06	0.02
	Aesthetic	0.03		0.06
	Education and Research	0.02		
	Cultural/Ceremonial Sites	0.01	0.04	0.05
Sub –total		**0.09**	**0.10**	**0.13**
Regulation	Air Quality	0.07	0.04	0.06
Supporting	Habitat/Biodiversity	0.03	0.04	0.06
Total		**1.00**	**1.00**	**1.00**

Valuation Findings

The **Total Economic Value** of the three watersheds is estimated to be KES 357 billion (USD 3.5 billion) per year

Regulating services (e.g. water storage and climate regulation) provide more than half of this value

Valuation Findings

- **Subsistence use** by households: KES 22.9 billion/year (~US $229 million). This represents 50% of the total annual value of tea exports (2017)
- Approximately 35 million m^3 of **water** valued at KES 3.4 billion/year (~US $34 million) is extracted for irrigation, industry and commercial uses
- The **total value added by the forest industry and trade** is approximately KES 4.3 billion/year (~US $43 million)

Hydropower stations
in these watersheds
generate
170 megawatts
per year valued at
US $119 million

What are the tradeoffs?

Tourism is one of Kenya's largest foreign-currency earners.

Direct contribution to GDP is forecast to reach USD 3.7 billion by 2025.

(World Travel and Tourism Council, 2015)

Ancestral Lands in the Forest

Forest Adjacent Communities

"Increasingly, forests and agriculture are being considered together as synergistic components of sustainable development." (FAO, 2016)

Agriculture production in the study area contributes 24% of Kenya's GDP

Forests and Agriculture

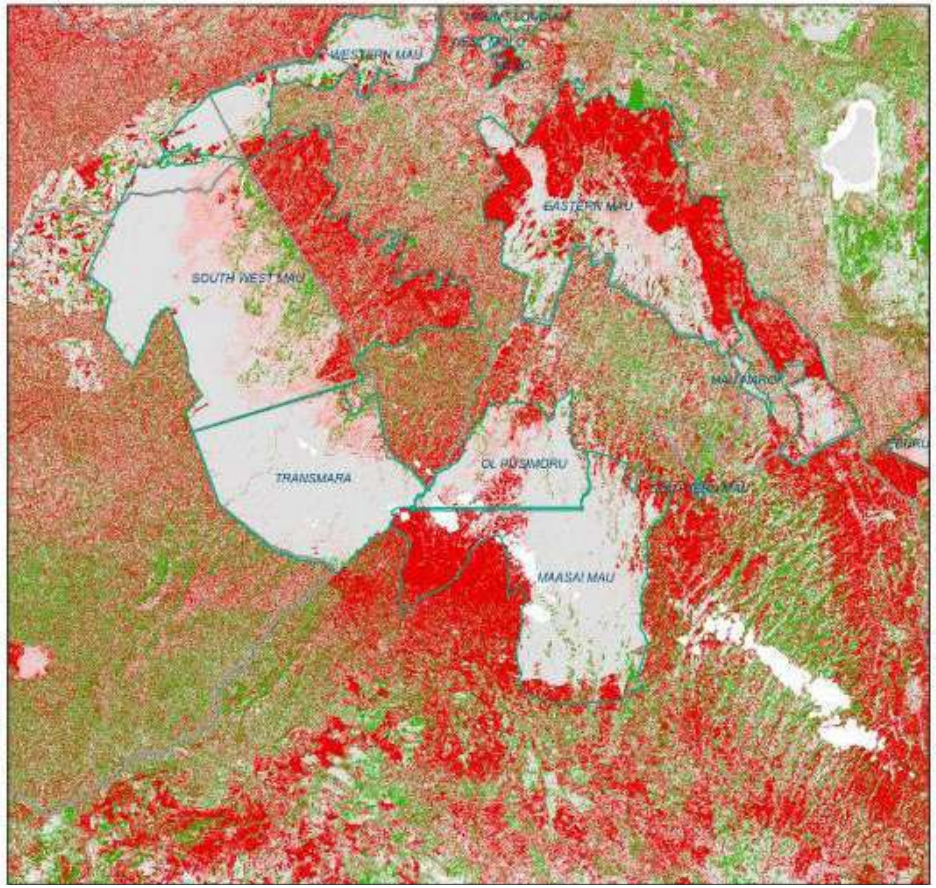
Total Economic Value of insect **pollination** for crop production estimated at KES 930 million (2015)

Micro-climatic influences of forests on tea yield estimated at KES 2 billion/year

Courtesy of GRID-Arendal, Vital Forest Graphics

Understanding Ecosystem Services Over Space and Time

Connections with land use / land cover change

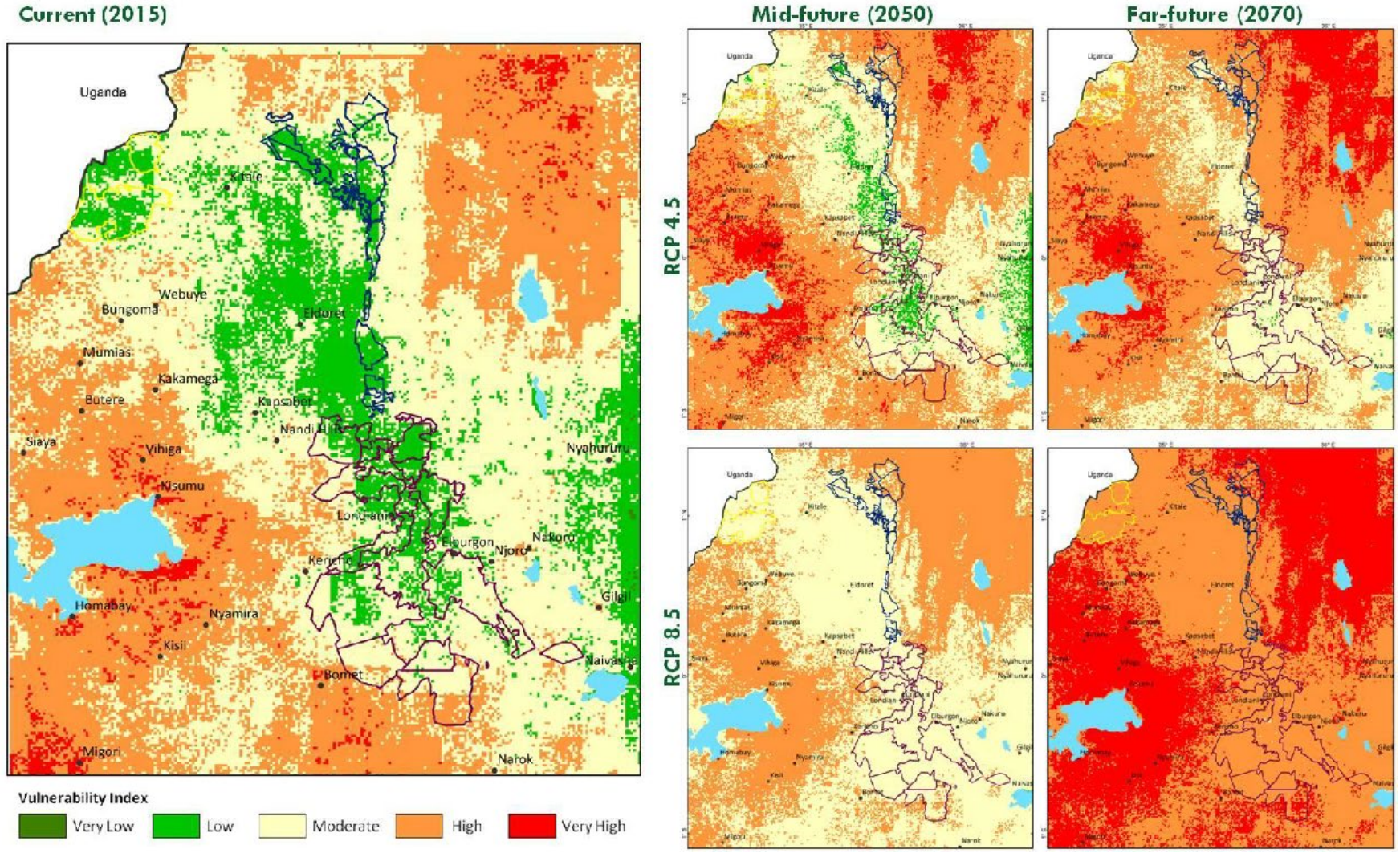


IGAD Climate Predication and Applications Centre

Degradation within the Mau Forest Complex from 1995-2014

Sustaining Ecosystem Services in the Face of Climate Change

Session 65
Thursday Dec. 6
2:45 pm
Tom DeMeo



Vulnerability Index into the Future

Next Steps and Recommendations

Chart a way forward for integration of ecosystem services into **national accounts**

Use ecosystem service **mapping** to identify strategic areas providing key services and hotspots for intervention measures

Apply ecosystem service valuation to **reforestation goals**, including meeting Kenya's Bonn Challenge pledge of restoring 5.1 million forest hectares by 2030

Next Steps and Recommendations

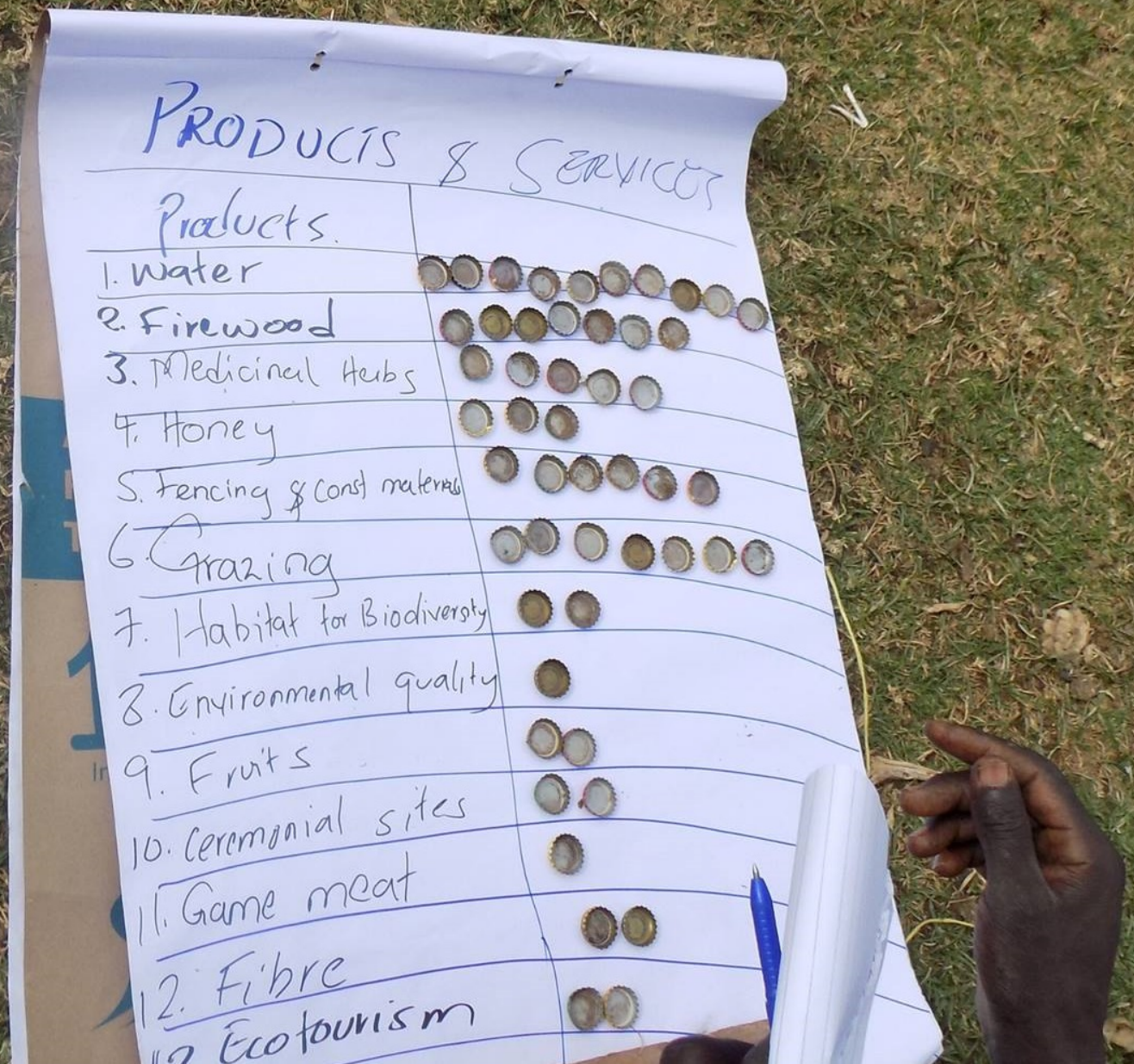
Integrate ecosystem service assessments into **County Integrated Development Plans**

Make the business case for **green infrastructure** for water storage and quality improvements

Engage **partners** in watershed investments (e.g. tea sector, hydropower, tourism) including PES and water funds

Dr. Alphonce Guzha
Center for International Forestry Research
Dr. David Langat
Kenya Forestry Research Institute

Thank you!



Nikola Smith
U.S. Forest Service
nmsmith@fs.fed.us
503-808-2270