

Valuing Ecosystem Services For Conservation and Management Purposes: A case study from Kenya

Silvia Silvestri

(on behalf of Silvia Silvestri, Lokman Zaibet,
Mohammed Said, Polly Ericksen, Jan de Leeuw)



ILRI

International Livestock Research Institute

International Conference on Sustainable Development of Natural Resources in Africa
5 -7 December 2011, Accra, Ghana

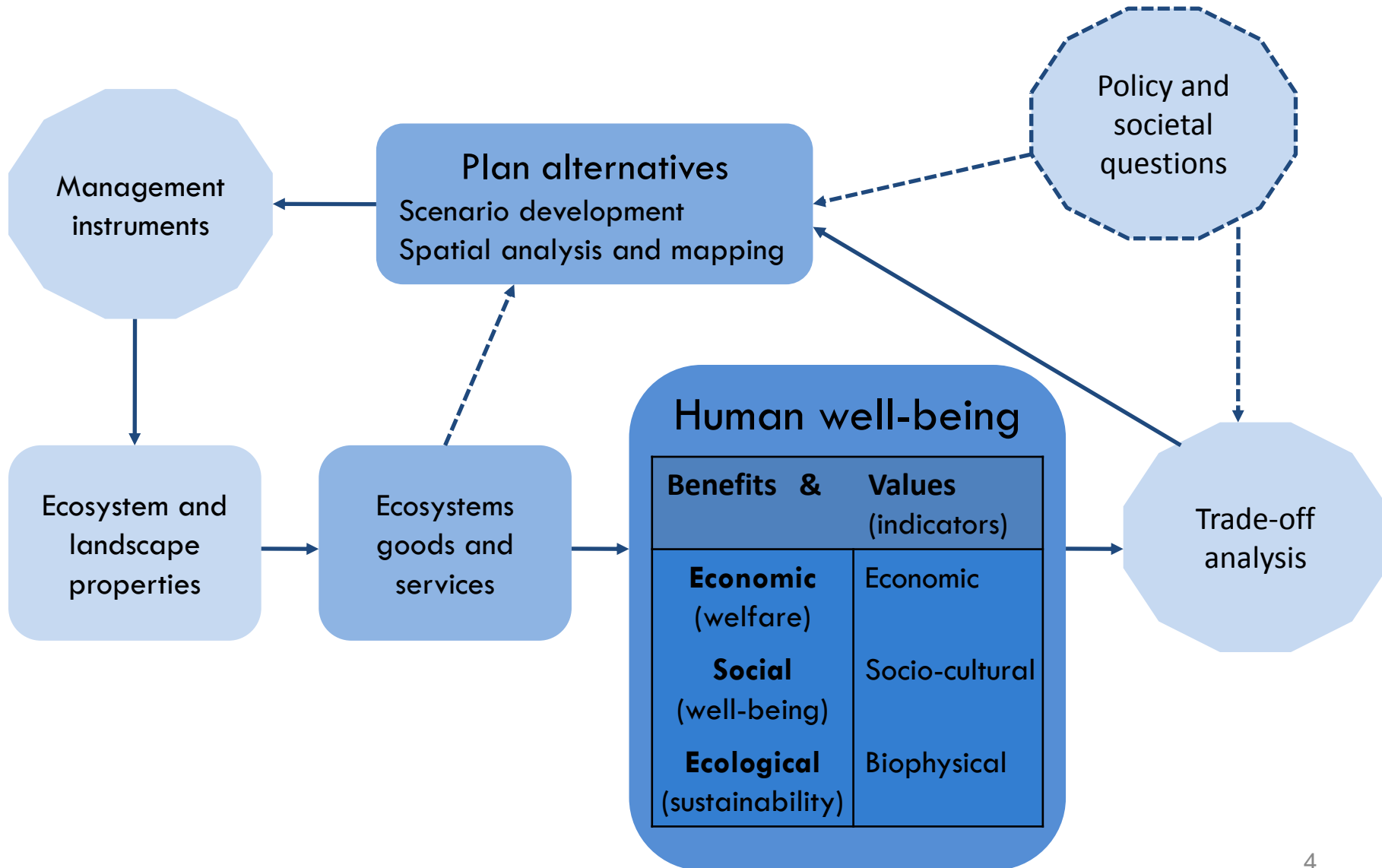
Outline

- ASALs (Arid and Semi Arid Lands) ecosystem services (ES)
- A framework to understand the links between ES, human well-being and policy questions
- Mapping and valuing key inter-related ES: a case study from ASALs in Kenya
- Showing the use of spatial economic valuation as a tool to address challenges in sustainable management
- Implementing ecosystem-based planning for sustainable development
- Conclusions

Arid and Semi Arid Lands Ecosystem Services (ES)

- ASALs are characterized by high vulnerability and high dependence of their residents on the ecosystem (strong poverty-environment nexus)
- ASALs hardly receive attention in spatial and economic studies on ES (fewer spatially explicit studies that delineate supply and demand areas for ES and assess the trade-off between services over space and time).
- Maintaining the multi-functionality of ASALs allow them to deliver goods and services and support livelihoods → land use and management influence system processes, properties and components that are the basis of services provision

Understanding the links between ES, human well-being and policy questions



Mapping and valuing key inter-related ES: a case study from ASALs in Kenya



Broad objectives of Project

- Assemble geo-data base on socio, economic and environment for the Northern Arid lands in collaboration with Ministry of State for Development of Northern Kenya and other Arid Lands (MDNKOAL)
- **Map and quantify key inter-related ES of importance to pastoralist, crop farmers, the tourism industry, conservationist and national policy planners, such as: crops, livestock and livestock products and wildlife based tourism.**
- Develop capacity with the ministry to undertake strategic environmental assessments in the Arid and Semi arid lands in Kenya.

Mapping and valuing key inter-related ES: a case study from ASALs in Kenya

The

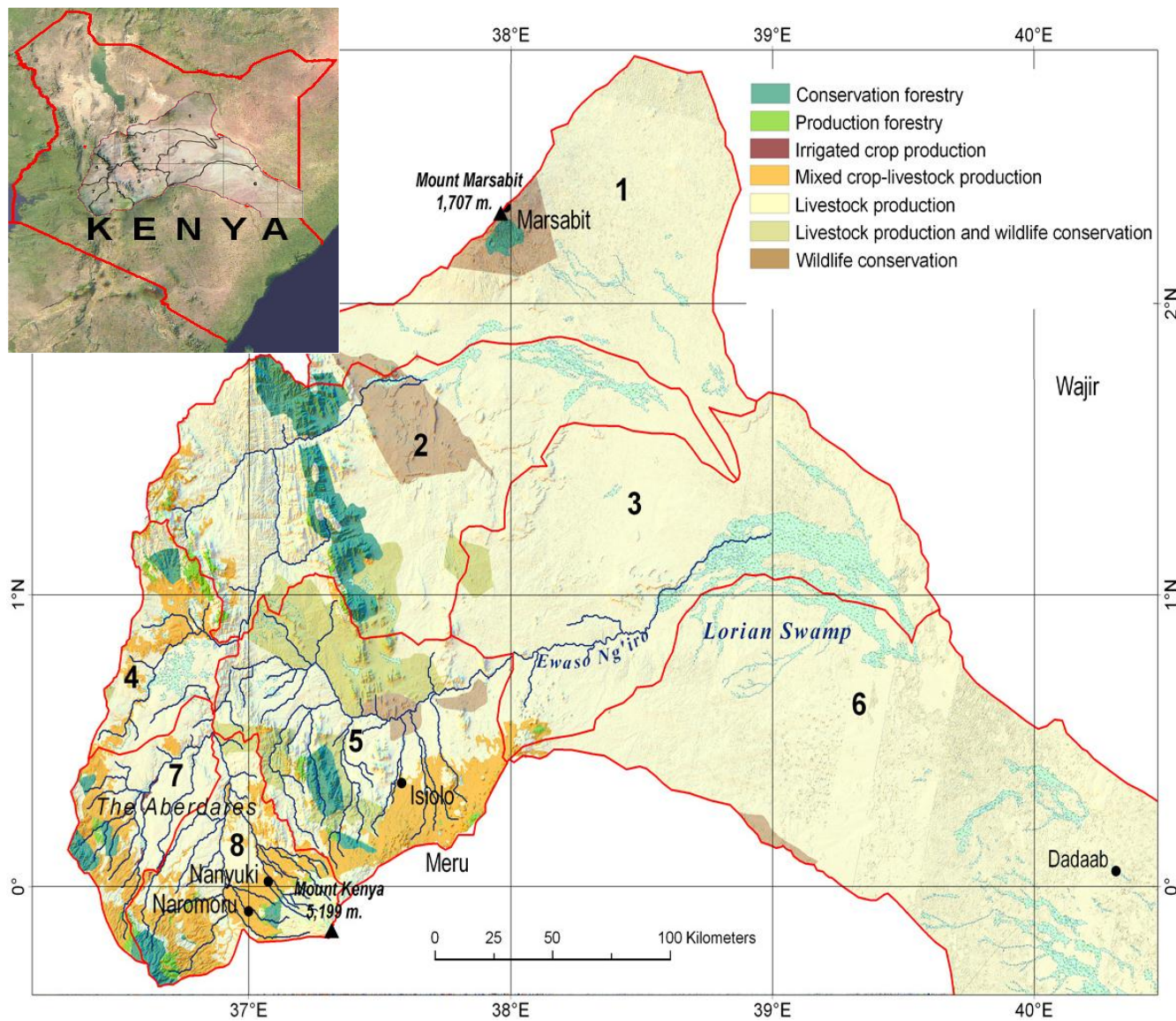
Ewaso Ng'iro Catchment

Ecosystem Services in upper and lower catchments



Photos: WRI et al., 2007, Msoffe, ILRI

Study site: land use



Catchment
83847 SQKM

Protected area
12335 SQKM

Wetlands
4353 SQKM

8 sub-catchments
reflecting differences
in topography and
relief

Highlands with high
rainfall
and lowlands that are
arid and have
variable rainfall

- Fencing and habitat fragmentation
- Inadequate water resources and land use management → aggravated water scarcity and increased water use conflicts
- Reduced water flow along the catchment for increased water abstraction in the upper catchment and diversion of water
- Climate change projections show increase in erratic rainfall → exacerbation of the conflicts already in place for the use of natural resources

Spatial economic valuation as a tool to address challenges in sustainable management

So far maps have almost uniquely included land cover or land cover related issues, but this info is not sufficient in the context of planning

→ it needs to be integrated with data showing the heterogeneity in the quantity and quality of services provision

Spatial economic valuation as a tool to address challenges in sustainable management

What is achieved

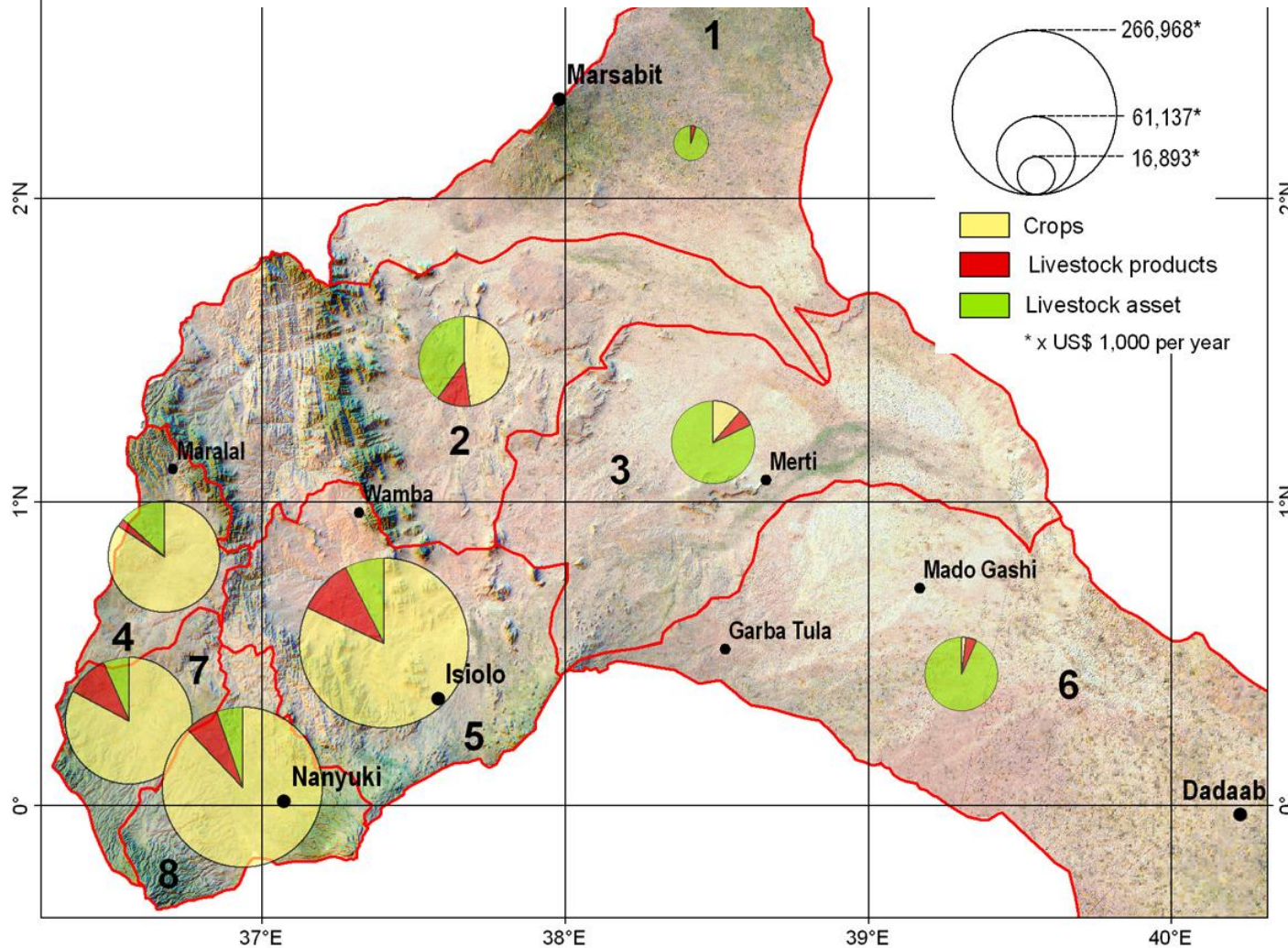
- Recognition of the distribution of supply and demand
- Recognition that ecological and institutional boundaries rarely coincide and often stakeholders cut across a range of institutional zones and scales
- Compares “pears and apples” and measure the contribution of the single components we evaluated

How is it achieved?

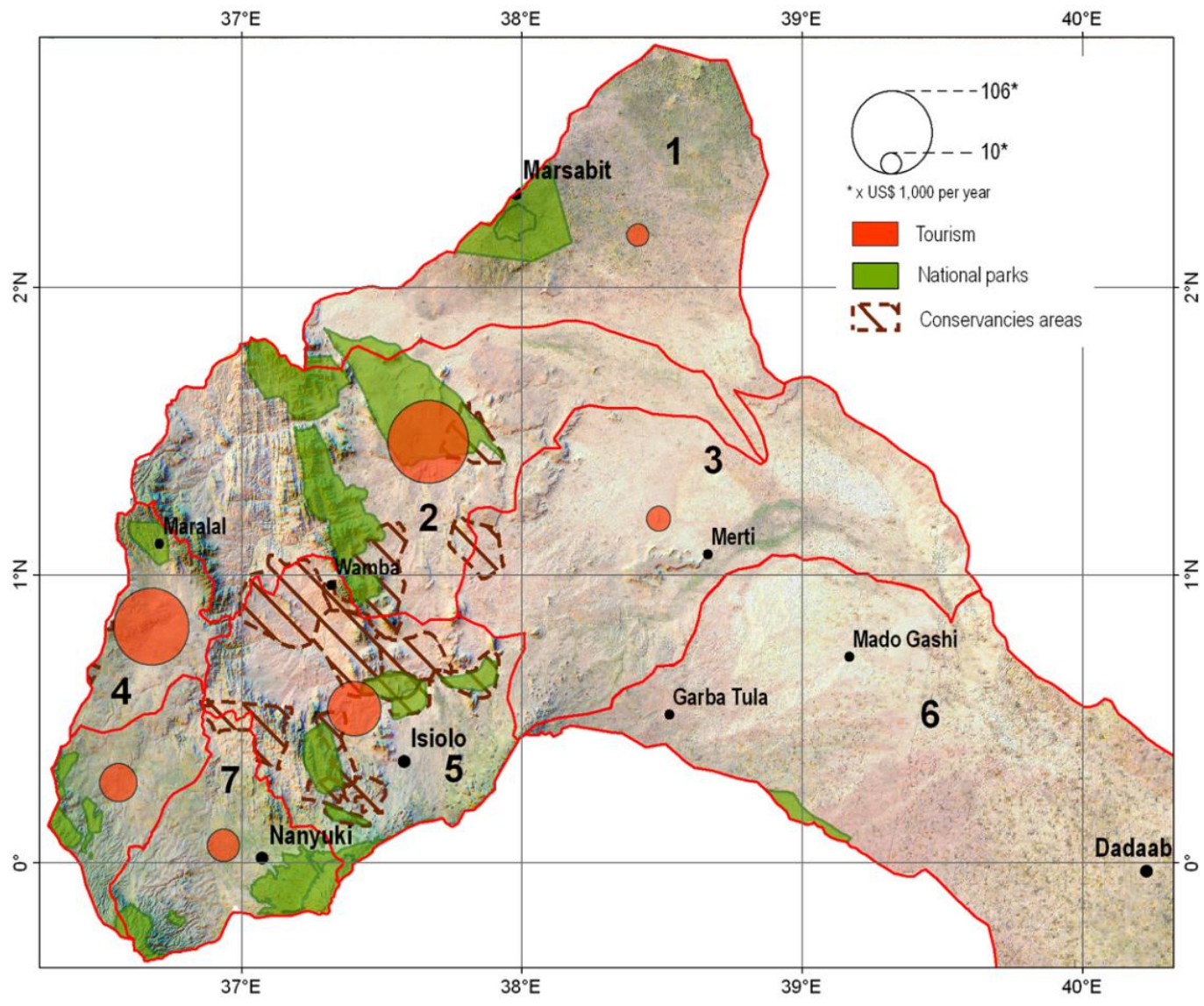
- Where are goods and services produced? Where are they bought and sold?
- Reflect the differences in topography, relief across the catchment.
- Data usually provided at district level are reorganised by sub-catchment.
- For crops and livestock, quantification in terms of physical yields is possible, but similar quantification of some services such as tourism, is not

Market Value of Selected final benefit: crop, livestock asset and livestock products

Market value of the selected Es is on average greater in the upstream part of the basin, that has distinctive climatic conditions and is well endowed with road and market infrastructures

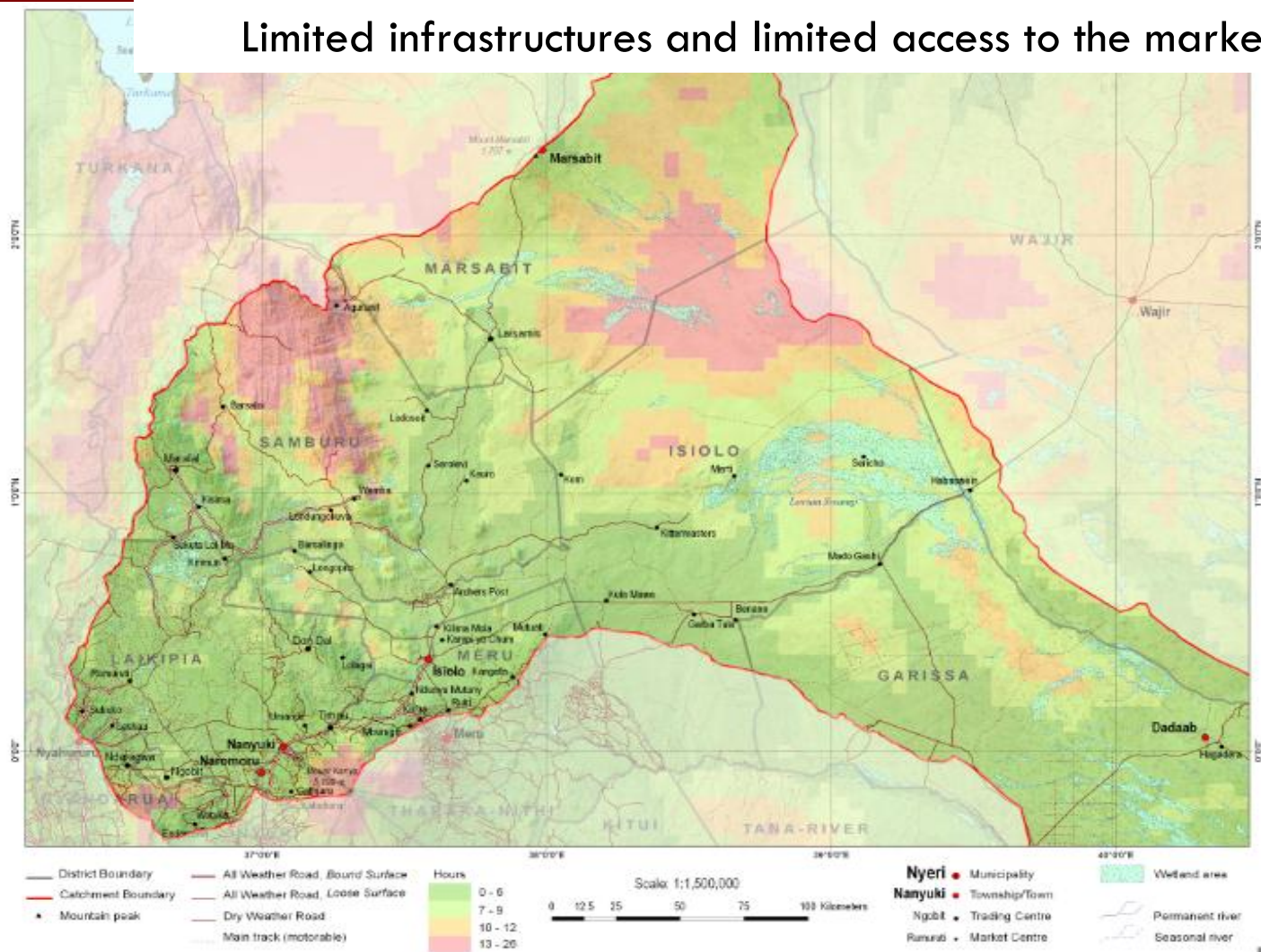


Market Value of Selected final benefit: tourism



Travel time to distance to market

Limited infrastructures and limited access to the markets downstream

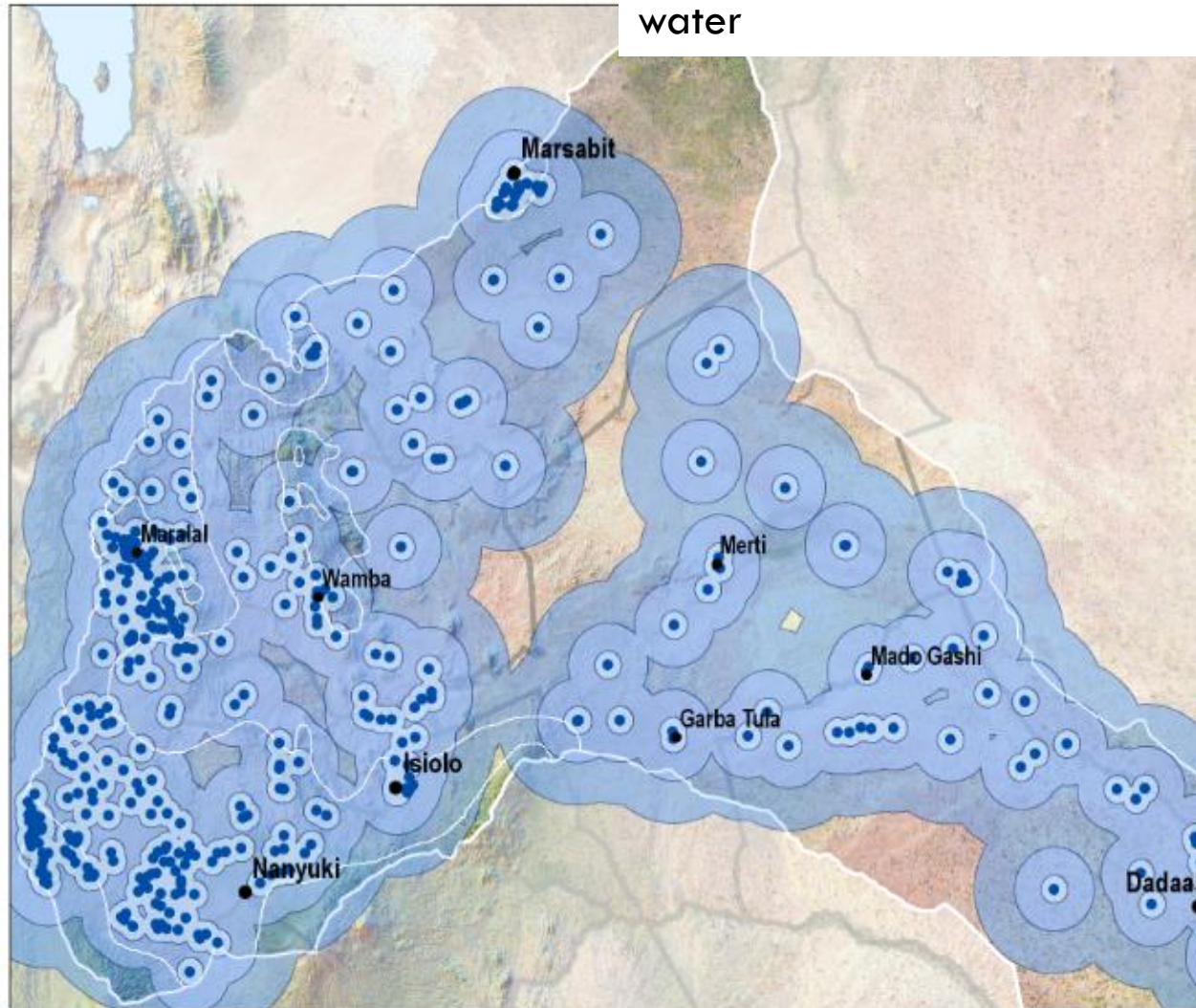


Supplementary maps can help us to understand and interpret the results from the spatial economic valuation, such as the map with the information on travel time distances to market...

Distance from water sources

Combined 5, 15 and 30 Km.

... and the map with the distances from the sources of water

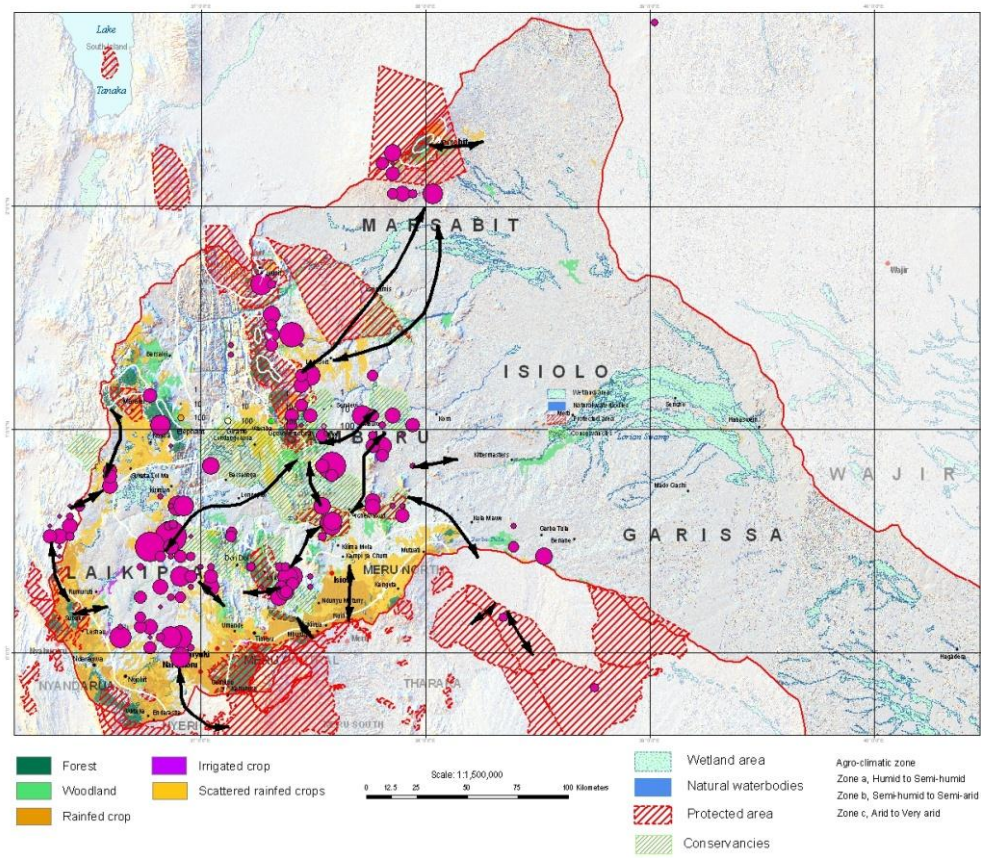


Scale 1:3,000,000

Major distances from water sources downstream

Elephant distribution and movements

Elephant movements



Mapping elephant distribution and movement can be used as input in policies related to wildlife corridors



Ericksen et al. 2011

Implementing ecosystem-based planning for sustainable development

- Natural capital is essential in supporting the development of the ASALs and conservation and management of ecosystem services require the understanding of the spatial links between ecosystems and human well-being.
- Mapping of distribution of supply and demand areas in a catchment should be done taking into account that rarely ecological and institutional boundaries coincides
- Mapping and valuing the spatial distribution of resources and the existing competition over these resources is important for sustainable development and it is an approach that has to be implemented at a level higher than the landscape

Conclusions

- Large variation of ecosystems services across the landscapes - communities have been capitalizing on these opportunities
- Opportunities for planning as new development is envisaged for northern arid lands
- Spatial economic valuation of ecosystem services combined with an analysis of the existing competitions over the resources is a tool that can:
 - ✓ bridge institutional and ecological boundaries, improving the understanding of ecological and socio-economic dynamics around ecosystem services
 - ✓ help to assess the societal benefits and costs of management measures and to better design politics of interventions
- Planning for biodiversity conservation and ecosystem management must involve different stakeholders for effective implementation of actions.

International Livestock Research Institute

Better lives through livestock

ILRI

www.ilri.org

s.silvestri@cgiar.org



ILRI

International Livestock Research Institute