

# Mapping Ecosystem Services and Poverty in Kenya: Preview of Work in Progress

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# A Joint Project Relying on Data and Expertise from:

- Central Bureau of Statistics (CBS)
- Department of Resource Surveys and Remote Sensing (DRSRS)
- Ministry of Agriculture and Livestock Development
- Ministry of Water Resources and Development
- National Environment Management Authority (NEMA)
- Poverty Analysis and Research Unit (Ministry of Planning and National Development)
  
- Kenya Wildlife Service (KWS)
  
- African Centre for Technology Studies (ACTS)
- Ecotourism Society of Kenya (ESOK)
- Energy for Sustainable Development Africa
- Kenya Association of Tour Operators (KATO)
- University of Nairobi
  
- *Africover* – Food and Agriculture Organization of the United Nations
- FEWS NET
- International Food Policy Research Institute (IFPRI)
- International Livestock Research Institute (ILRI)
- International Water Management Institute (IWMI)
- World Agroforestry Centre (ICRAF)
- World Resources Institute (WRI)



# With Our Partners We Seek To:

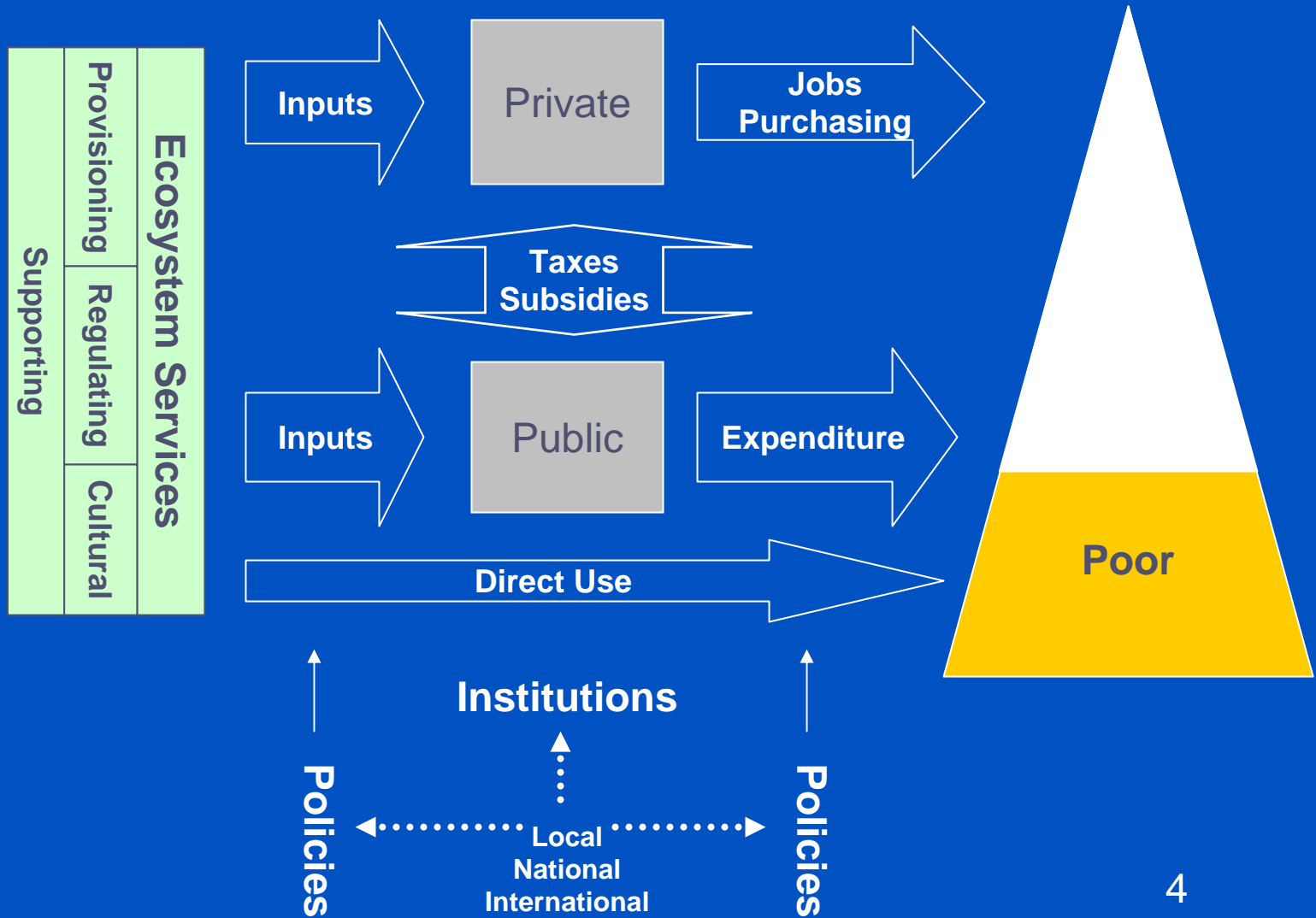
- Break down sectoral parochialism and influence national poverty reduction efforts
- Arm civil society groups to push for poverty reduction efforts that take ecosystem and governance issues into considerations
- Raise the status of environmental management authorities to improve environmental reporting and make them a stronger player
- Transform the thinking in ministries of planning, finance, or development so that they perceive ecosystem stewardship as an important foundation of national development



# Ecosystems

# Institutions & Governance

# Poverty & Equity



# How do We Make the Linkages between Poverty, Ecosystems, and Accountability?



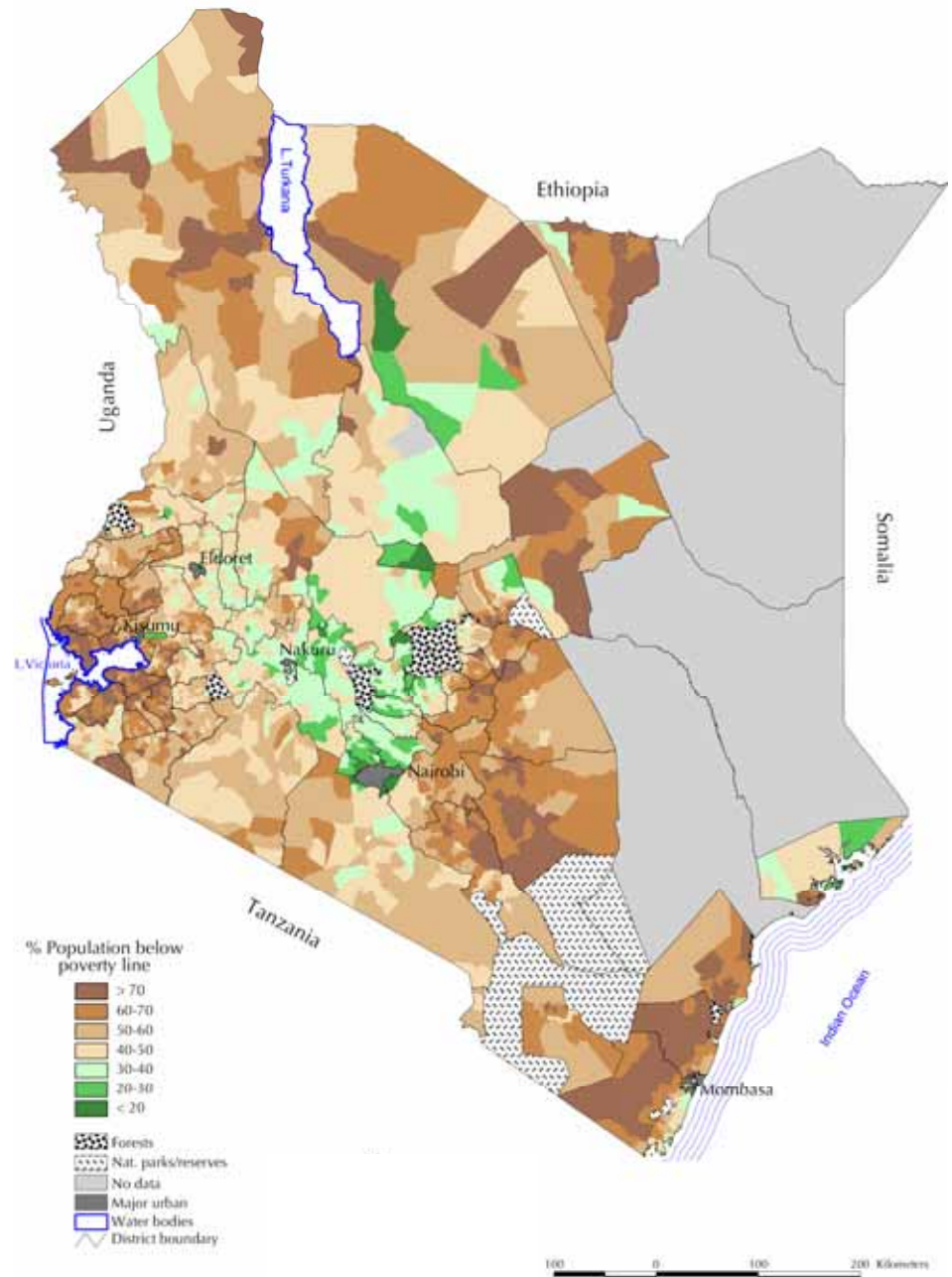
# One Way Would be to Answer the Following Questions:

- Where are the poor?
- Which areas provide which amount of ecosystem services?
- How does the location of poverty compare to the distribution of ecosystem services?
- Who has access to resources, who benefits, who bears the costs, and what are policymakers doing to improve the situation?

# Where Are the Poor ?



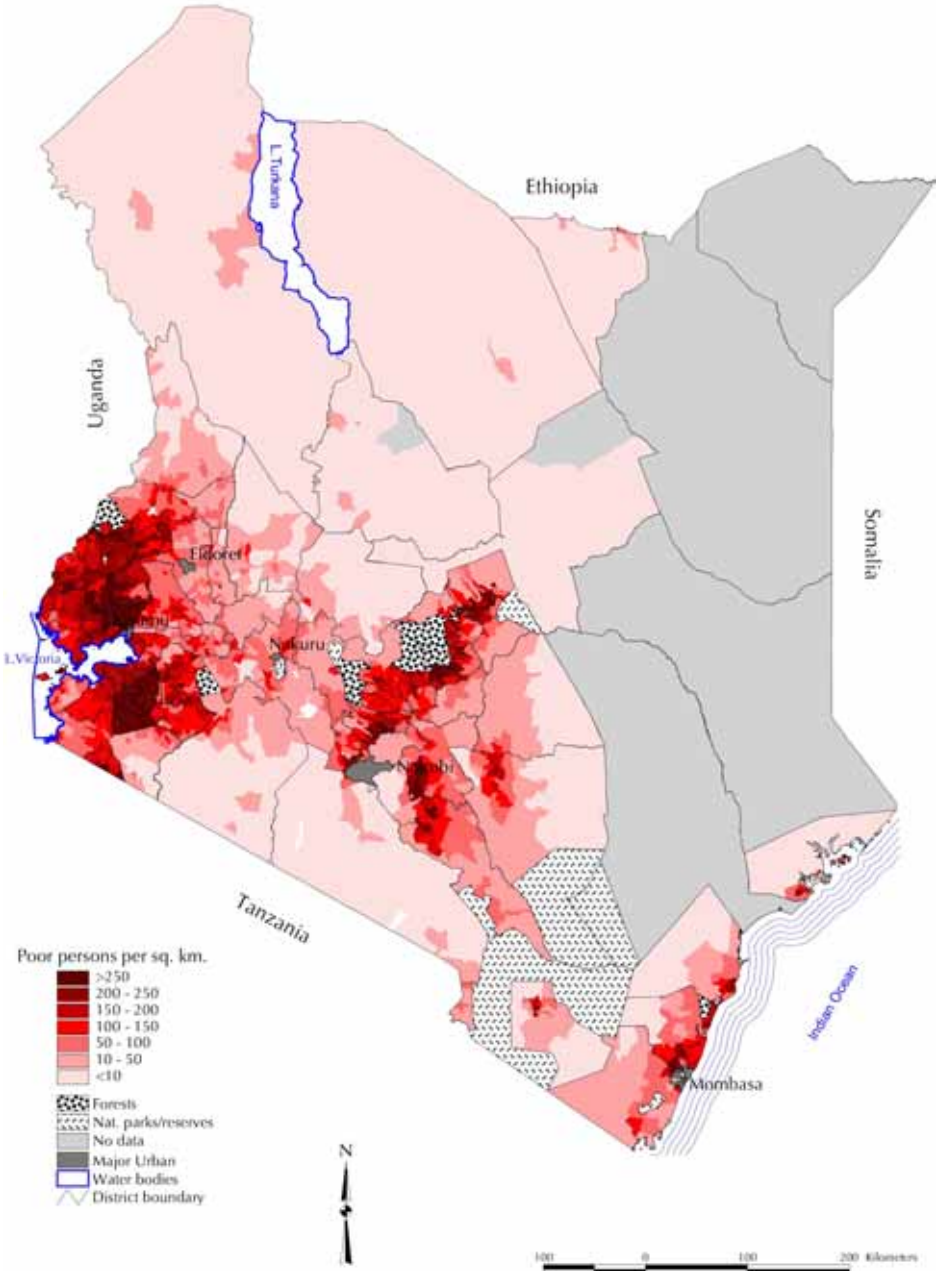
# Percent of Rural Population below the Poverty Line By Location



**Source:** Central Bureau of Statistics, Ministry of Planning and National Development, Kenya, 2003



# Number of Poor Persons per Square Kilometer by Location



Source: Central Bureau of Statistics, Ministry of Planning and National Development, Kenya, 2003

# Which Areas Provide which Amount of Ecosystem Services?



# Ecosystem Services: The Benefits People Derive from Ecosystems

## Provisioning

Products obtained from ecosystems

- Food
- Fresh water
- Fuelwood
- Fiber
- Biochemicals
- Genetic resources

## Regulating

Benefits obtained from regulation of ecosystem processes

- Climate regulation
- Disease regulation
- Water regulation
- Water purification

## Cultural

Nonmaterial benefits obtained from ecosystems

- Spiritual and religious
- Recreation and ecotourism
  - Aesthetic
  - Inspirational
  - Educational
- Sense of place
- Cultural heritage

## Supporting

Services necessary for the production of all other services

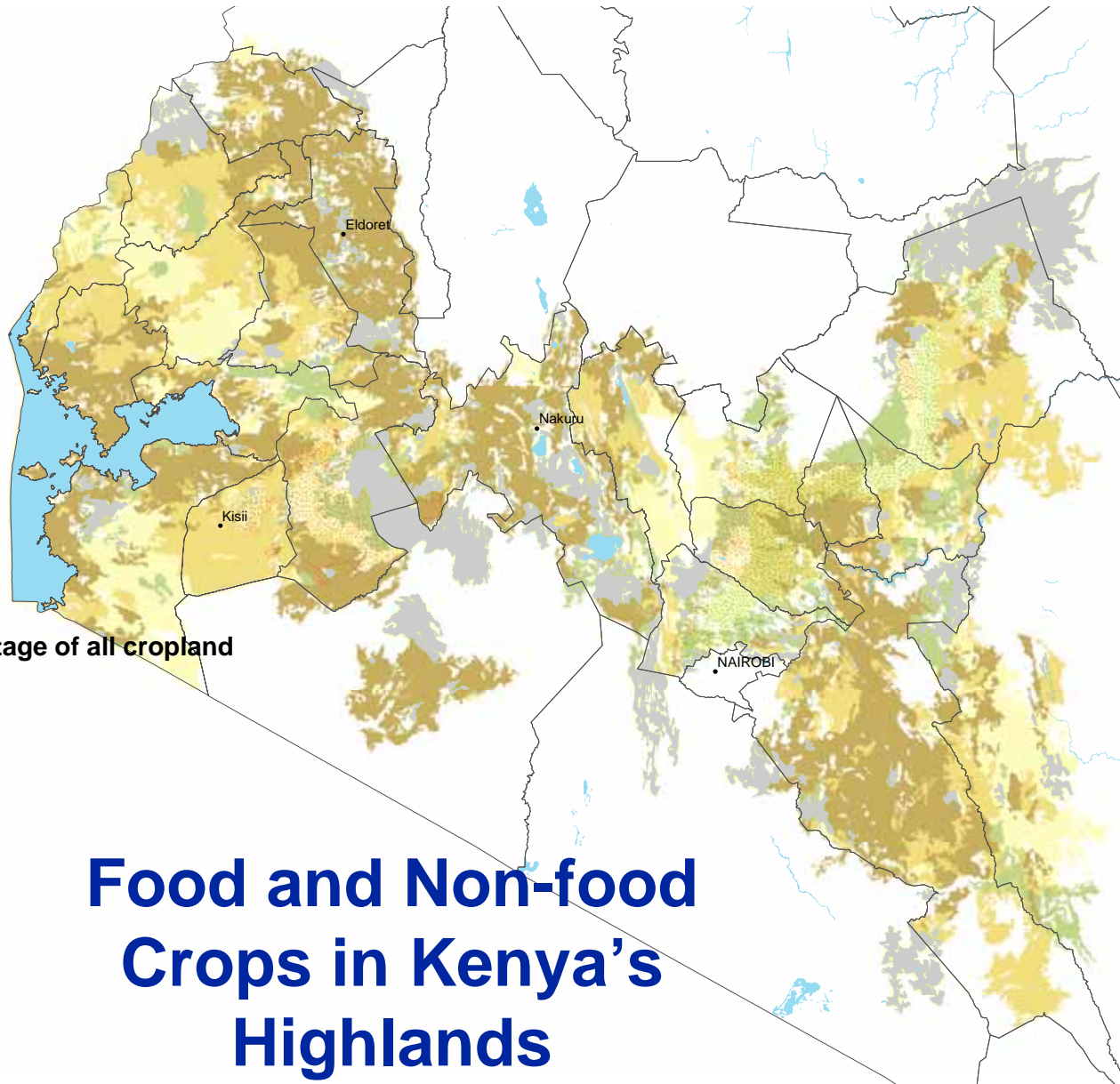
- Soil formation
- Nutrient cycling
- Primary production

# Approach: Map Major Ecosystem Services

- Food from crops, livestock, fish, and wildlife
- Water (quantity, quality, flood control)
- Biodiversity
- Tourism and recreation
- Fuel and energy
- Timber and housing material

# Provisioning Services: Food from Crops, Livestock, and Wildlife





**Food as a percentage of all cropland**

- < 25 %
- 25 - 50 %
- 50 - 75 %
- > 75 %
- No cropping

**Non-food crops**

- Coffee
- Tea
- Kenya districts
- Waterbodies

# Food and Non-food Crops in Kenya's Highlands

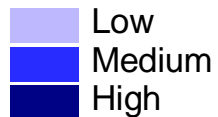
Sources: *Africover* – Food and Agriculture Organization of the United Nations (FAO) and Kenya Department of Resource Surveys and Remote Sensing (DRSRS).

# Supply of Livestock and Wildlife Products

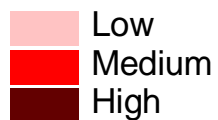
## Animal Density (Both wildlife and livestock present)



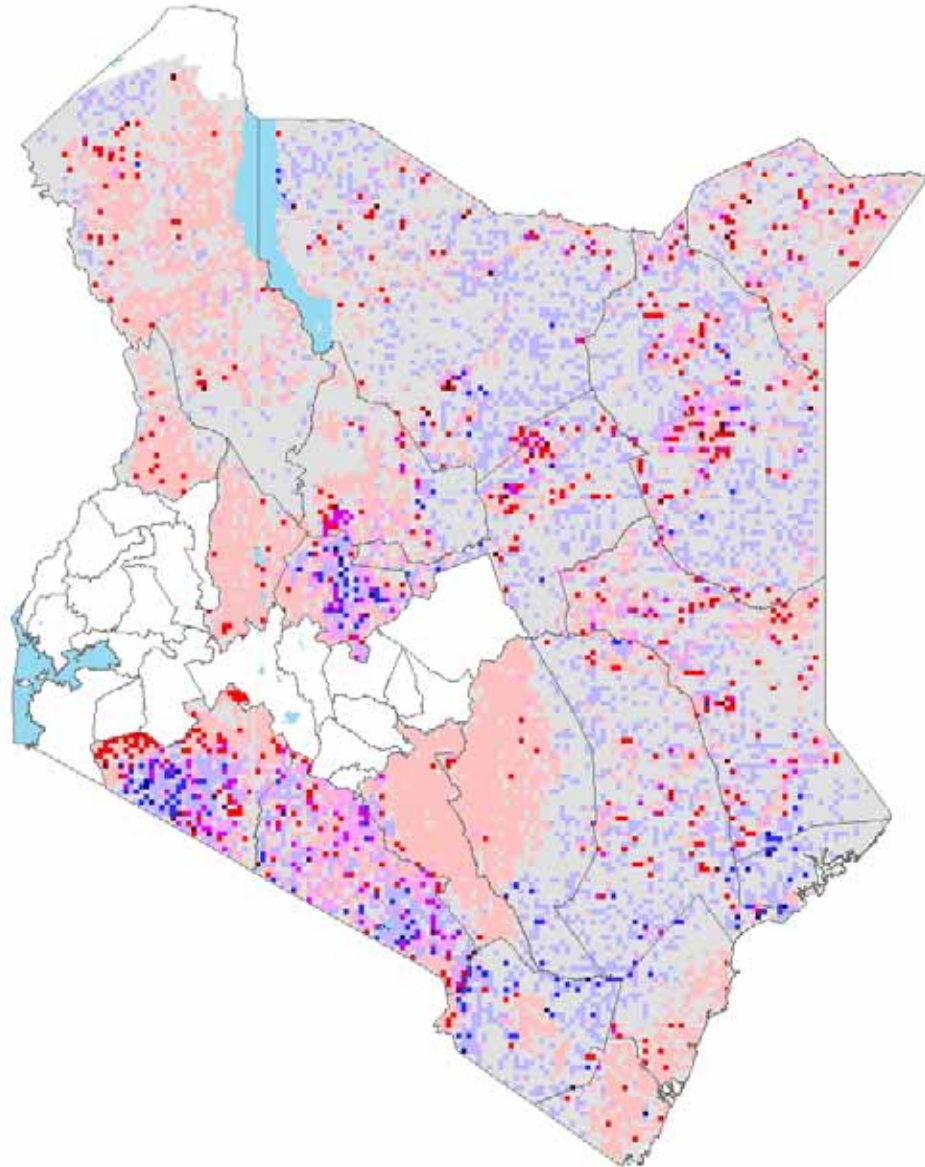
## Wildlife Density Only



## Livestock Density Only



No Data



Source: Kenya Department of Resource Surveys  
and Remote Sensing (DRSRS).

# Provisioning and Cultural Services: Genetic Resources and Tourism





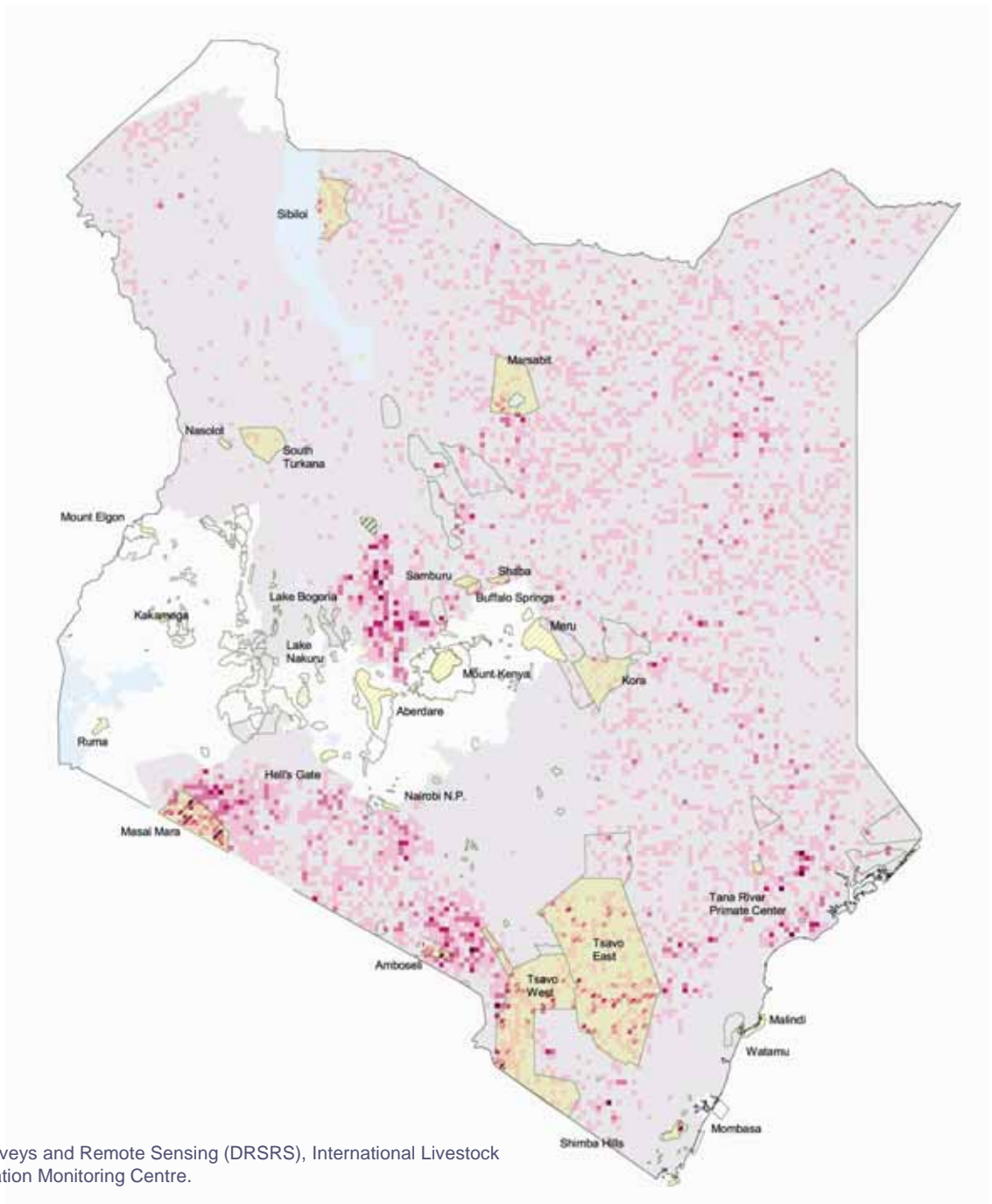
# Mammal Density and Protected Areas

## Protected Areas

- IUCN I-IV
- Other

## Wildlife Density (TLU/km<sup>2</sup>)

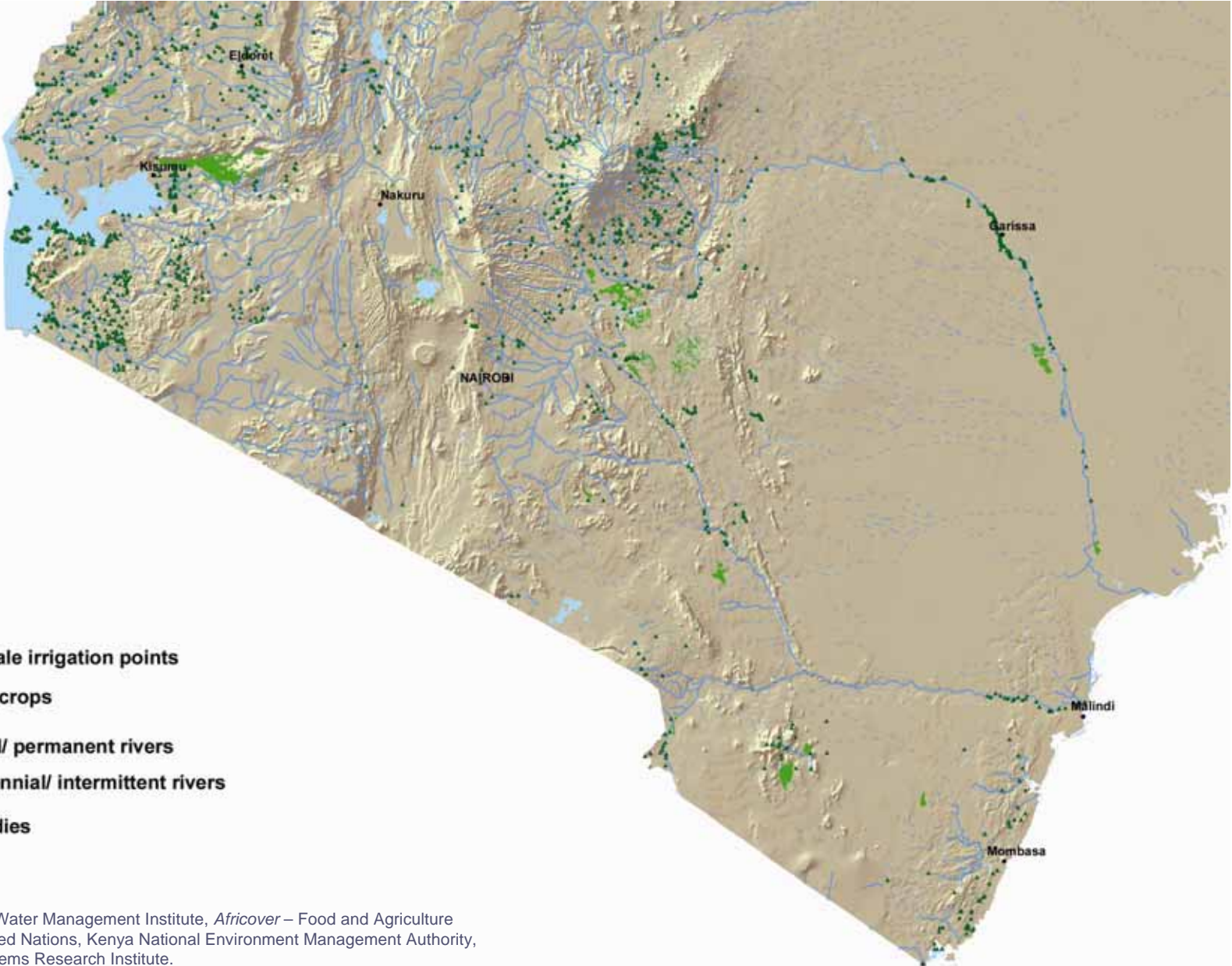
- < 11.6
- 11.7 - 43.5
- 43.6 - 124.5
- > 124.5
- No Wildlife
- No Data
- Waterbodies



Sources: Kenya Department of Resource Surveys and Remote Sensing (DRSRS), International Livestock Research Institute (ILRI), and World Conservation Monitoring Centre.

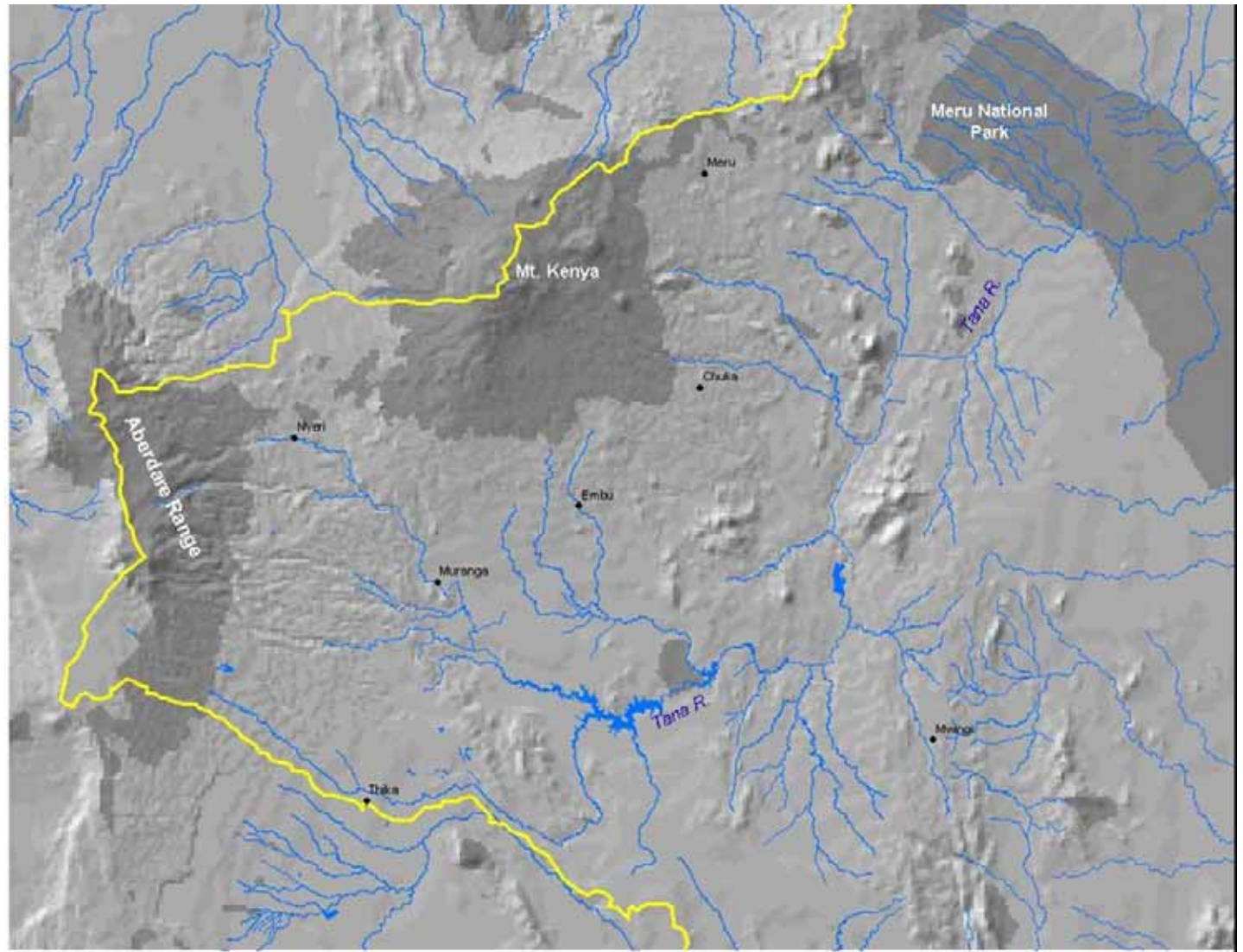
# Competing Demands for Ecosystem Services: Mount Kenya and Upper Tana River

# Tana River

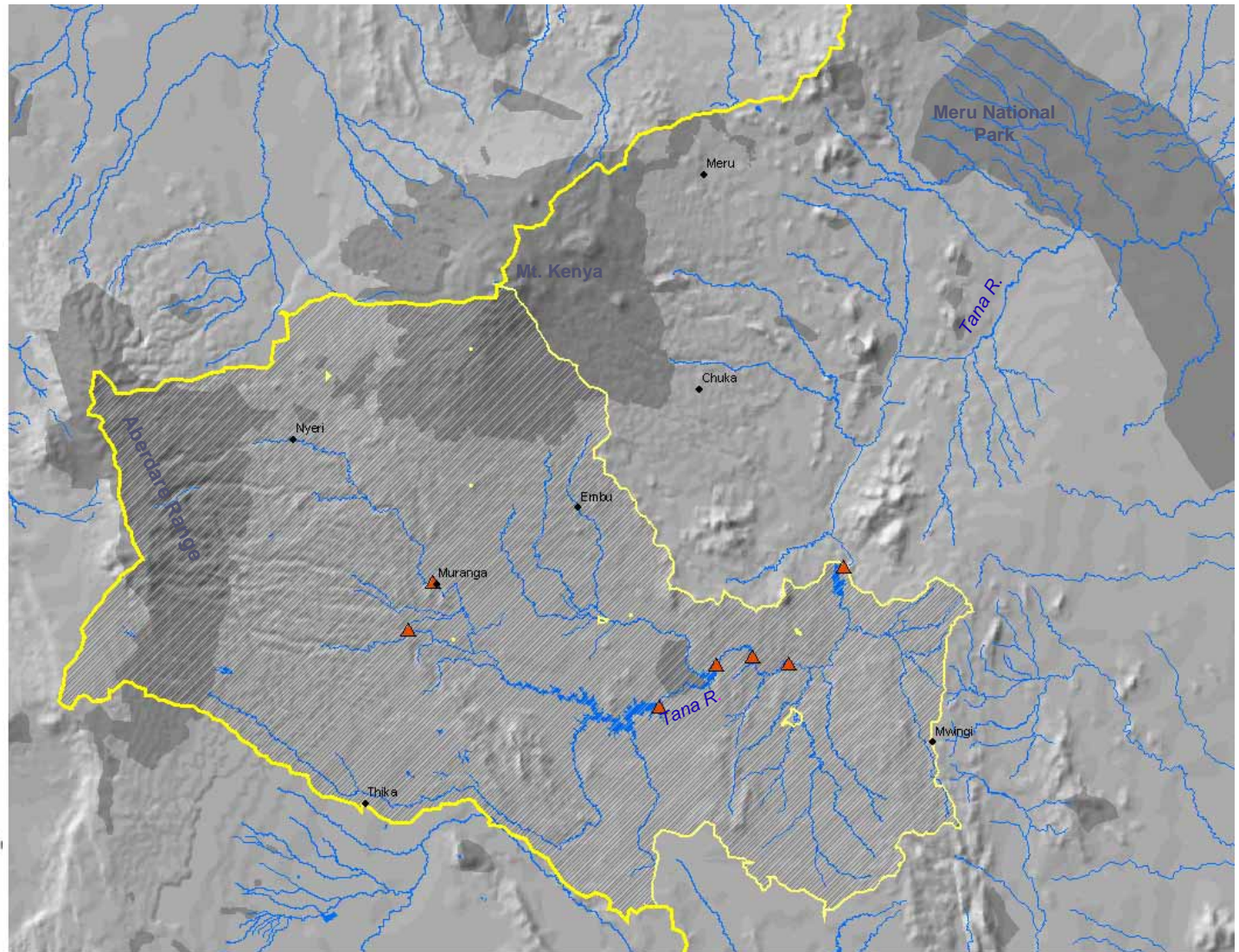


Sources: International Water Management Institute, *Africover* – Food and Agriculture Organization of the United Nations, Kenya National Environment Management Authority, and Environmental Systems Research Institute.

# The Upper Tana River Basin

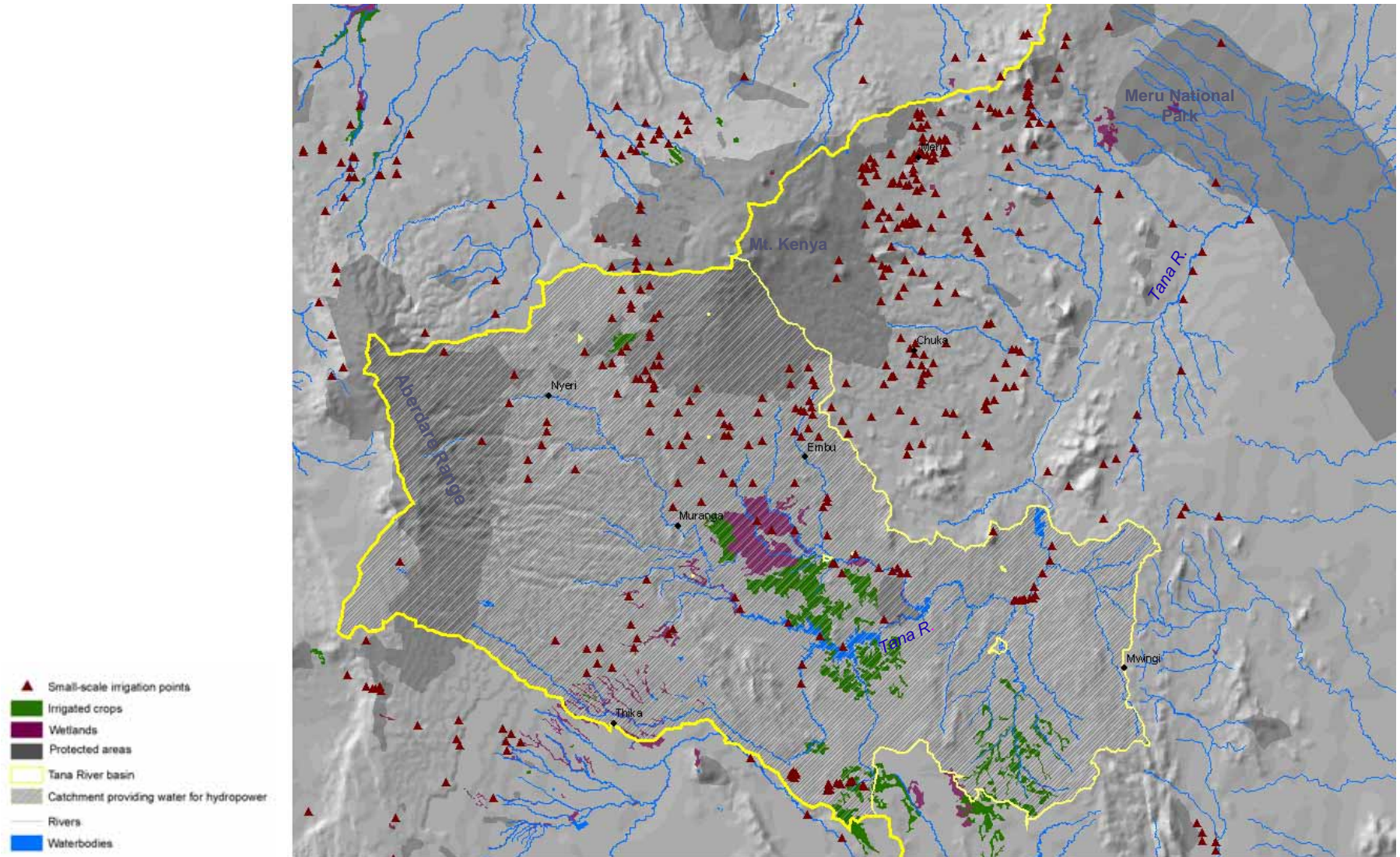


# Water for Hydropower in the Upper Tana River Basin



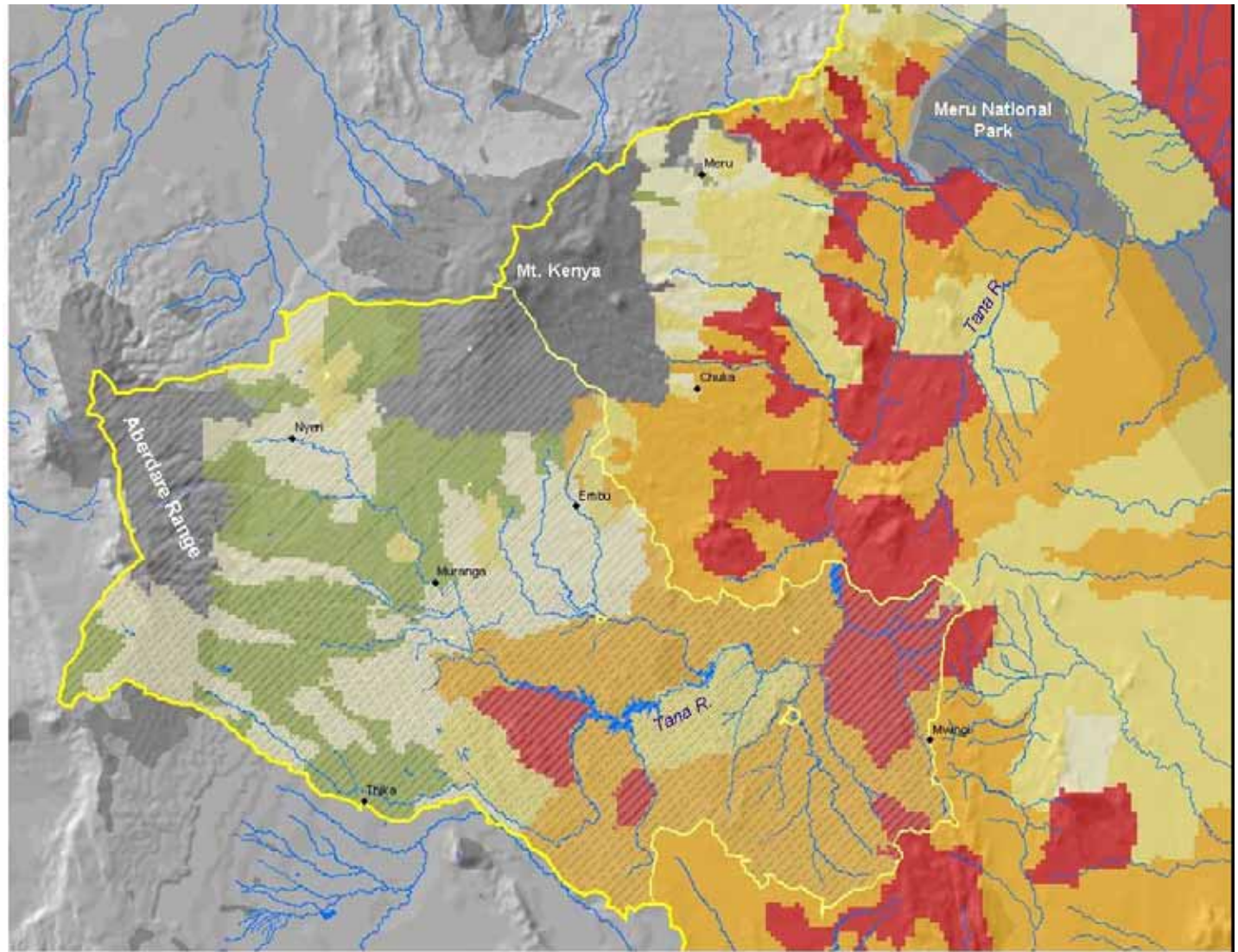
Sources: Kenya Central Bureau of Statistics, International Water Management Institute, *Africover* – Food and Agriculture Organization of the United Nations, Kenya National Environment Management Authority, and World Conservation Monitoring Centre.

# Ecosystem Services in the Upper Tana River Basin



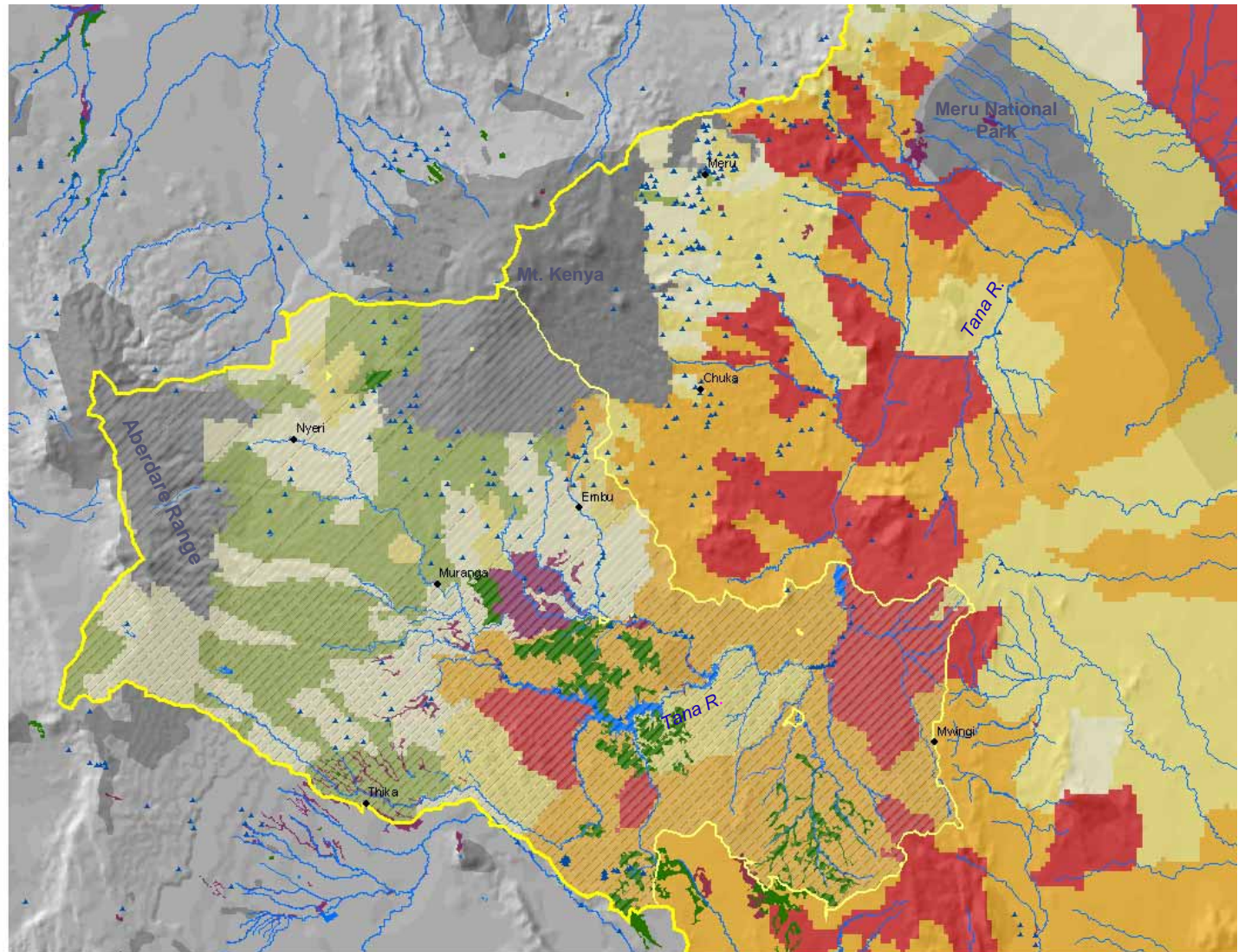
**Sources:** Kenya Central Bureau of Statistics, International Water Management Institute, *Africover* – Food and Agriculture Organization of the United Nations, Kenya National Environment Management Authority, and World Conservation Monitoring Centre.

# Poverty in the Upper Tana River Basin



Sources: Kenya Central Bureau of Statistics, International Water Management Institute, *Africover* – Food and Agriculture Organization of the United Nations, Kenya National Environment Management Authority, and World Conservation Monitoring Centre.

# Combining all Layers: Poverty and Competing Demands for Ecosystem Services in the Upper Tana River Basin

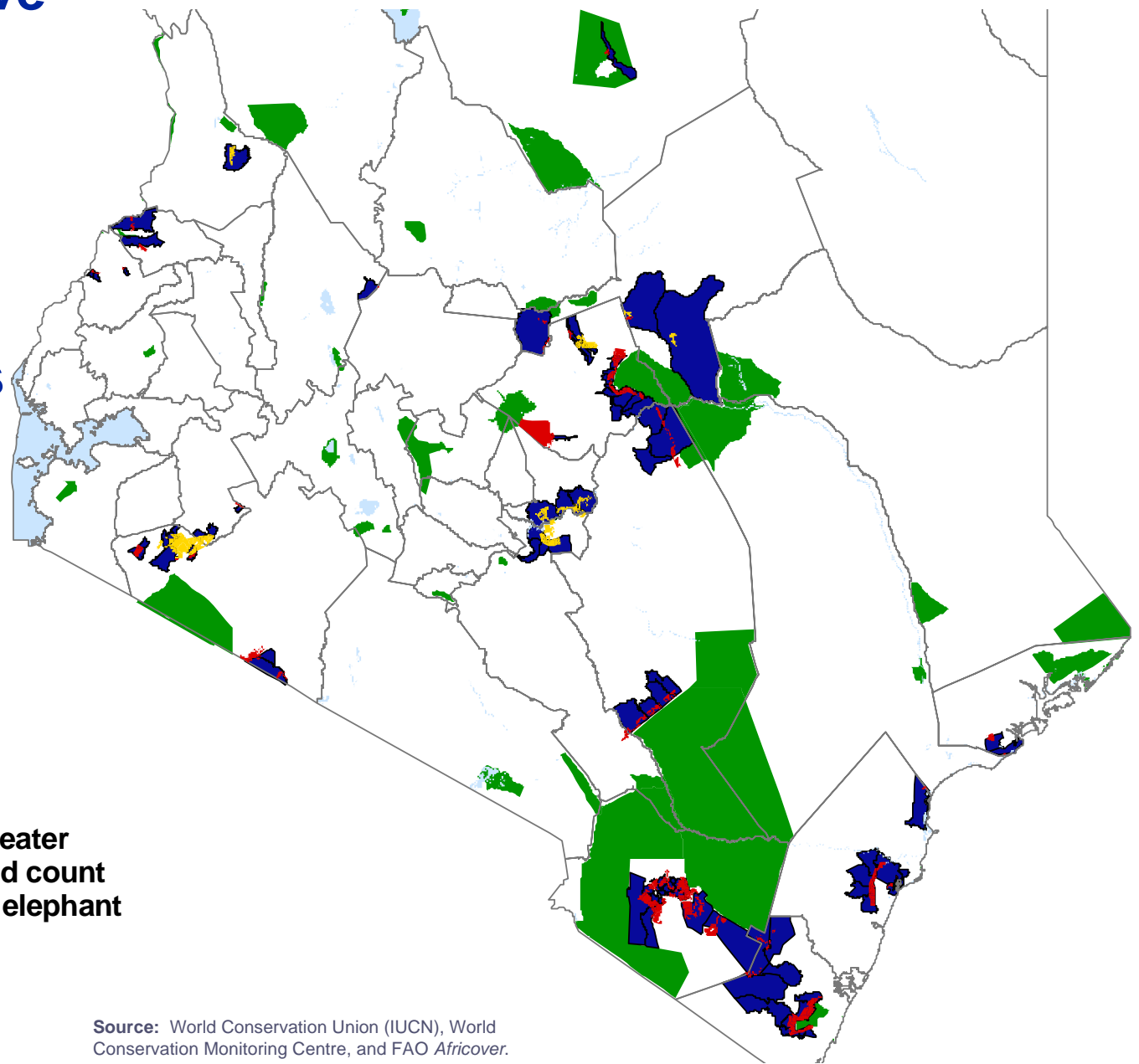










# Ecosystem Disservices



# 86 Administrative Districts with High Poverty Rates Intersect with Elephant Conflict Areas



Elephant conflict areas intersecting with areas of high poverty head count

-  High conflict
-  Medium conflict
-  Sub-locations with greater than 60% poverty head count and intersecting with elephant conflict areas
-  Protected areas
-  Kenya districts
-  Waterbodies

Source: World Conservation Union (IUCN), World Conservation Monitoring Centre, and FAO *Africover*.

# Next Steps

- Produce joint publication (2005)
- Work with individuals in government and civil society to inject findings in selected policy processes
- Raise funds to do similar work in Uganda (2006)
- Explore options to replicate method and experiences in other countries

