Climate Change Vulnerability Assessment of Three Key Kenyan Landscapes with Implications for Ecosystem Services

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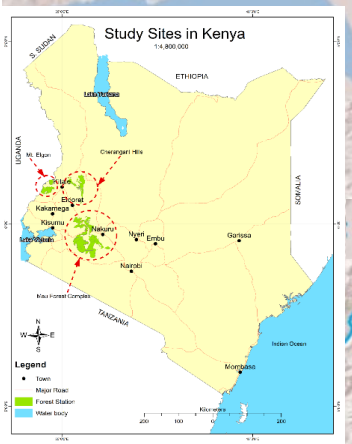
Climate Change Vulnerability Assessment (CCVA)

Provides the setting for identifying

- Ecosystem stresses
- Socioeconomic needs
- Payment for Ecosystem Services (PES)
- Adaptation actions and focus areas (spatial)

The Water Tower Setting

The Mau, Cherangany and Mt Elgon Water Towers of Kenya

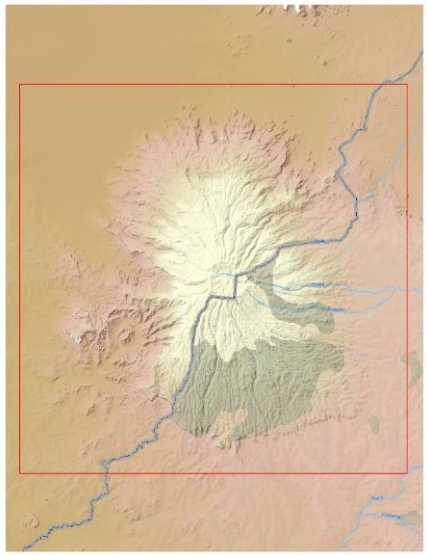


Mt. Elgon

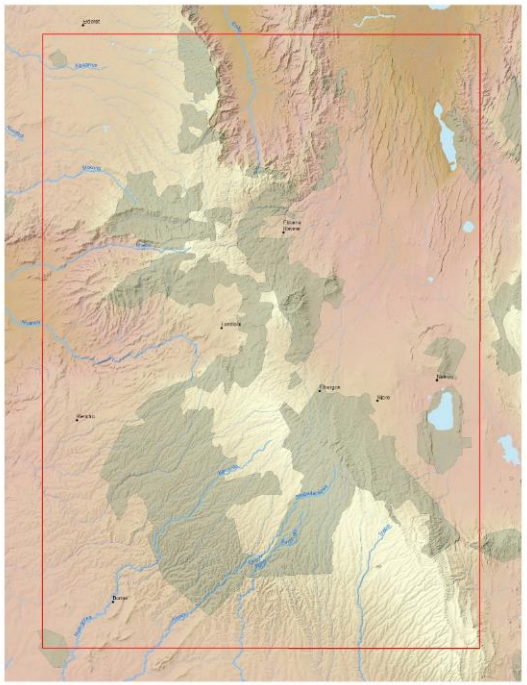
Cherangany Hills

Mau Complex

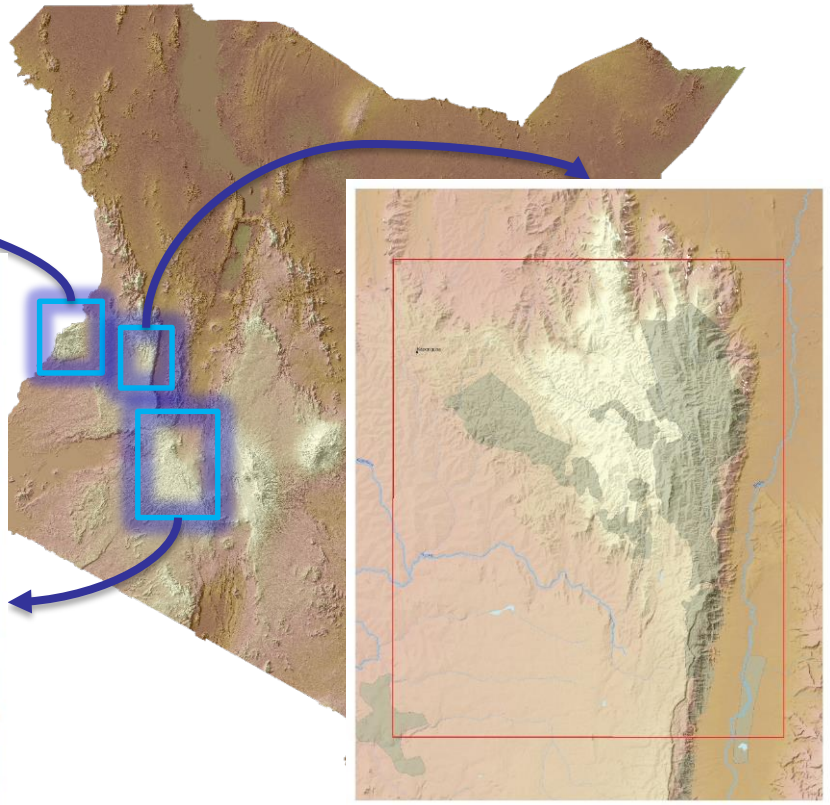
Focus Areas



Mt. Elgon



Mau Forest



Cherangany Hills

Components of CCVA

Exposure

Sensitivity

Adaptive Capacity

Components of CCVA

Exposure

--the magnitude of the climate change effect, typically temperature and precipitation

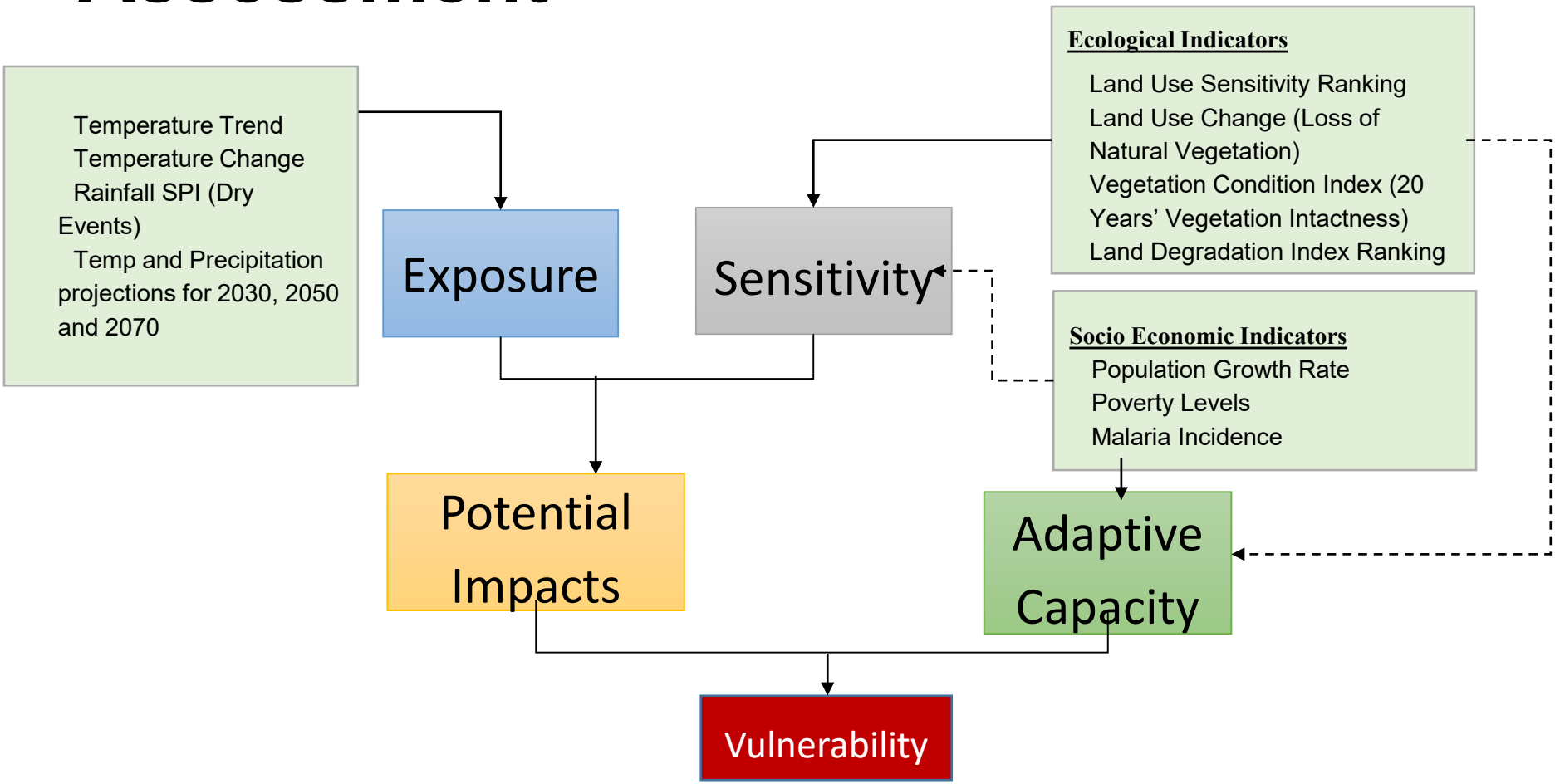
Sensitivity

--the degree to which an attribute or indicator is affected by climate change exposure

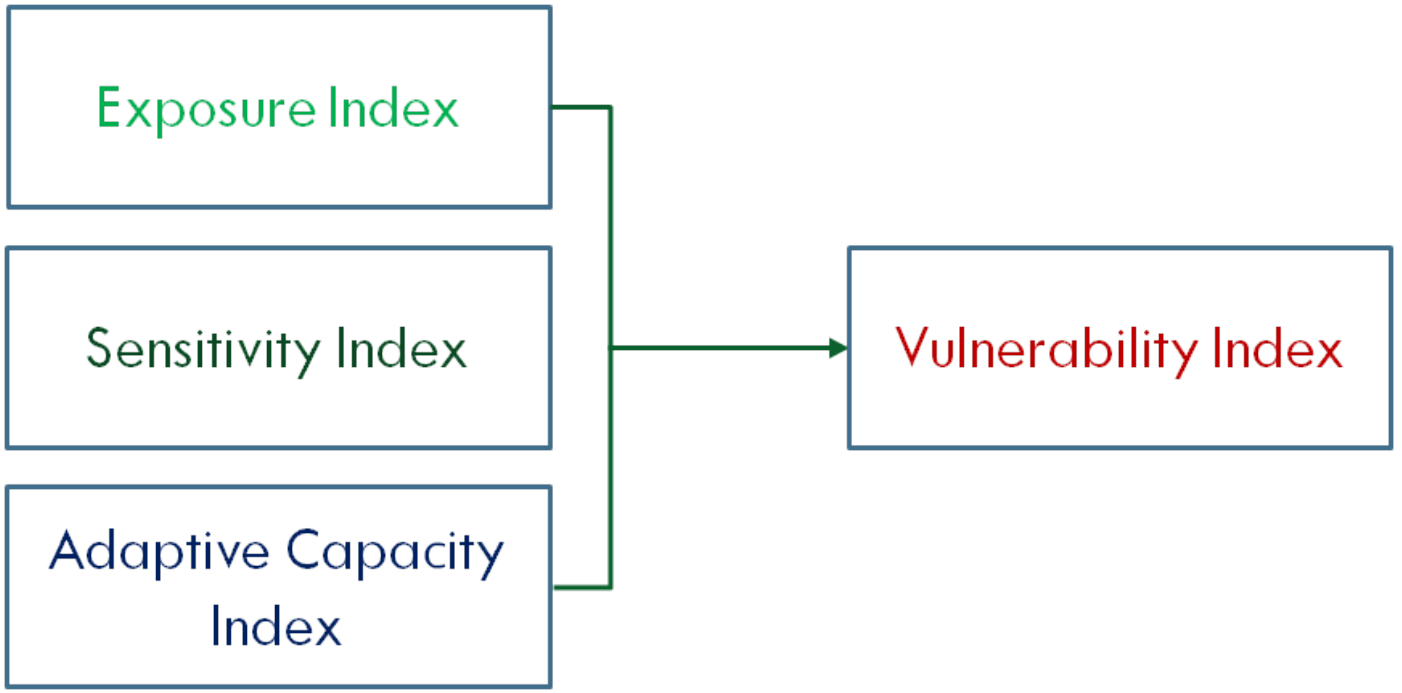
Adaptive Capacity

--How an attribute or indicator adjusts to climate change, moderates its affects, or responds to opportunities

Climate Change Vulnerability Assessment



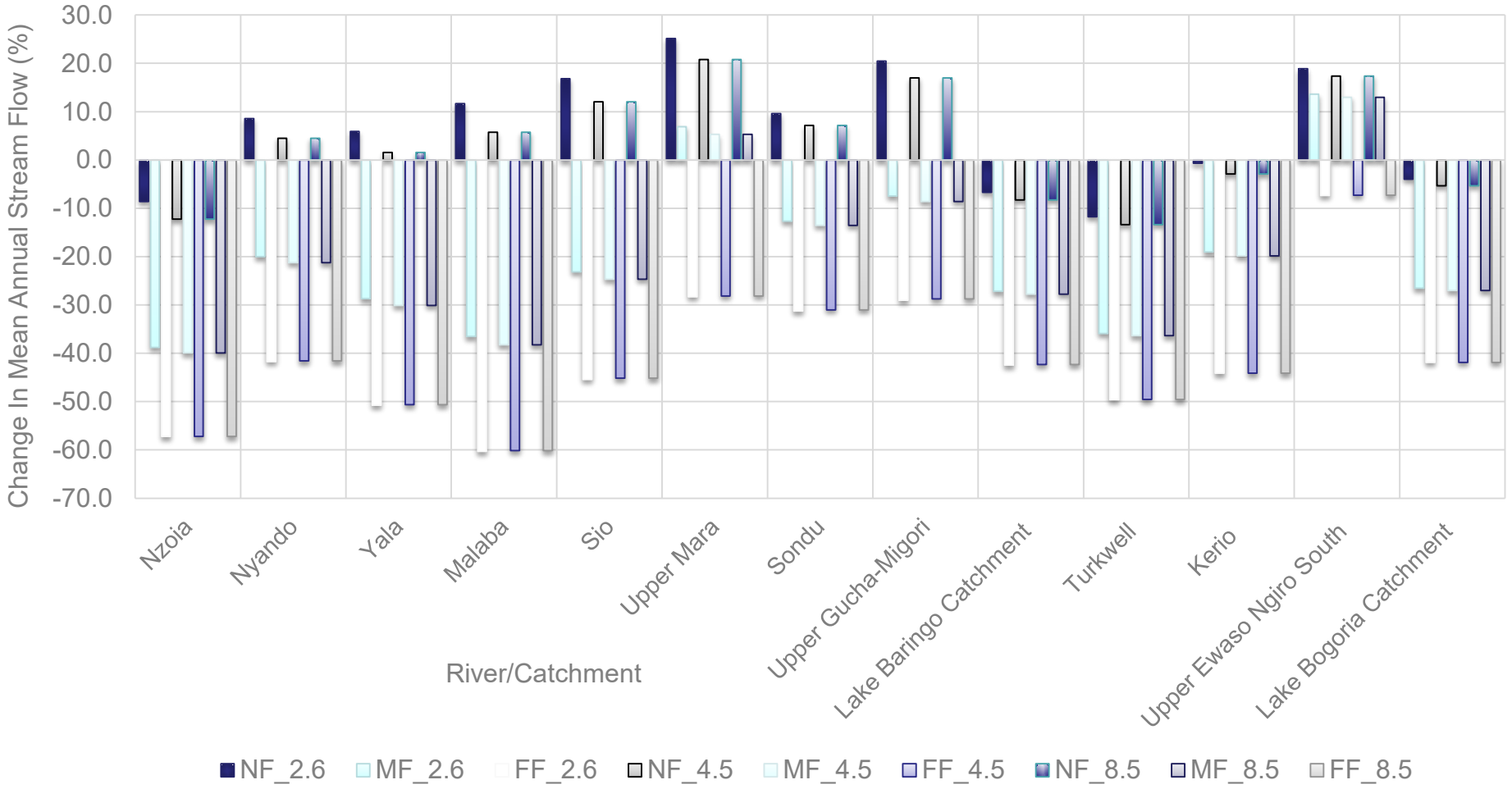
Development of a vulnerability index



Key Findings

- Population growth has been greatest in areas adjacent to water towers
- Precipitation has become more variable and unreliable. This is also confirmed by findings in community meetings.

Impacts on Water Resources



Key Findings

- Declining precipitation over all. Declining precipitation during long rains, increased precipitation during short rains.

- Most pronounced in the Mau landscape, with an overall decline of precipitation of 73 mm per decade.

- With decreasing water availability, there is an accompanying increase in deficit or shortage—especially to the consumptive users, which are mainly irrigation and municipal water providers.

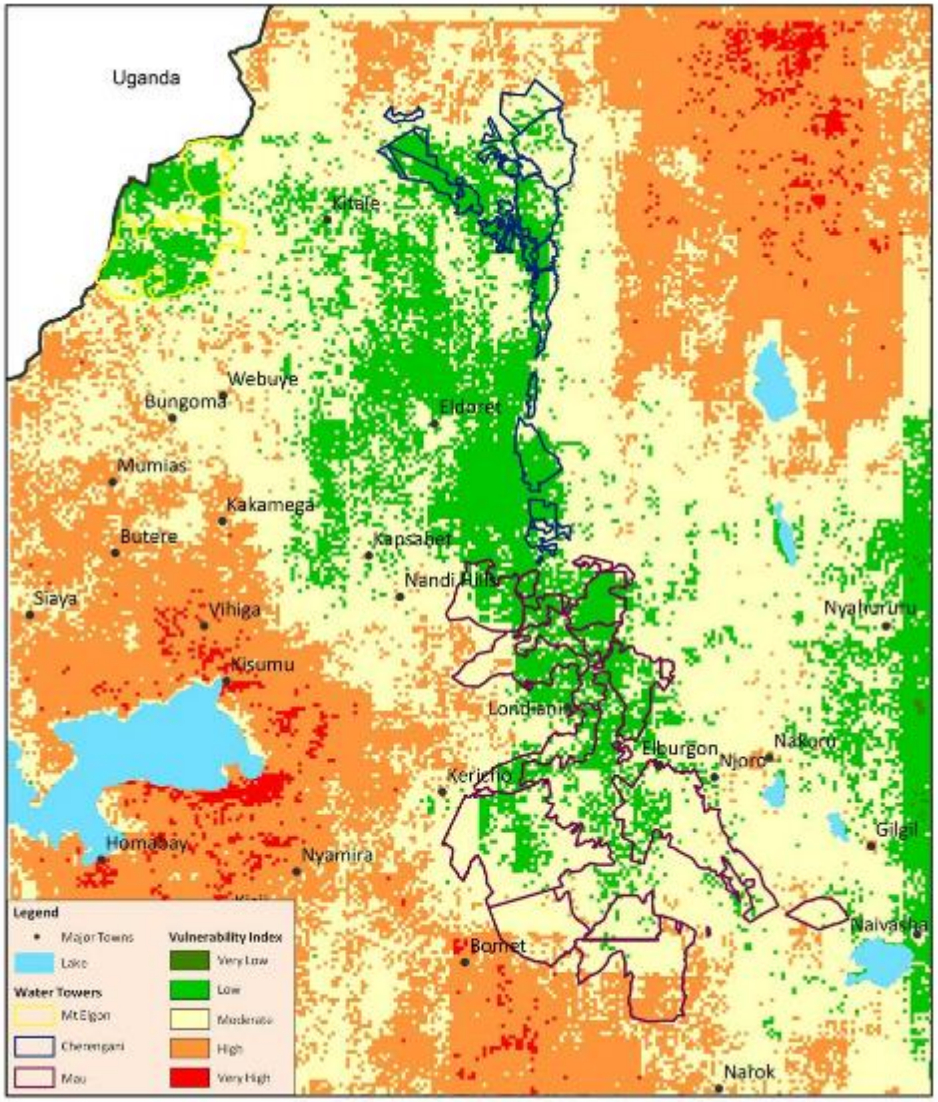
Key Findings

- Climate change vulnerability indices vary between and within the water towers. Mt. Elgon shows the lowest vulnerability but also the largest projected shift in rainfall.

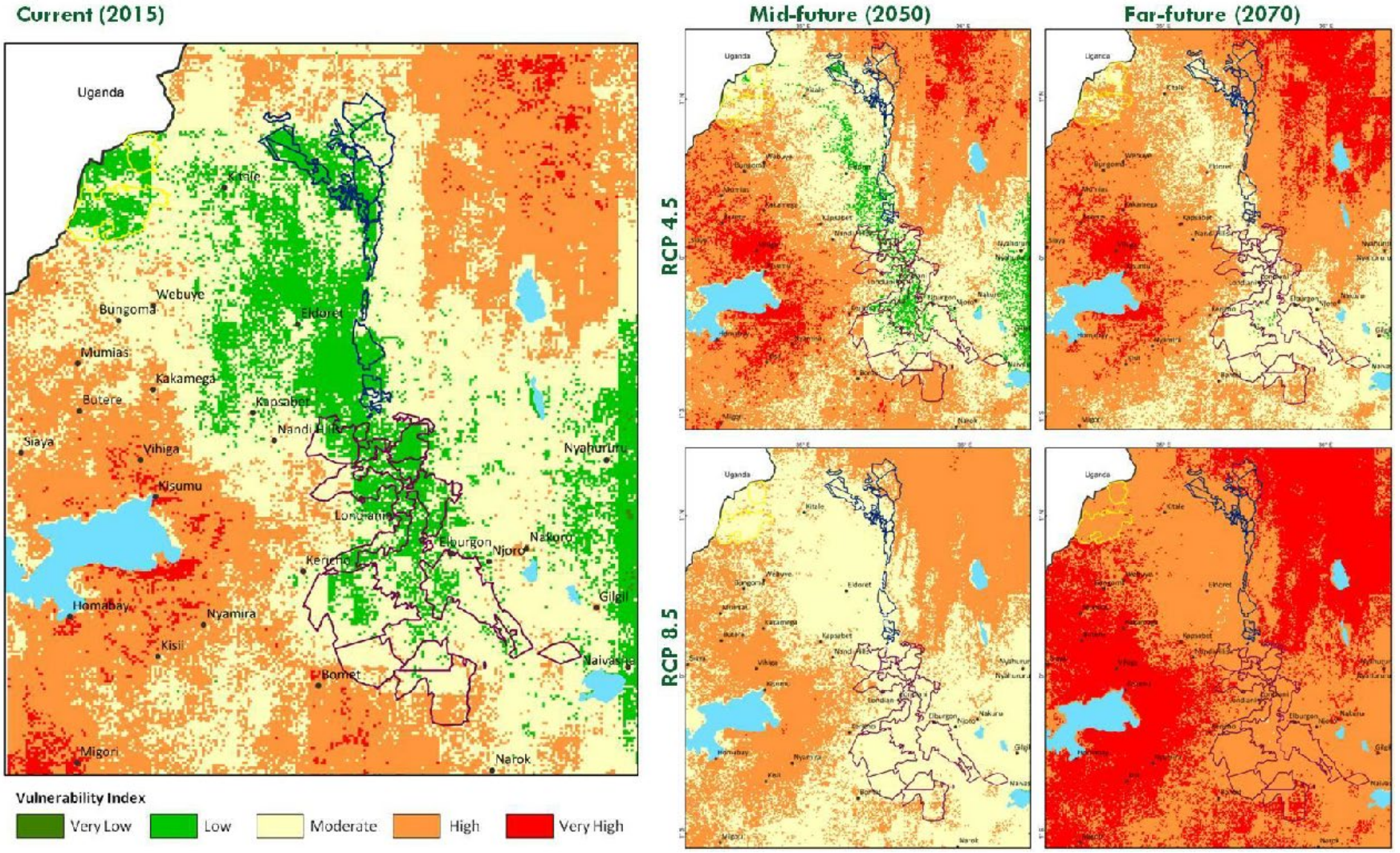
- Future projections indicates that the water towers will become more vulnerable in the future.

- The areas classified as low vulnerability (approximately 40 percent) is observed to shrink in the mid-future (2050s) under both RCP 4.5 and RCP 8.5, while the areas classified as high and very high will increase in both RCP's

Vulnerability Index



Vulnerability Index Into the Future



Implications

- Changes in precipitation mean food production will be disrupted and likely reduced. Likewise, livestock diseases and conflicts over grazing lands may increase.
- The Mau ecosystem is a tea growing zone due to favorable microclimatic conditions. Temperature warming and warming temperature is likely to impact of tea production in this zone.
- Biodiversity will be affected by changes in vegetation cover, compounded by human population increases.
- Variable rainfall and increasing average temperatures may lead to increased incidence of malaria

Enhancing Adaptive Capacities

- Building resilience- Rehabilitation of degraded landscapes
- Altering crops, and crop timing
- Reduce waste of water through more efficient irrigation, as well as cover crops

- Alternative livelihoods to ease pressure on forest resources

- Enhanced monitoring to track status of ecosystem (both biophysical and socio economic monitoring)

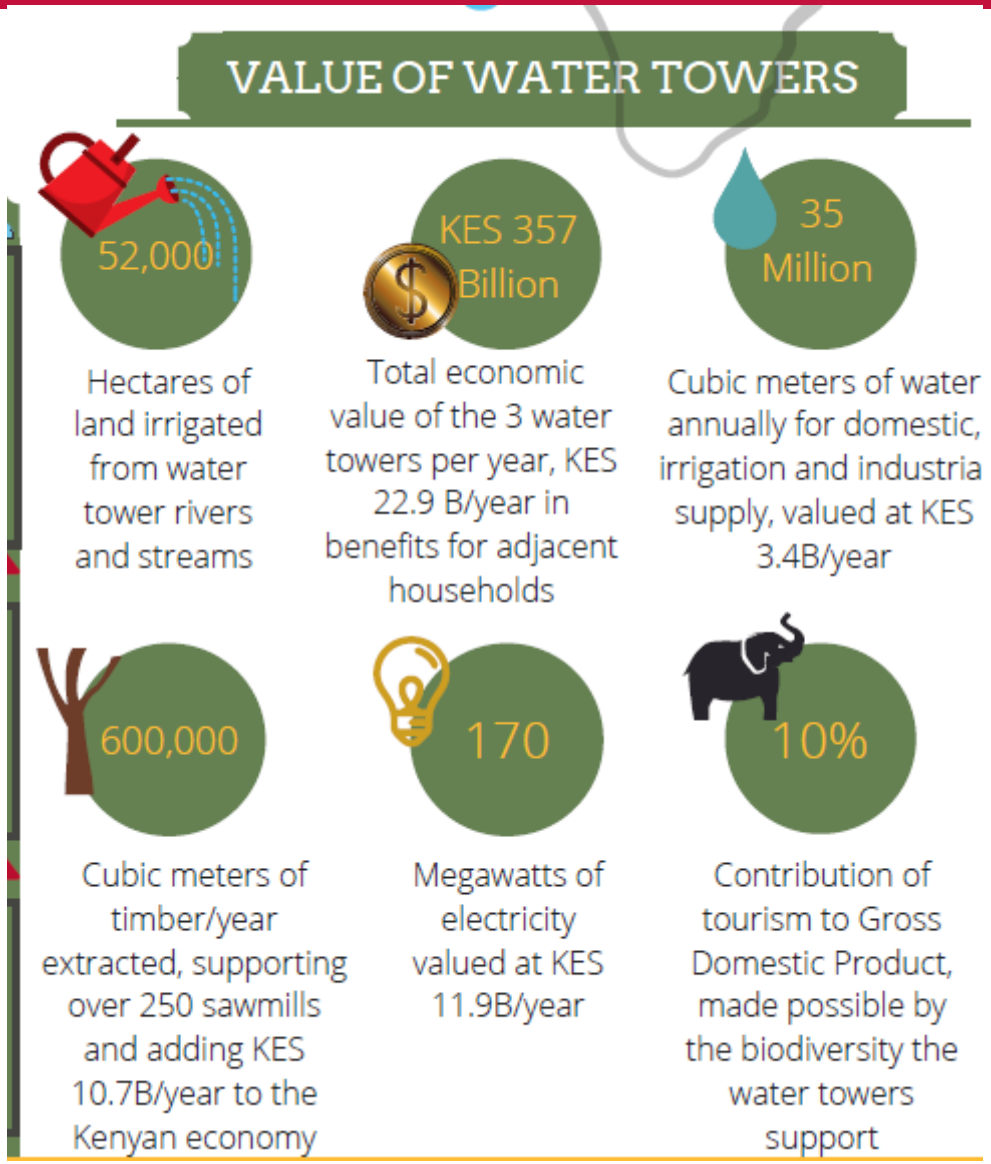
- Enhanced participation of local communities in **designing**, **implementing** and **benefiting** from sustainable ecosystem management programs, e.g. PES

Summary of CCVA Implications

- Less reliable agricultural production
- Less consistent water storage for irrigation and hydropower
- Flash flooding
- Increased drought
- Compounded by increases in resource demand

Implications of Climate Change for Ecosystem Services

- ✓ Policy briefs to guide forest management
- ✓ Demonstrated methodology for natural capital assessments nationally, with possible regional applications
- ✓ Identification of “hotspots” that are critical for ecosystem service provision
- ✓ Foundation for payment for ecosystem services programs



Questions?