



Working realm of the Geo-Information (GI) Unit within the International Centre of Insect Physiology and Ecology, Kenya

General facts

Geospatial data analysis is an integral part of *icipe*'s working and research agenda. The GI unit, for instance, provides geo-spatial data on environmental conditions to better understand distributions of species, or the presence of vector-borne diseases. The EO unit provides **Services** (such as spatial analysis and map making), and also has a **Research and Development Thrust**, aligned to the Millennium Development Goals (MDG) for Africa (as well as the Sustainable Development Goals when the MDGs expire at the end of 2015), UN reporting needs, and pertinent East African developmental issues. **Capacity Development** is a cross-cutting activity.

The GI unit is part of the Environmental Health theme, and is involved in the following **ten projects** in East Africa, Horn of Africa, West Africa, and Indian Ocean Island Nations: (i) Climate Change Impacts on Ecosystem Services and Food Security in Eastern Africa (CHIESA), (ii) Community of Excellence for Research in Neglected Vector Borne Zoonotic Diseases (CERNVec), (iii) EU Bee Health, (iv) EU Milk Value Chain, (v) SIDA project on Rift Valley Fever, (vi) IFAD Bee Health in Indian Ocean Island Nations, (vii) NIH Yellow Fever and Dengue, (viii) BMZ Maize Lethal Necrosis Disease (MLND) in Maize, (ix) BMZ IPM in Citrus, and (x) DFID Climate Change and Agricultural Productivity.

Key partners of the GI Unit are the University of Helsinki, the University of Umea in Sweden, and the German Aerospace Centre (DLR), as well as the Department of Remote Sensing of the University of Wuerzburg in Germany.

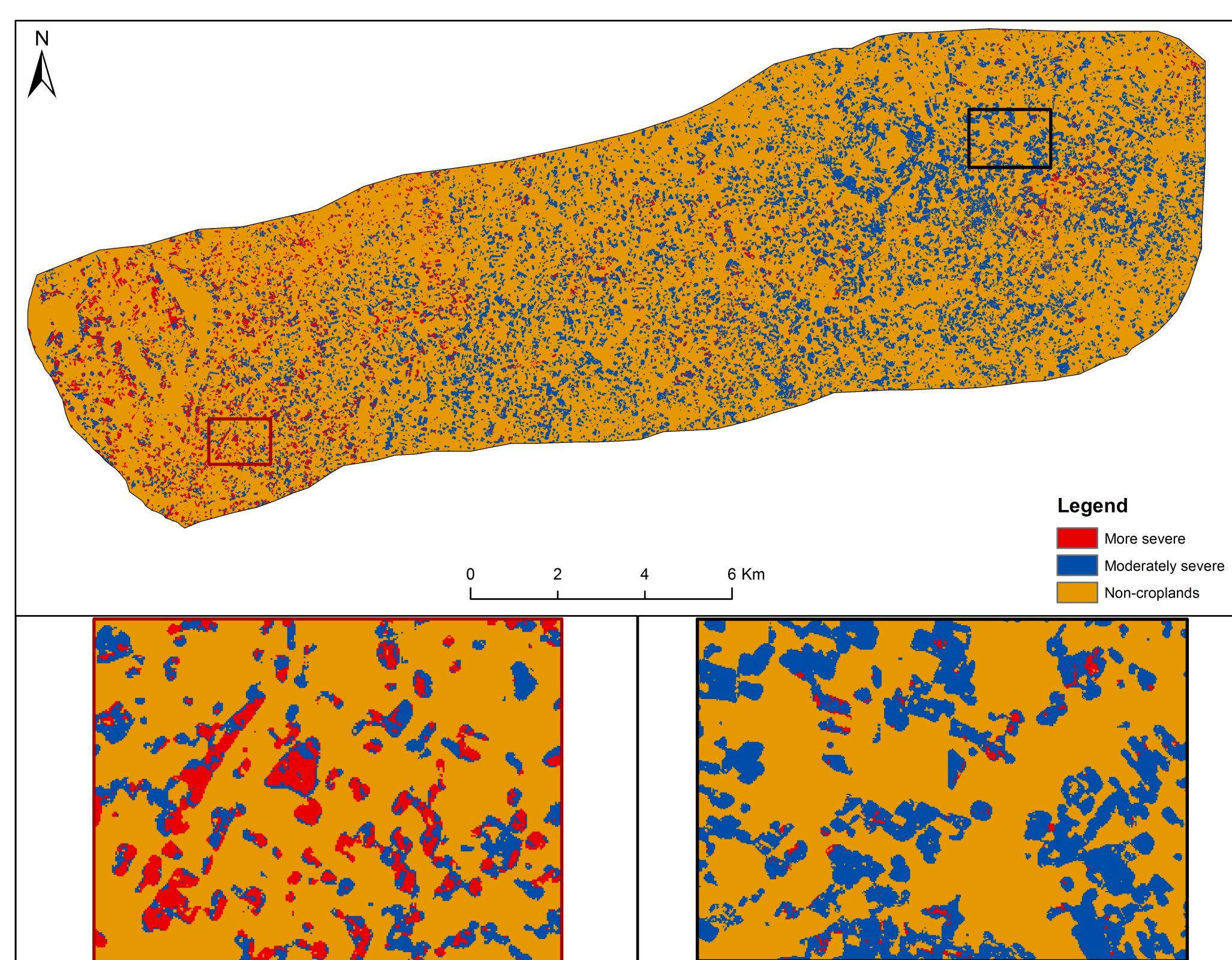
R&D strategy and examples

The GI Unit is strategically positioned to address the following four thematic areas, as part of its **R&D strategy**.

1. Food security – Improve crop acreage and crop systems mapping, and map pest and disease infestation rates in crops (MDG #1).

Right: Maize lethal necrosis disease (MLND) infestation severity mapped using 5-m Rapid Eye satellite data for a maize growing area in Bomet County, Kenya

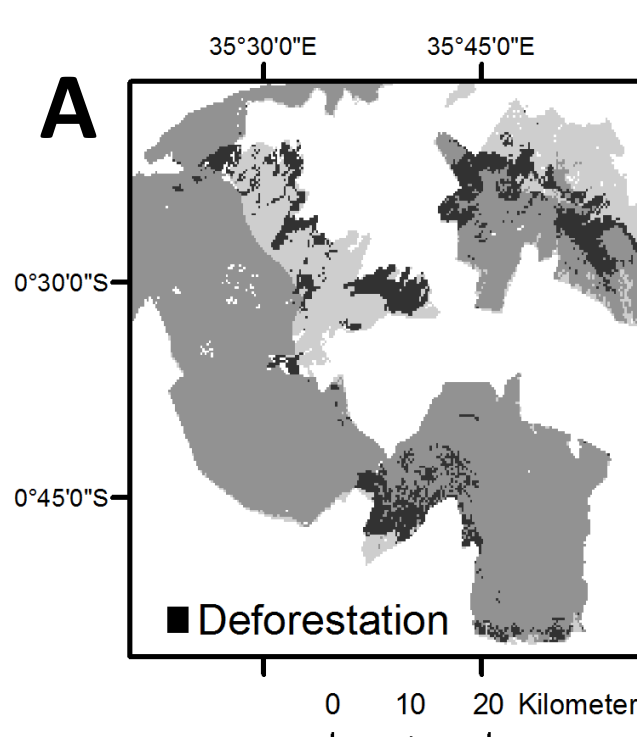
Richard Kyalo et al.



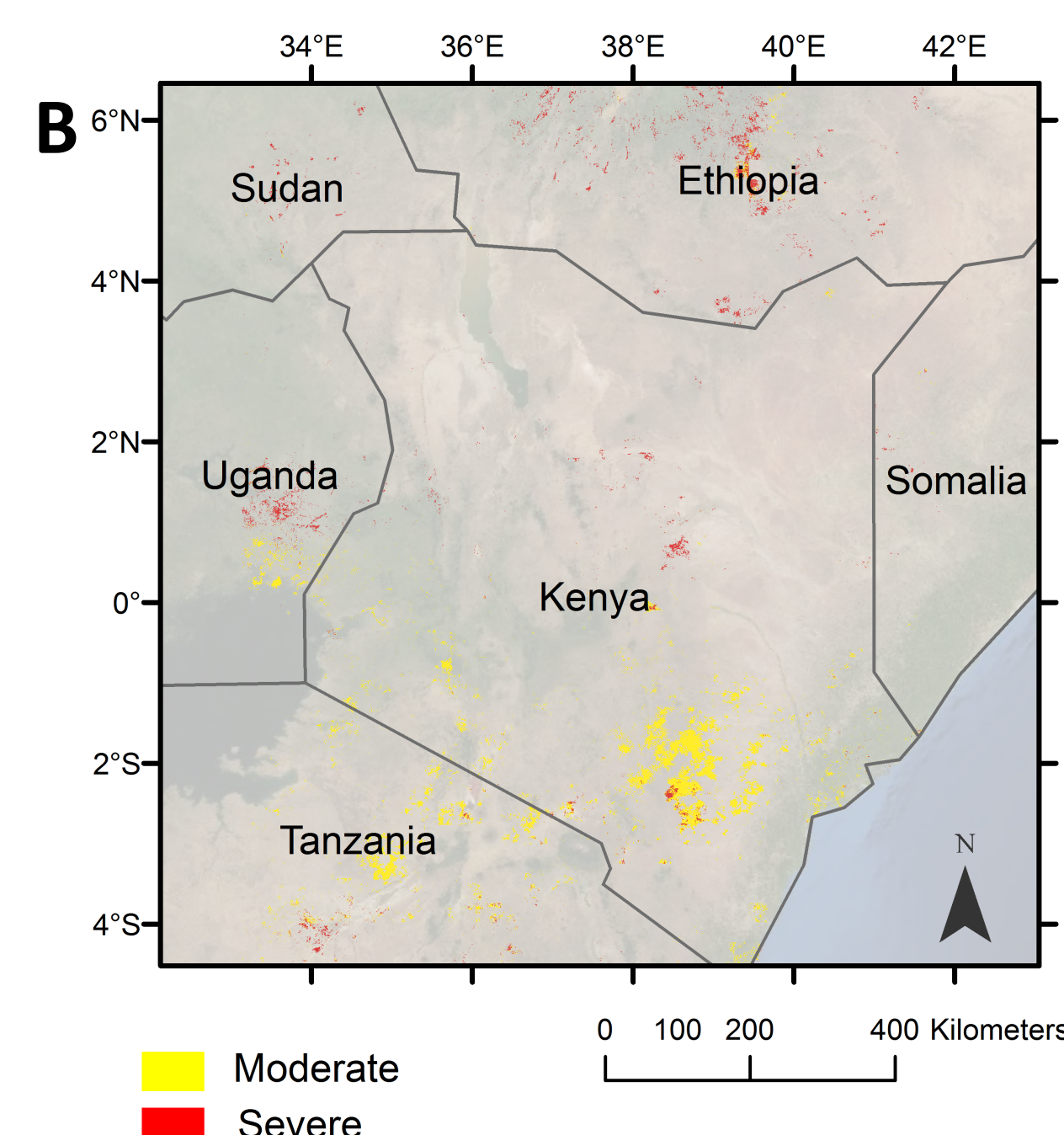
2. Landscape dynamics – Map land degradation, deforestation and climate effects in Africa, and determine key drivers of land change (MDG #4).

Below: Deforestation in the Mau escarpment in Kenya (A), land degradation severity in eastern Africa between 2001 and 2013 (B)

A degraded area in eastern Kenya



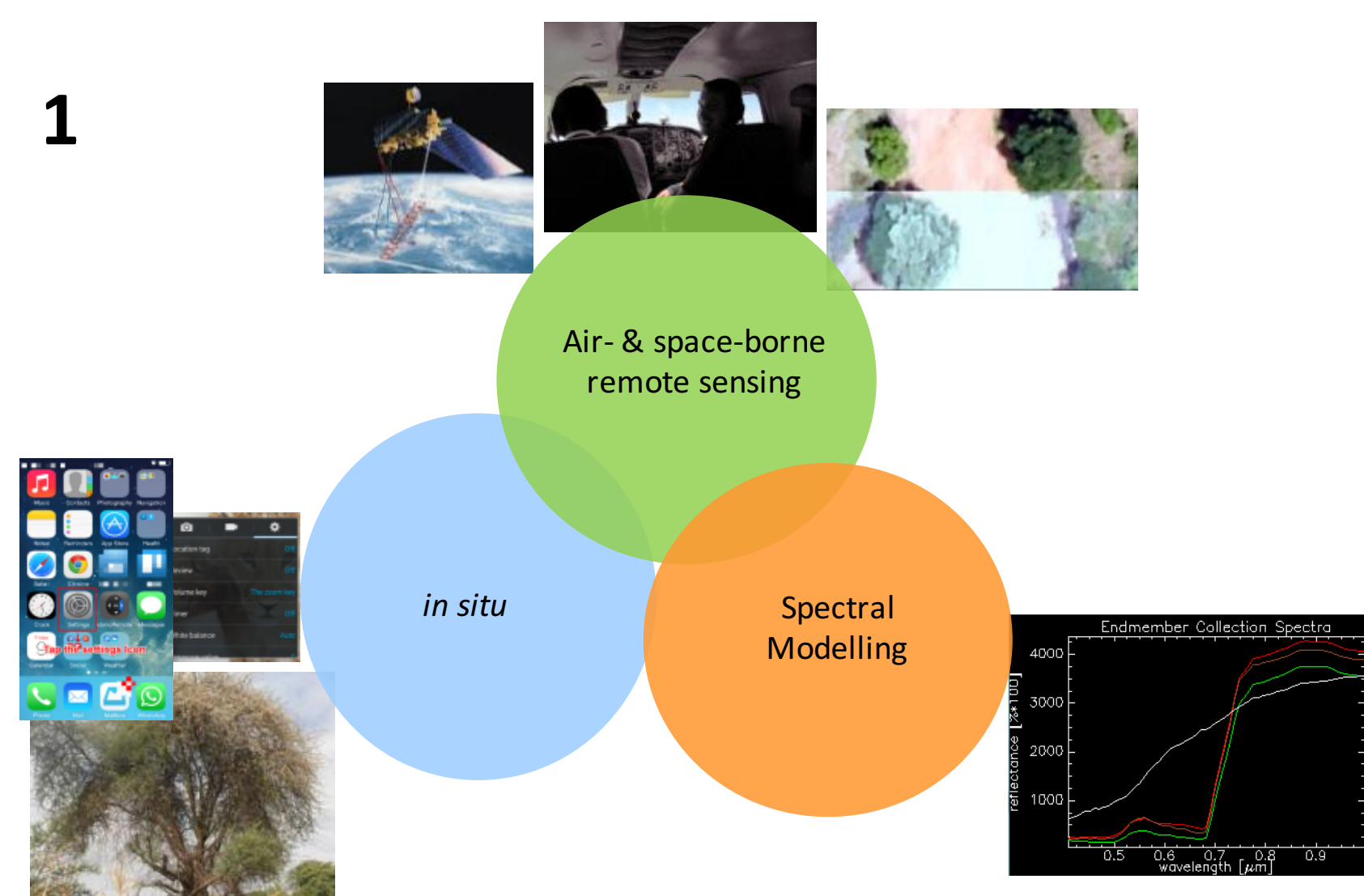
Landmann & Dubovyk, 2014



3. Ecosystem Services (ESS) – Mapping flowering patterns to quantify pollination effects and understand bee health

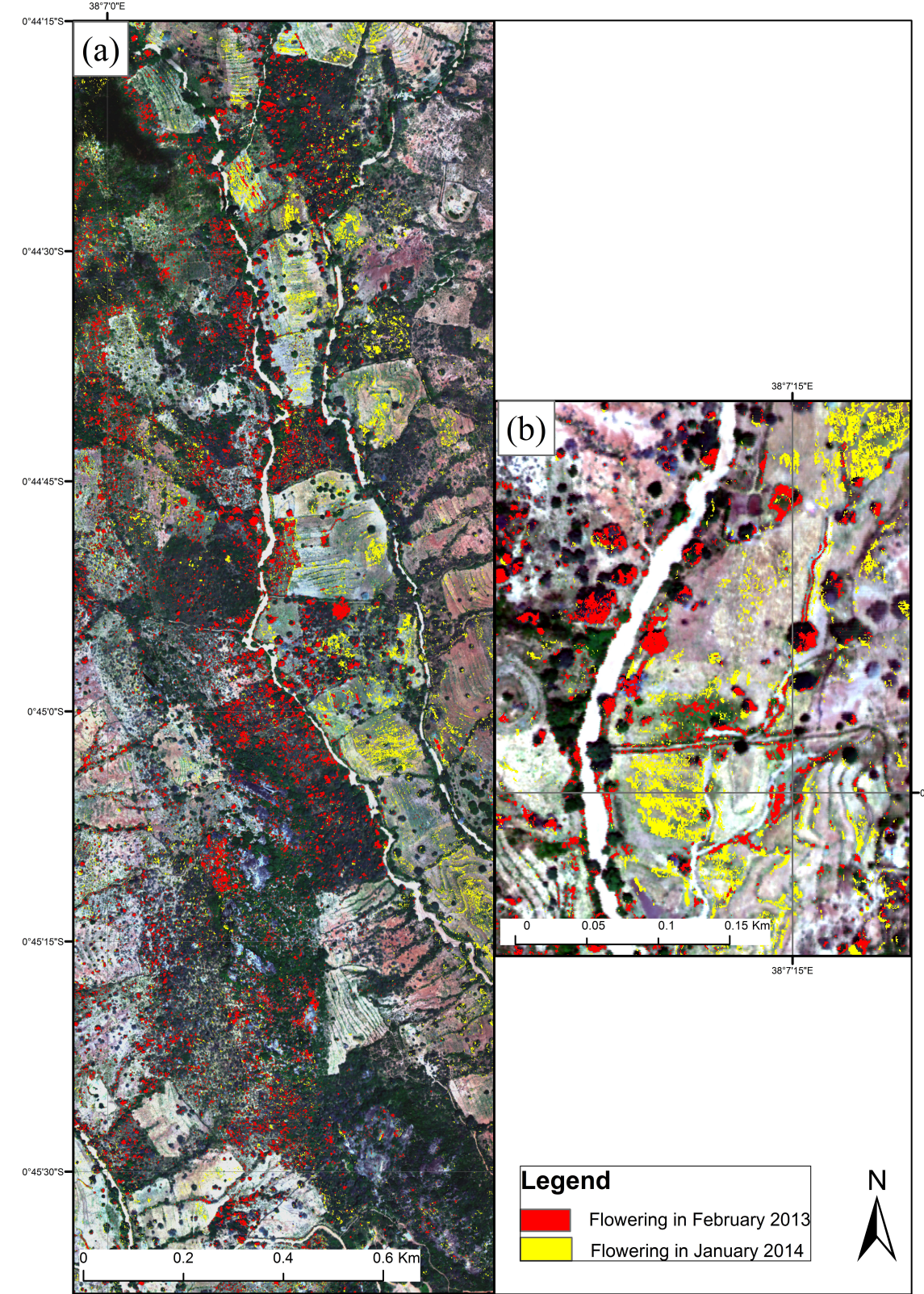
Below: Integrative flower mapping concept (1) using Smartphone captures, airborne imagery and spectral modelling. Flower mapping results (2). 2a shows a larger area, 2b is zoomed in. Flowering maize fields are visible as yellow patches in 2b. Most of the red pixels are flowering acacia trees.

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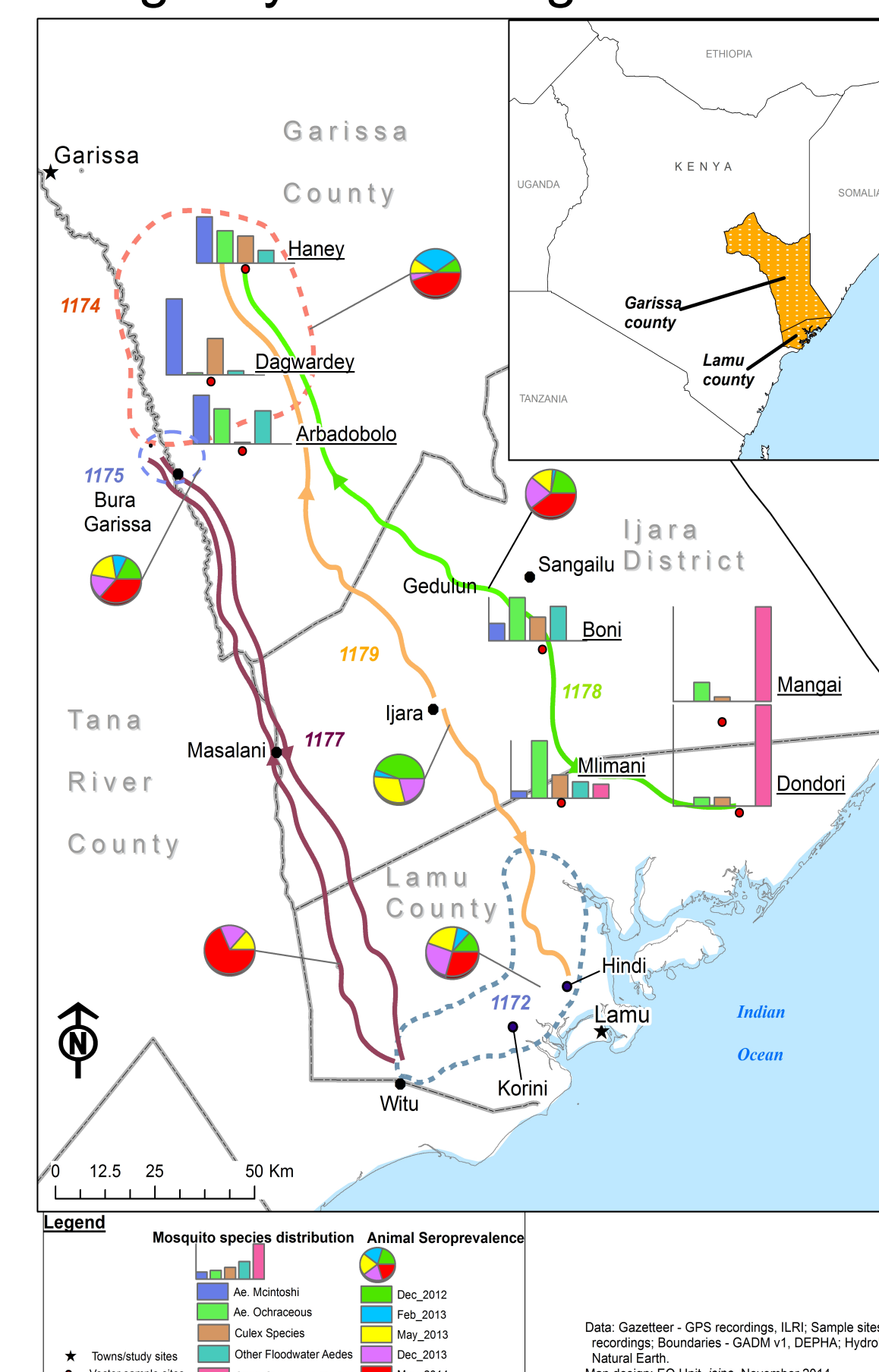
Landmann et al., 2015

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4. Disease mapping– Ecological and climate variables and GPS-derived animal migration routes for better risk assessment and decision making in regard to neglected tropical diseases

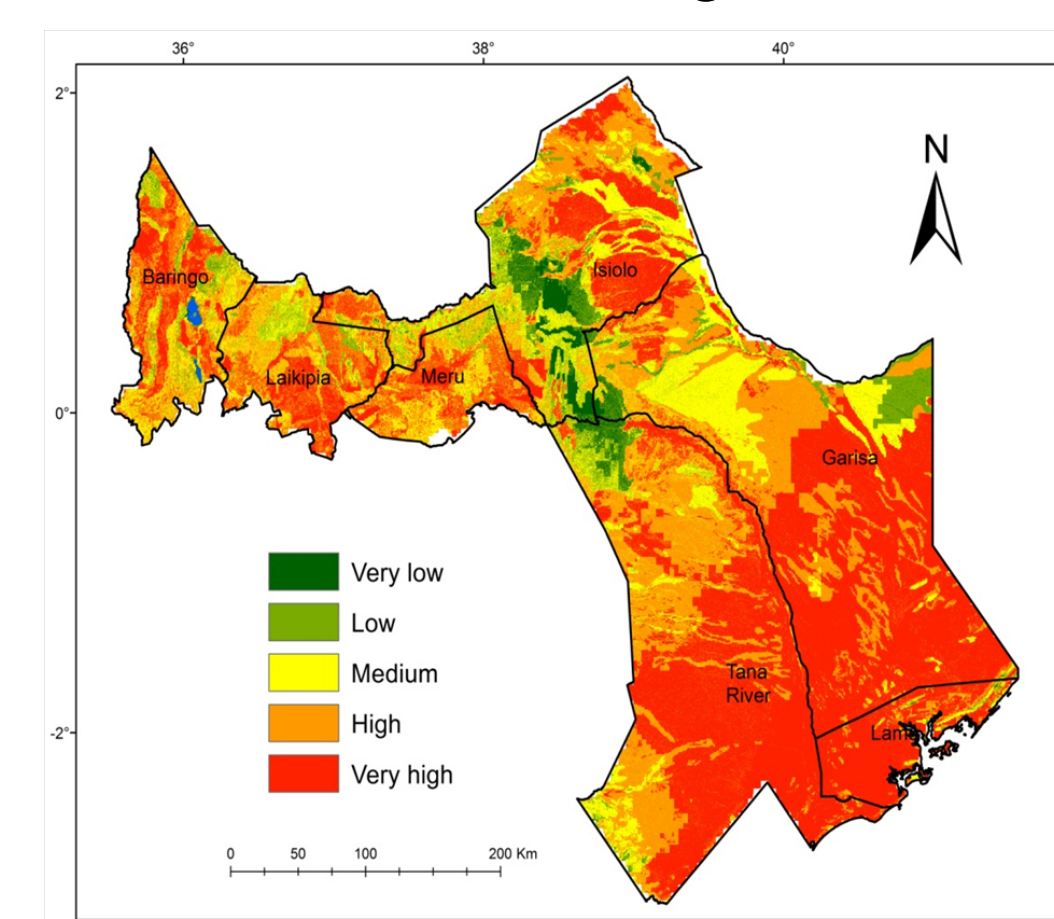
Vector diversity and sero-prevalence along key animal migration routes



GPS collaring of livestock in Kenya



Rift Valley fever risk map for northern and eastern Kenya derived from satellite and other ecological variables



Mosomtai et al.