

## **ESRC grant number ES/P002609/1: Key findings report**

### ***Unravelling complexity: Understanding the land-water-food nexus in Elgeyo-Marakwet, north-west Kenya***

#### **Main high-level results (500 words)**

This project has achieved its primary objective to bring together interdisciplinary experts, policy makers, and community members to explore the land-water-food nexus in Elgeyo-Marakwet County, Kenya. We have begun building a comprehensive picture of how communities in two linked but environmentally contrasting locales (highland forests and low-land agricultural systems) have managed resources over time and have adapted to changing climate, water availability, deforestation, land degradation, and biodiversity loss. We have communicated these results to local policy-makers and are working on a co-authored environmental/climate policy document. We have further established new collaborative partnerships to take this impactful work forward. We here highlight four key achievements:

1. We have synthesised and archived an extensive body of existing and new research data including published academic sources, government statistics, aerial/satellite imagery, ground-truthed GPS/GIS data, primary interviews with local farmers, and botanic and climatic information. We have deposited digital copies with local communities via the Marakwet Research Station and with local policy makers in the County Government.
2. We have generated considerable new research data in line with four original objectives. Objective 1.1. Forests and Water: we have physically mapped changing forest boundaries, incursions and settlement patterns and are developing advanced models of changing forest cover and land-use using Landsat. Objective 1.2. Forests and Food Security: we have conducted 12 botanical transect surveys. Combining participatory and scientific methods, we have generated comprehensive lists and samples of wild plant food and medicinal specimens. Objective 2.1. Agriculture and Water: we undertook primary interview work with farmers concerning perceptions of environmental change and conflict. Unfortunately, we were unable to undertake hydrological flow measurements as planned, due to tense local circumstances outside of our control. Objective 2.2. Agriculture and Food: working with local farmers, we have surveyed and collected samples demonstrating the diversity of crops grown and extracted information on yields from existing survey data.
3. We have solidified new partnerships for future impactful research including with the Kenyan National Herbarium (two meetings, MoU in progress), Nature Kenya (two meetings), World Agro-Forestry Centre (two meetings), the University of Eldoret (MoU signed), and especially the new Elgeyo-Marakwet County Government. The latter was facilitated by two planning meetings followed by a workshop/policy development meeting in February 2017, attended by eight County Government ministers. We are working on a jointly authored policy document.

We have increased capacity of the local Citizen Science research team through training in various data collection methods in support of future research. The project has further inspired us to seek technical partnerships for advanced data modelling – including climate-yield modelling with partners at the UCL Institute for Sustainable Resources and

biodiversity/land-cover change modelling with partners from Kew Gardens (planning workshops undertaken).

4. We have/will produce several outputs that lay foundations for future research: several academic presentations, poster, two blog posts, two academic papers, policy document, data archive and botanic collections. The work also contributes directly to the production of three PhD projects, including one from the University of Eldoret, Kenya that enhances regional skills and capacity.

**Description of section:** *What have you discovered or developed through the research funded on this grant? Please explain for a non-specialist audience You should normally focus on no more than four achievements and provide no more than 500 words of text. To avoid unnecessary replication and wasted research effort it is important to consider including significant negative results which cannot easily be published through established publication routes. You might tell us about, for example:* • significant new knowledge generated • new or improved research methods or skills developed • important new research resources identified • important new research questions opened up • significant negative results or research paths closed off • particularly noteworthy new research networks, collaborations or partnerships, or combinations of these • increased research capability generated from training delivered in specialist skills • summary information combining outcomes detailed in other sections.

### **How might your findings be taken forward (200 words)**

Our research outcomes will primarily be taken forward by ourselves in collaboration with our partners. We have already created a range of resources (data archives, reports, images) for use by local communities and County officials and we envisage that these actors will utilize these resources in their own future activities. However, we see significant impact emerging from further sustained academic and non-academic collaboration. To this end as a joint Kenya-UK academic team we will continue working with County officials to focus future research on environmental, agricultural and hydrological issues that they identify as crucial for the long term sustainability and prosperity of Elgeyo-Marakwet. This is vital for developing long-term partnerships that synergise scientific research/knowledge with effective policy making. In particular we are planning two further policy development meetings over the coming year. We are also planning further collaborative funding bids with Kenyan and UK academic partners, in which we aim to address knowledge gaps – both for academic research and local policy – building research capacity in Kenya and enhancing community-policy-research synergies. In particular, we already envisage the need for effective down-scaling of predictive climate models and have begun developing a partnership with climate modellers at the UCL Institute for Sustainable Resources. We also envisage need for more effective understandings of plant biology and land-use potential to maximize regional land-use in the face of climatic change. To that end we are working to establish future funding applications with researchers at Kew Gardens and the Kenyan National Herbarium.

**Description of section:** *In the context of your Pathways to Impact statement, how do you now envisage your research outcomes being taken forward? Please consider academic and non-academic routes. Please explain briefly (we recommend no more than 200 words) how*

*the outcomes might be taken forward and by whom, bearing in mind your answer to the next question on section*