

Preliminary GIS study of the pastoralist Settlement Pattern in Engaruka, Tanzania

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Projects “Cultural Ecology of the East African Savanna Environment in a Long-term Historical Perspective” (2002-2005) and its continuation “LESE – Long-term Ecology of the Savannah Environment” (2006→), of the Department of Archaeology, University of Helsinki have studied the past of Engaruka area, north Tanzania from various viewpoints (fig. 1a). Archaeological surveys and excavations have been carried out in Engaruka, and in the areas connected to the so-called Engaruka Complex, e.g. in the Sonjo Land and around the Lakes Eyasi and Manyara. Also geological and palaeo-environmental sampling has been done by us and our co-operators – for example a series of ostrich eggshell fragments from archaeological sites has been analyzed for the stable-isotope data in the Dating Laboratory, University of Helsinki.

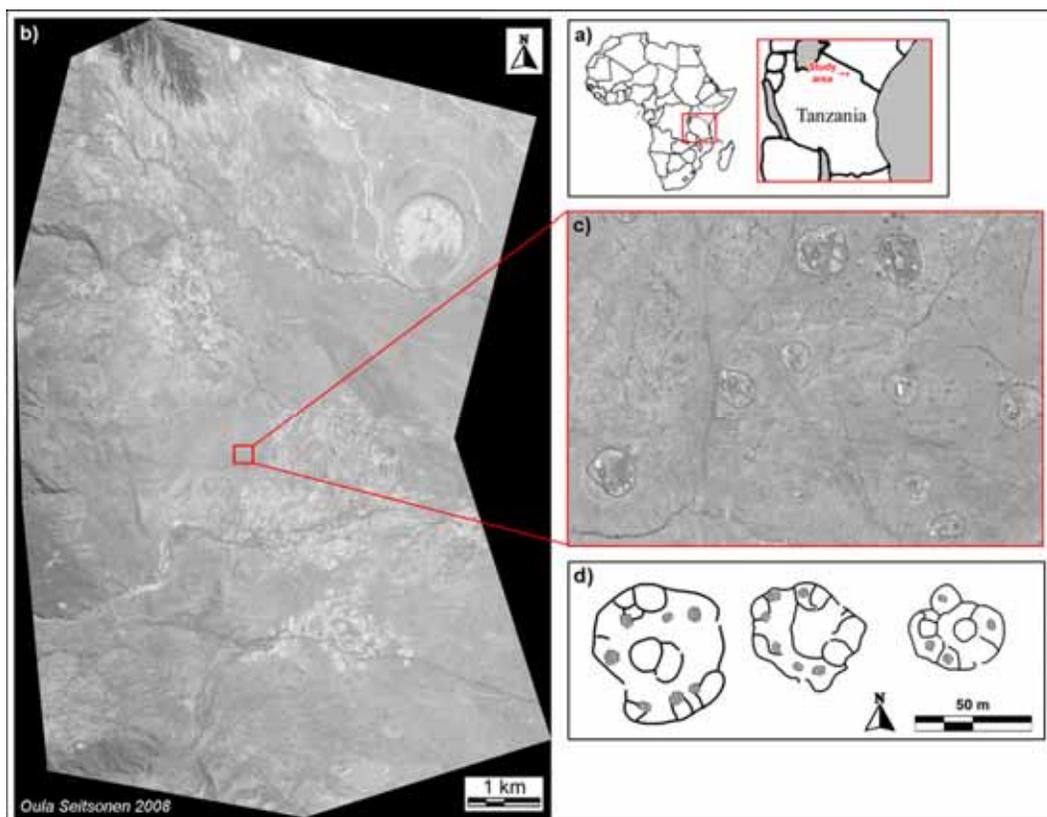
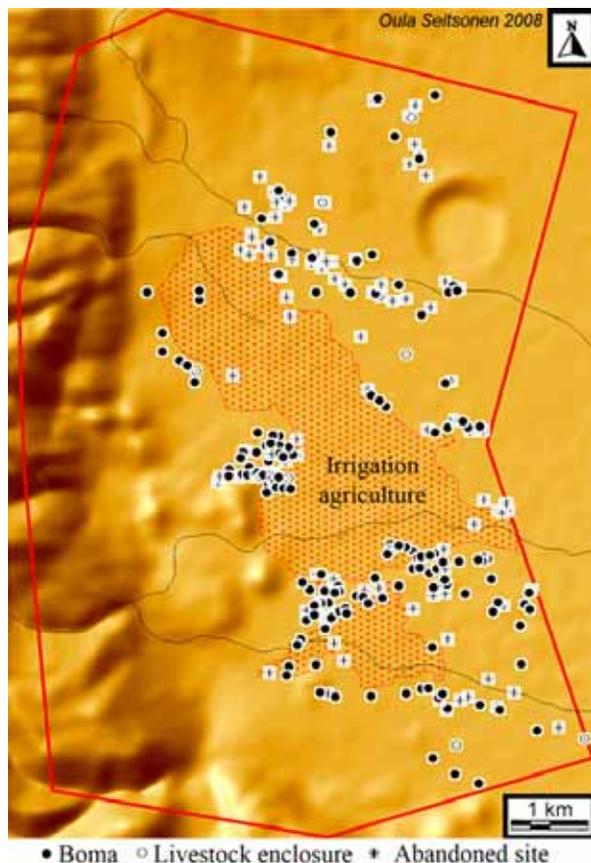


Fig 1. a) Location of Engaruka; b) satellite image of the area (courtesy of the Department of Archaeology, University of Helsinki); c) enlargement of the satellite image; d) some bomas mapped on field (mapping: O. Seitsonen).

In addition to the prehistoric studies, some ethnoarchaeological observations have been made amongst the pastoralist Maasai inhabitants of Engaruka. Locals were interviewed about various aspects of their daily life, e.g. of their socio-cultural contacts, livelihoods and so on: our trusted aide and friend Israel Ole Molel was invaluable in these studies. As an example the local ceramics use and manufacture, or rather its absence (e.g. Sassoon 1967), is studied in our project by Mr. Gilbert Oteyo of the Pitt-Rivers Museum, Oxford. He has interviewed the locals widely on the subject, both in Engaruka and our other research areas, as well as in the Kondoa area, and collected clay samples from various sources. These were analyzed to allow provenience studies of the LIA ceramics: this suggests that the LIA ceramics were in fact imported to Engaruka, probably from a southerly direction (Oteyo & Doherty 2006).

In this brief paper the conducted ethnoarchaeological pastoralist settlement studies are preliminarily presented on the inter-site spatial level. Studies are based on a ground survey carried out in 2004, after which the field observations were supplemented using the high resolution QuickBird satellite imagery (taken in 2002) (fig. 1b). Altogether 37 boma (maa: 'enkang') locations and their structures, as well as some abandoned sites were documented on field with a handheld GPS unit: the full database includes 159 bomas, 10 cattle enclosures without huts, and 99 abandoned sites. Current observations are limited to the area covered by the satellite photograph, circa 67 km², and will be expanded in the future (fig. 2).



This data provides basis for the Geographical Information System (GIS) analyses of the pastoralist settlement pattern. Also the intra-site structure was studied on field and from the satellite image (fig. 1c-d), and these intra-site observations, as well as the more detailed inter-site studies will be published when all the analyses are completed.

Fig. 2. Digital Elevation Model (DEM), the documented pastoralist sites, and the extents of irrigation agriculture (map: O. Seitsonen).

Maasai settlement concentrates around the seasonal streams running down from the Western Escarpment – the area around the perennial rivers is nearly fully taken by the irrigation agricultural habitation close to the Engaruka Commercial Center. The Maasai settlement pattern and the boma structure outside the Engaruka Center seem extremely traditional. Besides architectural aspects, such as the number and location of huts and the size of bomas, also various environmental attributes were recorded at the sites (cf. Western & Dunne 1979).

As an example, the majority of Maasai bomas are found on the relatively shallow gradients (fig. 3) of the volcanic plains at the bottom of the Rift Valley. The plains support a relatively open herbaceous vegetation providing good forage for the cattle. Very few pastoralist sites are situated on the sedimentary alluviums of the perennial streams, covered by more closed shrubs – and also occupied by the irrigation agriculture (see fig. 2).

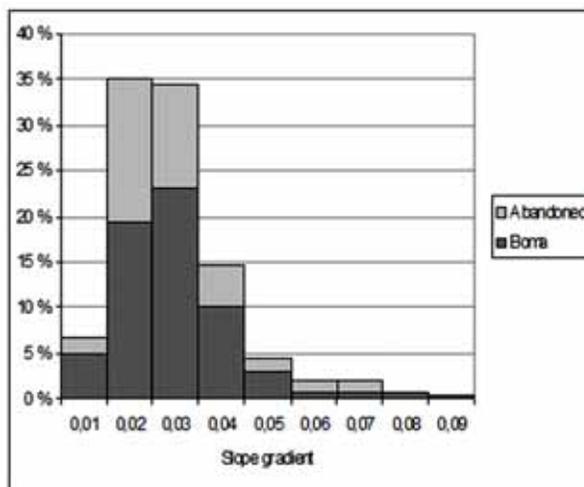


Fig. 3. Slope gradients at the sites (excluding the 10 temporary enclosures).

Also a preliminary site catchment analysis (SCA) was carried out for the mapped Maasai sites, using an isotropic cost surface function which takes into account the local topography (e.g. Wheatley & Gillings 2002: 152, 159-162) (fig. 4). Catchments were calculated at various radii, up to the distance of eight kilometres on a level plain. Unsurprisingly, the volcanic plains dominate also the catchment areas. As the current study area is very limited, the site sample should be expanded to varying types of environments to allow more wide ranging SCA.

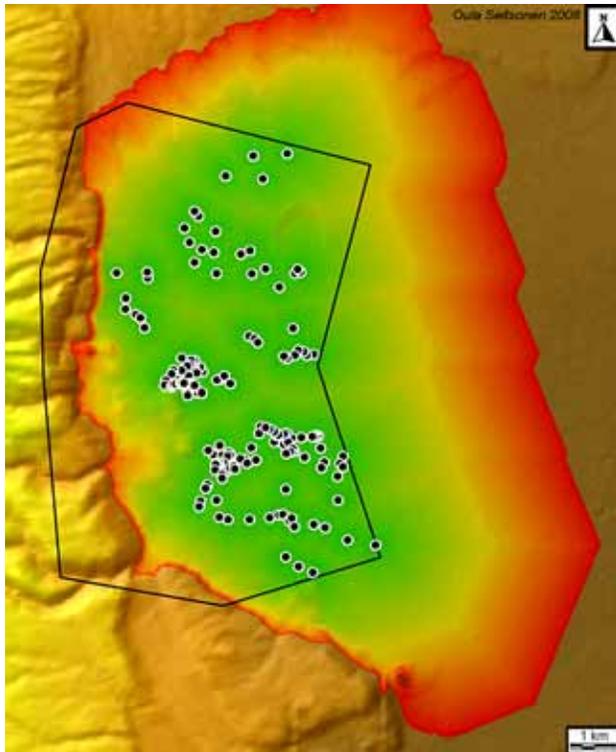


Fig. 4. Combined cost-distance catchments for the studied bomas (limits of the Quickbird image also shown) (map: O. Seitsonen).

Studies carried out this far will be extended in the future, and for example the conducted interviews will be analysed in their wider contexts. On the GIS side the sampled areas will be extended, which is underway by the current author with material from the Serengeti area and the surroundings of Engaruka. Also the temporal changes in the environment, as evidenced in the Landsat data from different years, will be studied.

References

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