Eco-systems of agricultural landscapes
and sustainable land use: Livestock systems

04 - Livestock Farming Systems - 3

Case study pastoralism:

The Rendille of Northern Kenya

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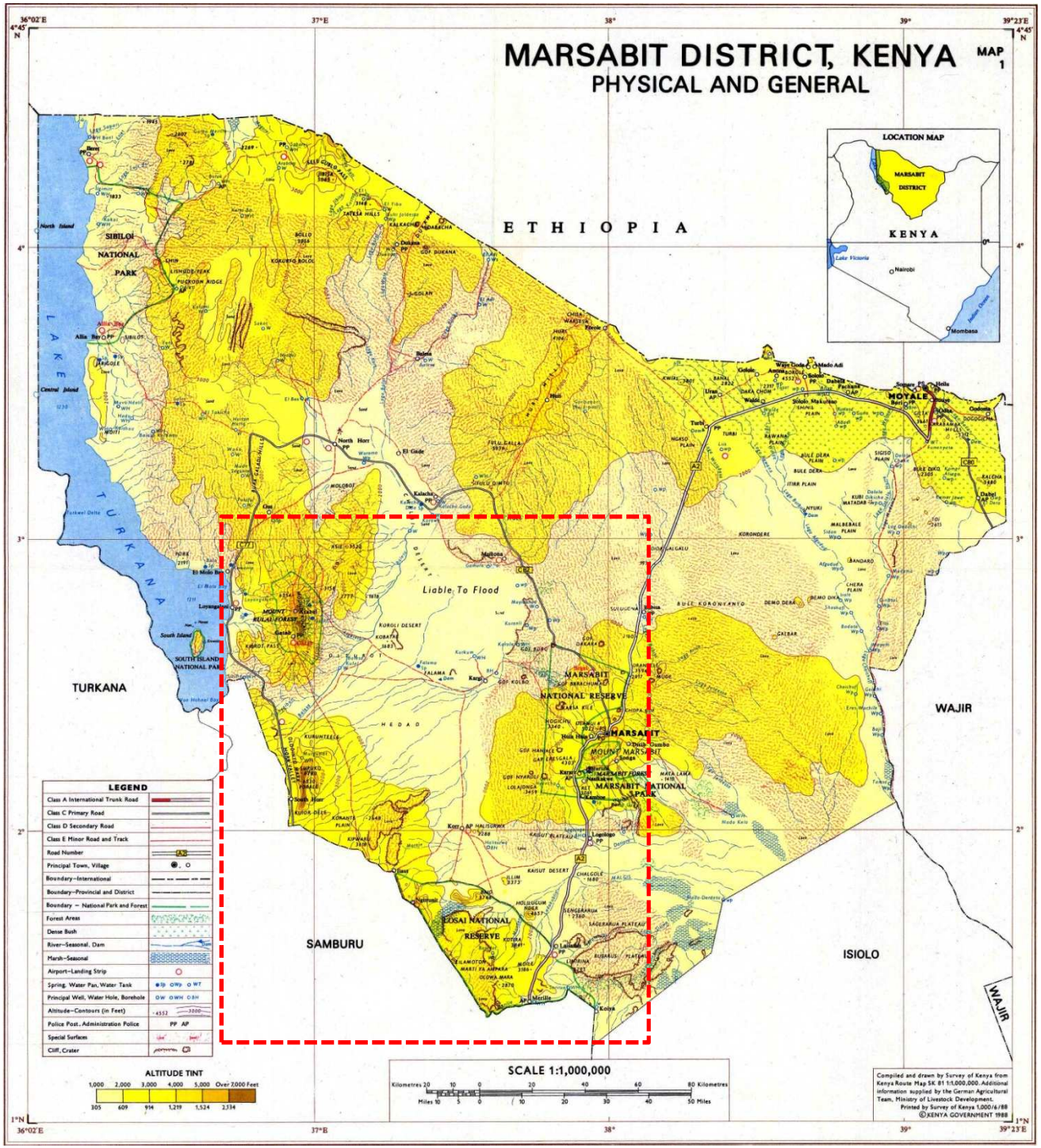
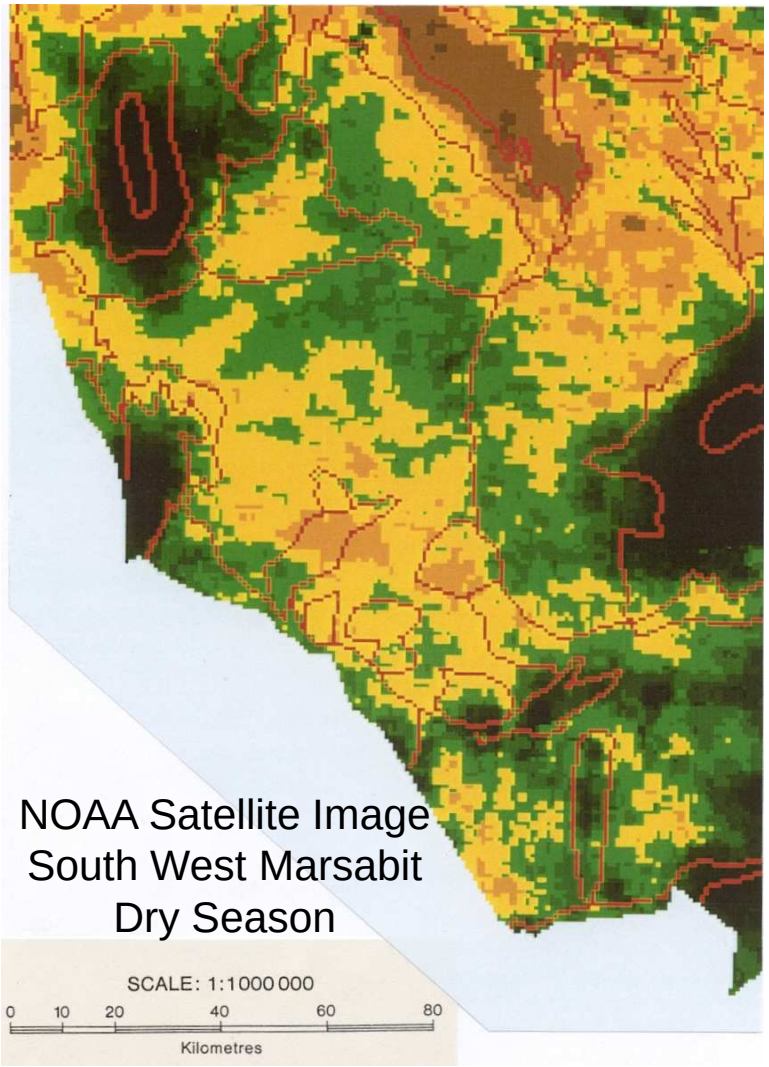
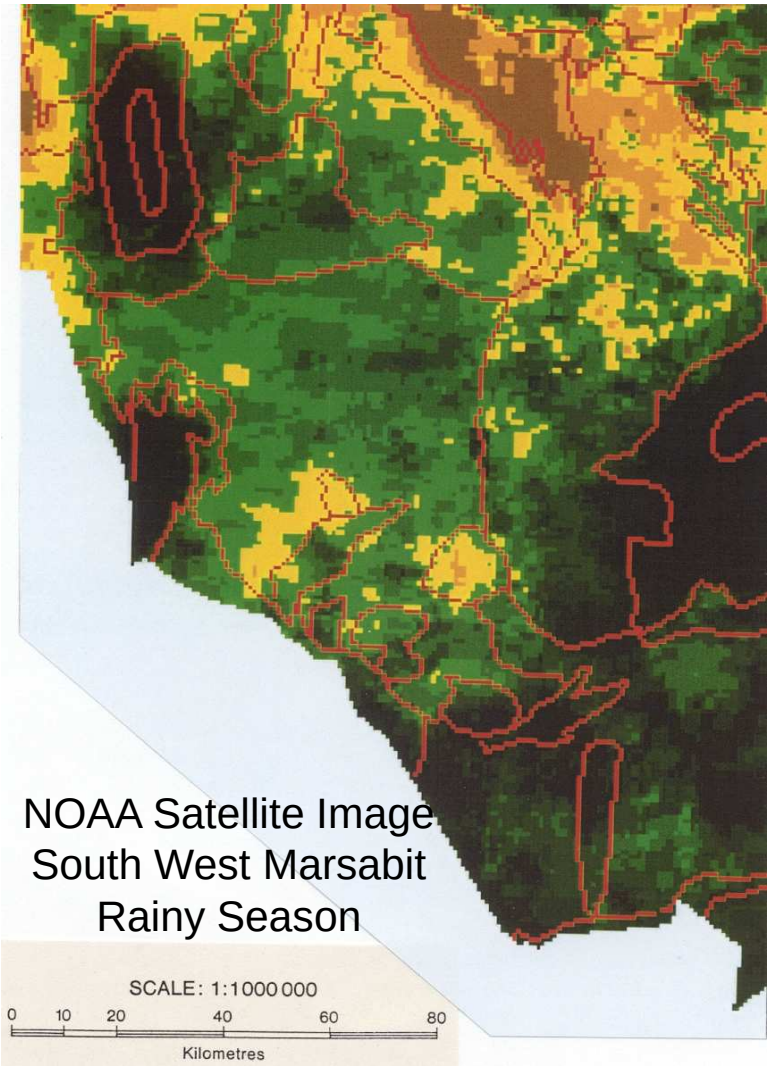
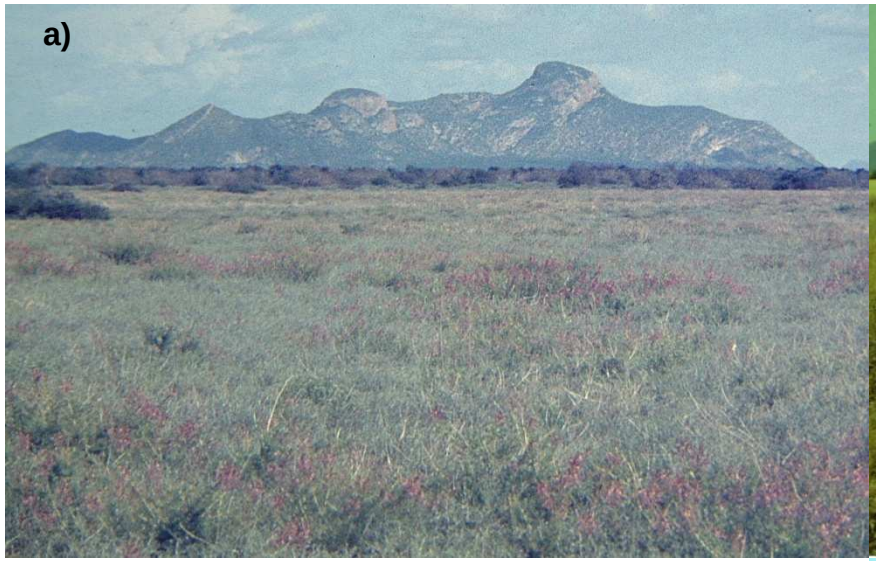


Marsabit District in Kenya borders Ethiopia. with the exception of a few mountain ranges going up to nearly 3000 m a.s.l. it is largely covered by lowlands between 400 and 700 m a.s.l. Correspondingly rainfall varies between 200 and to over 1000mm. Vegetation types vary between true desert through various grass- and bushlands to evergreen high biomass tropical mountain forest. The district, now county, amounts to approx. 75000 km² and carries a population of some 300000 inhabitants from several ethnic groups: Borana, Gabbra, Samburu, Dassanech, Burji, Rendille and others. Livestock herding is the main agricultural activity in the District.

Approximate study area


NOAA Satellite Image
South West Marsabit
Dry Season
SCALE: 1:1000 000
0 10 20 40 60 80
Kilometres

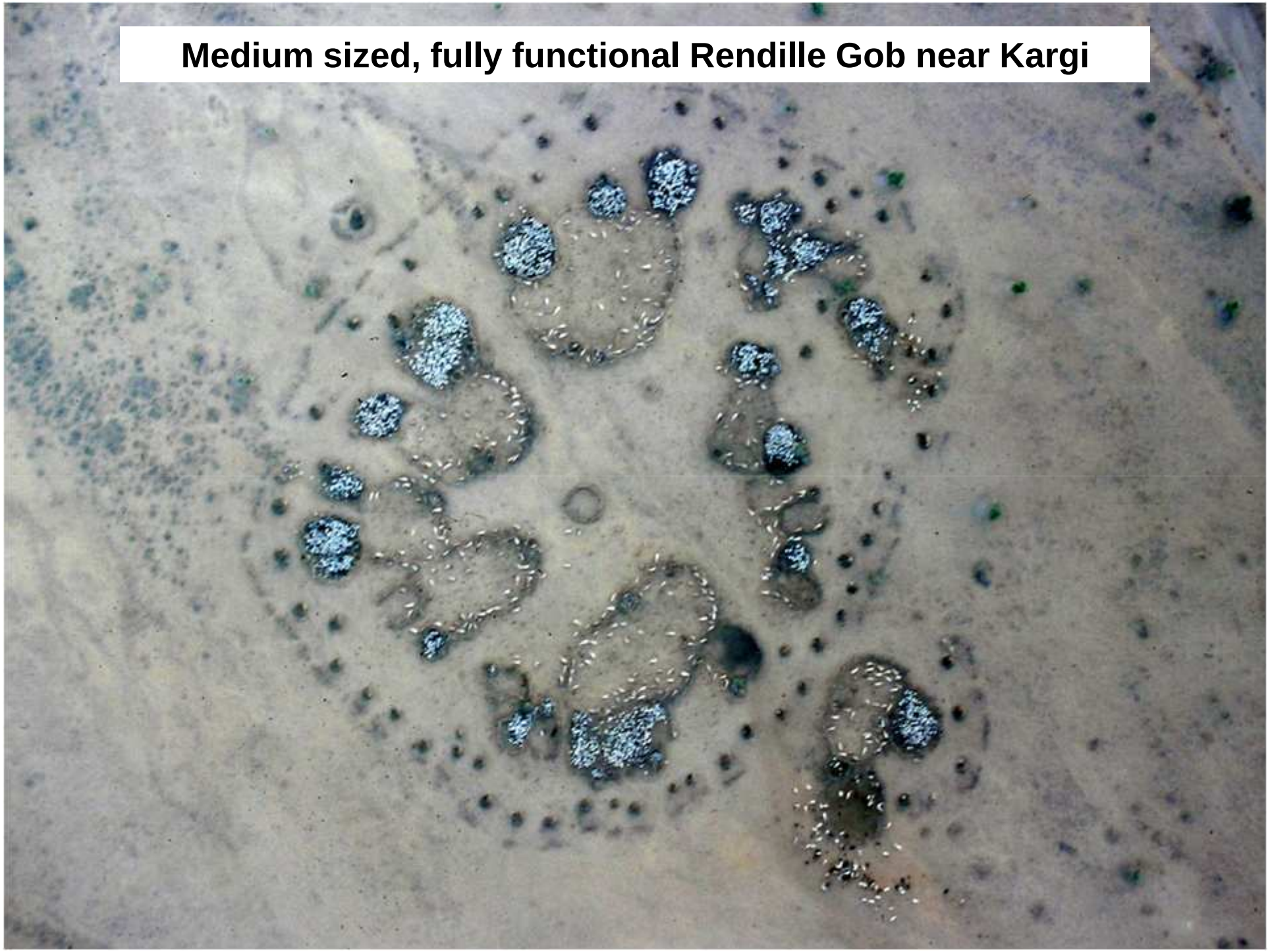

NOAA Satellite Image
South West Marsabit
Rainy Season
SCALE: 1:1000 000
0 10 20 40 60 80
Kilometres

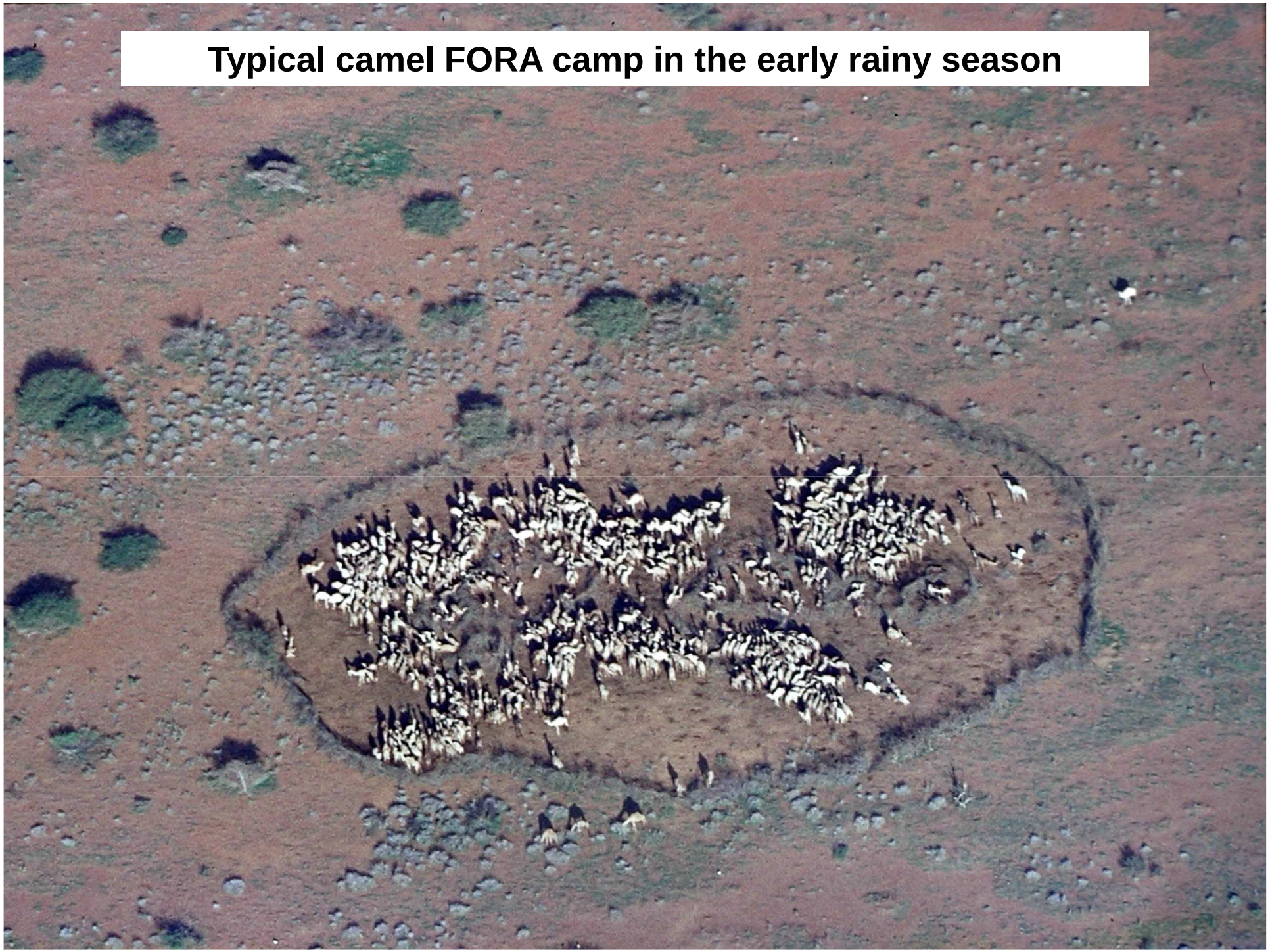


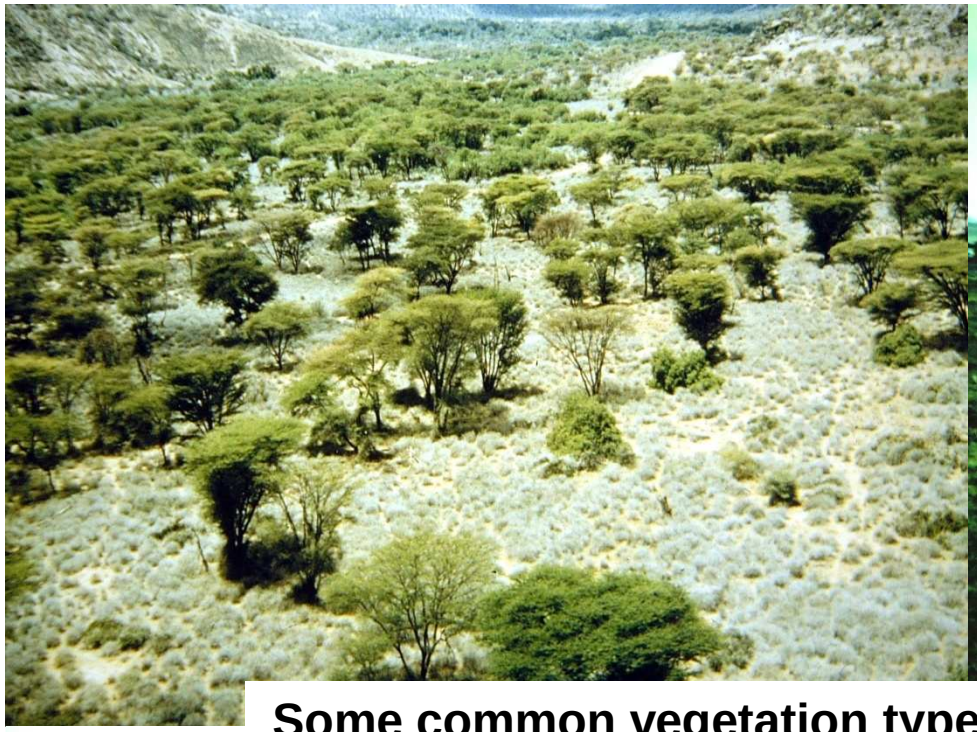
Seasonal forage availability on a semi-arid dwarf shrub/annual grass land in Northern Kenya

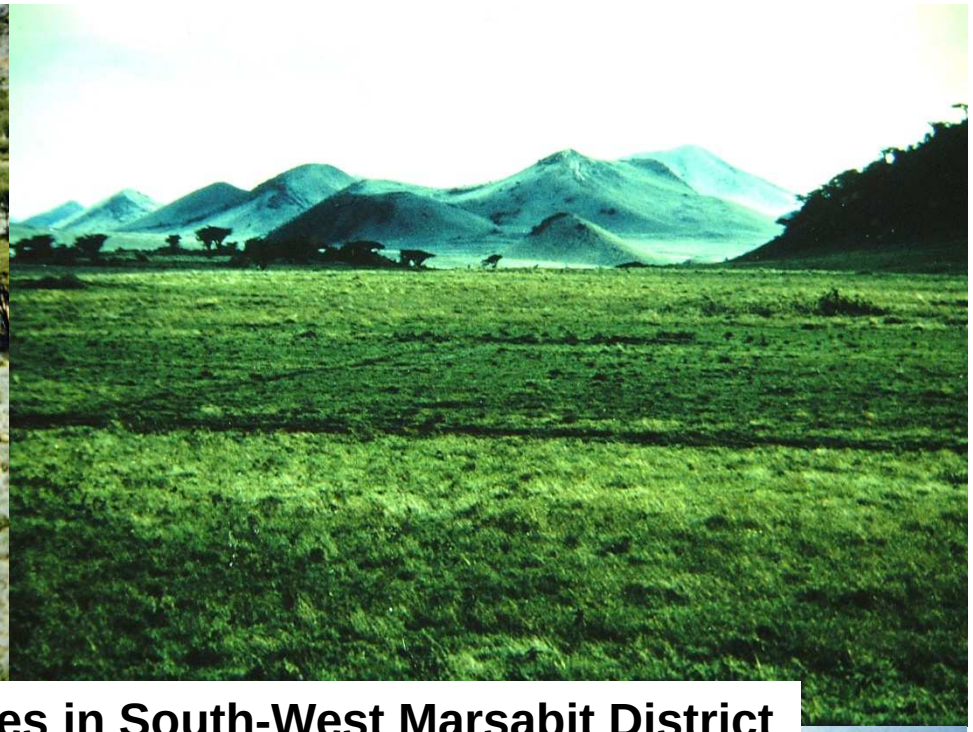
a) At the end of the rainy season; standing biomass ca 3000 kg/ha
b) Six weeks after the rainy season; standing biomass ca 1800 kg/ha
c) Ten weeks after the rainy season and after two weeks of grazing by nomadic herds; standing biomass ca 500 kg/ha

Medium sized, fully functional Rendille Gob near Kargi

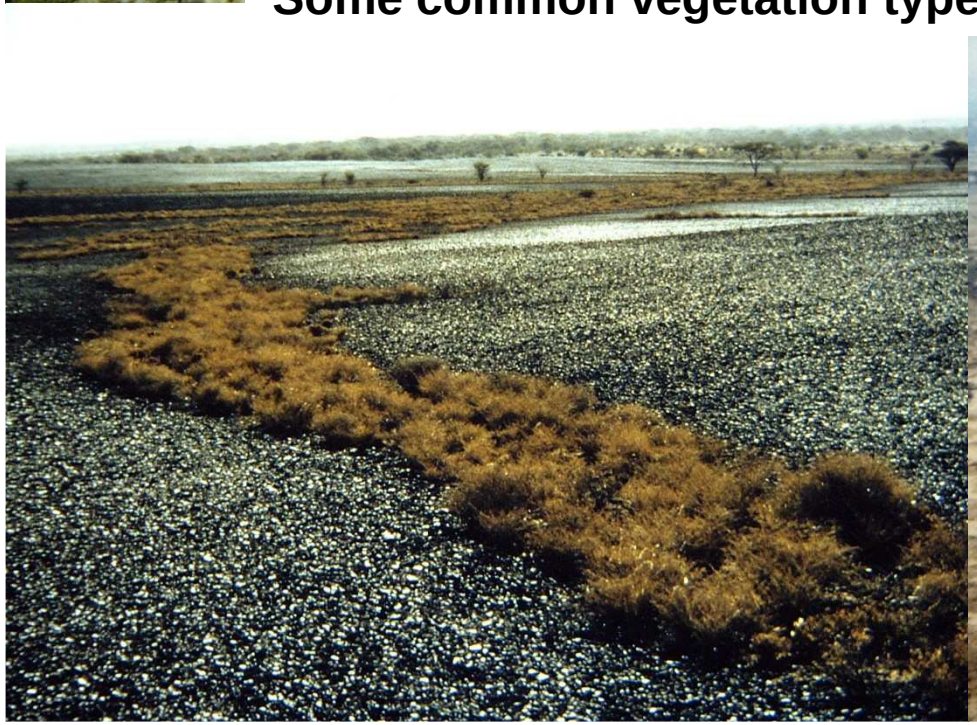


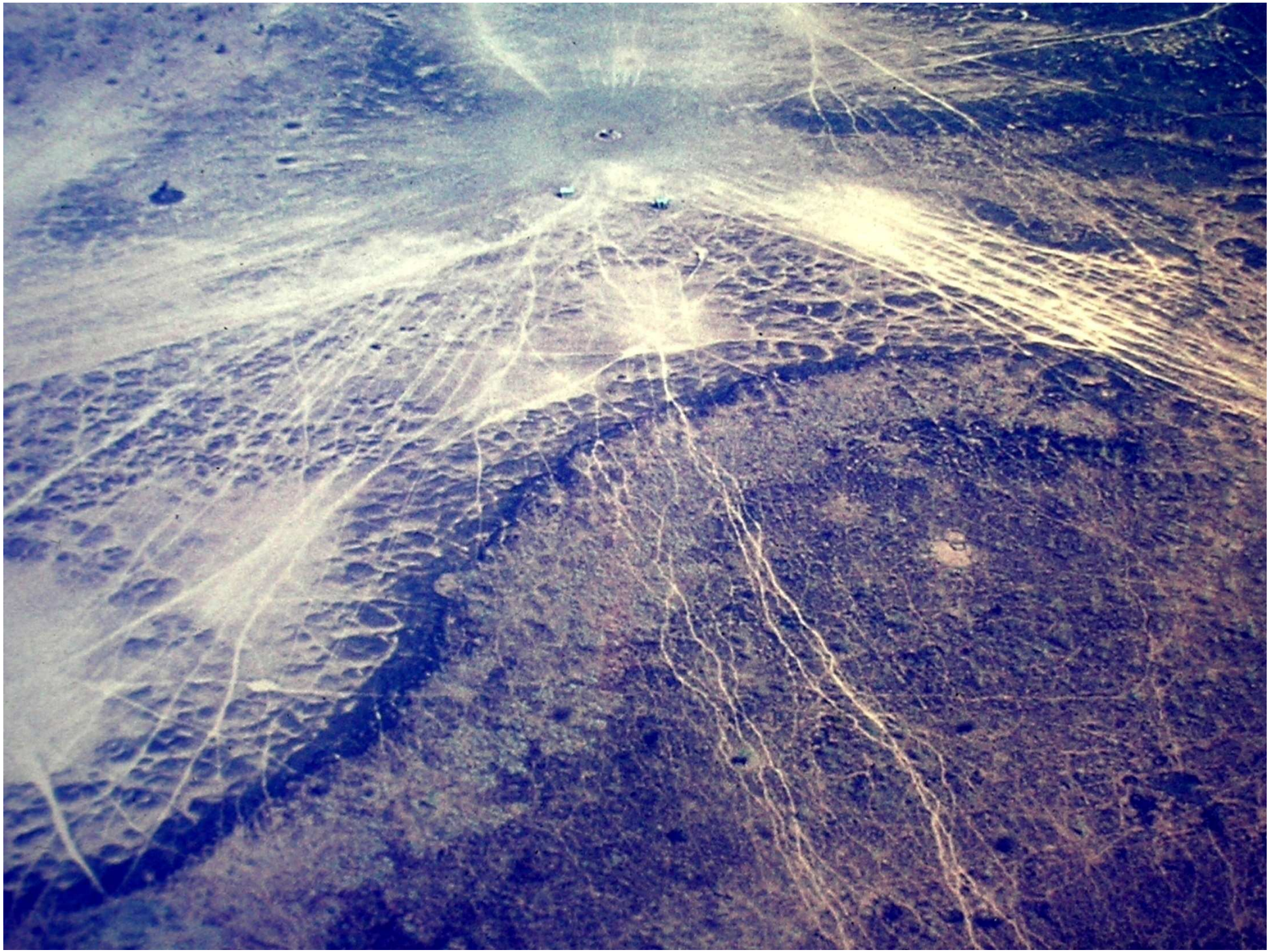

Typical camel FORA camp in the early rainy season





Some common vegetation types in South-West Marsabit District





Historical Survey of Migrations of seven Rendille Settlements 1927 - 1978

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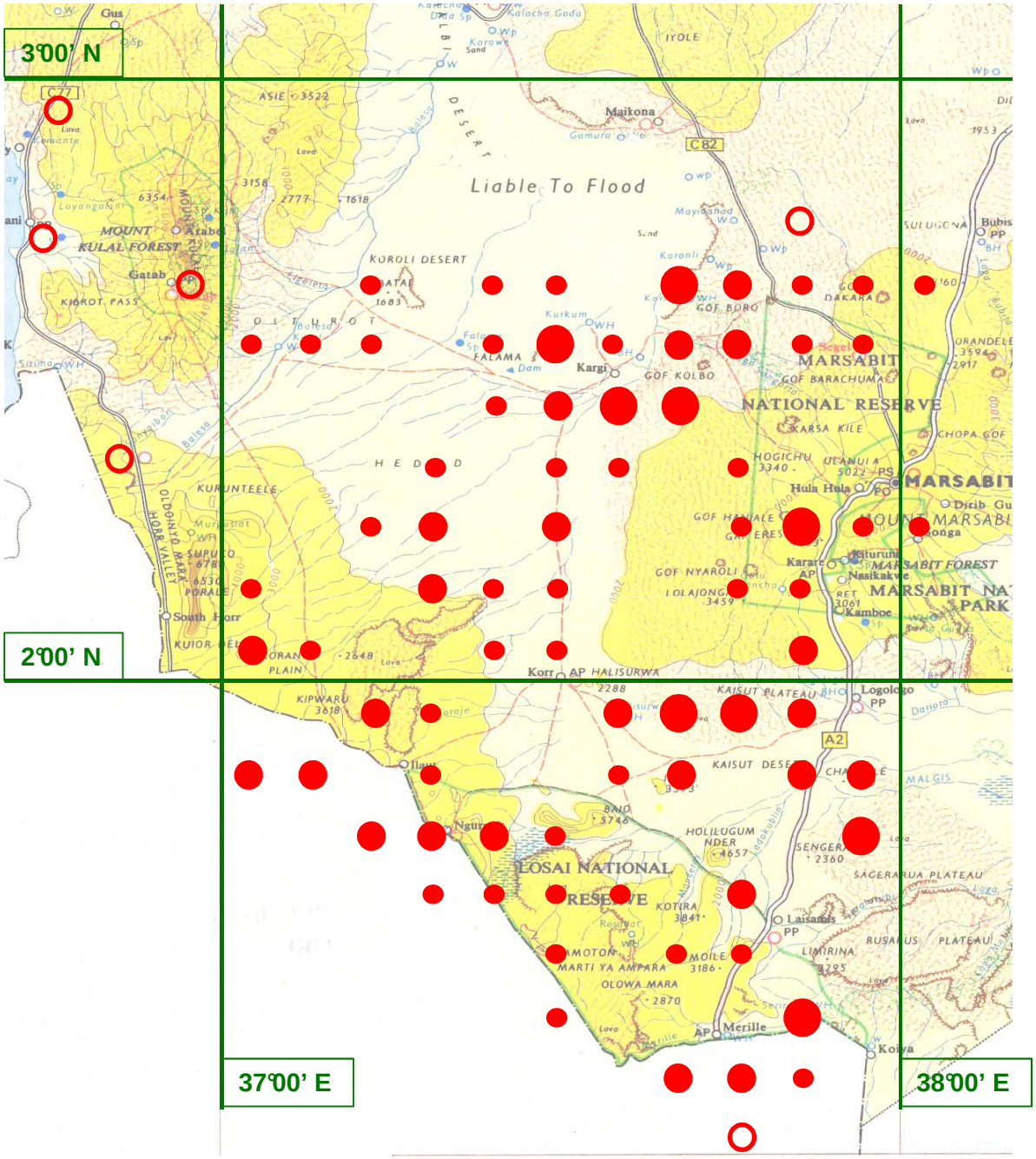
Number of Grid Squares (10x10km) occupied by seven clan settlements (gobs) and number of entrances by gobs into grid squares in four distinct time periods between 1941 and 1978

Time period	Number of grids occupied	Total number of movements	Movements within the present home range	
			Total period	Mean annual total
1941-49	81 (+30)*	589	499	55.4
1950-62	70 (+24)*	564	506	38.9
1963-70	61 (+8)*	324	318	39.7
1971-78	35 (+1)*	248	237	29.6

* Figures in brackets indicate movements outside the 1980 home range

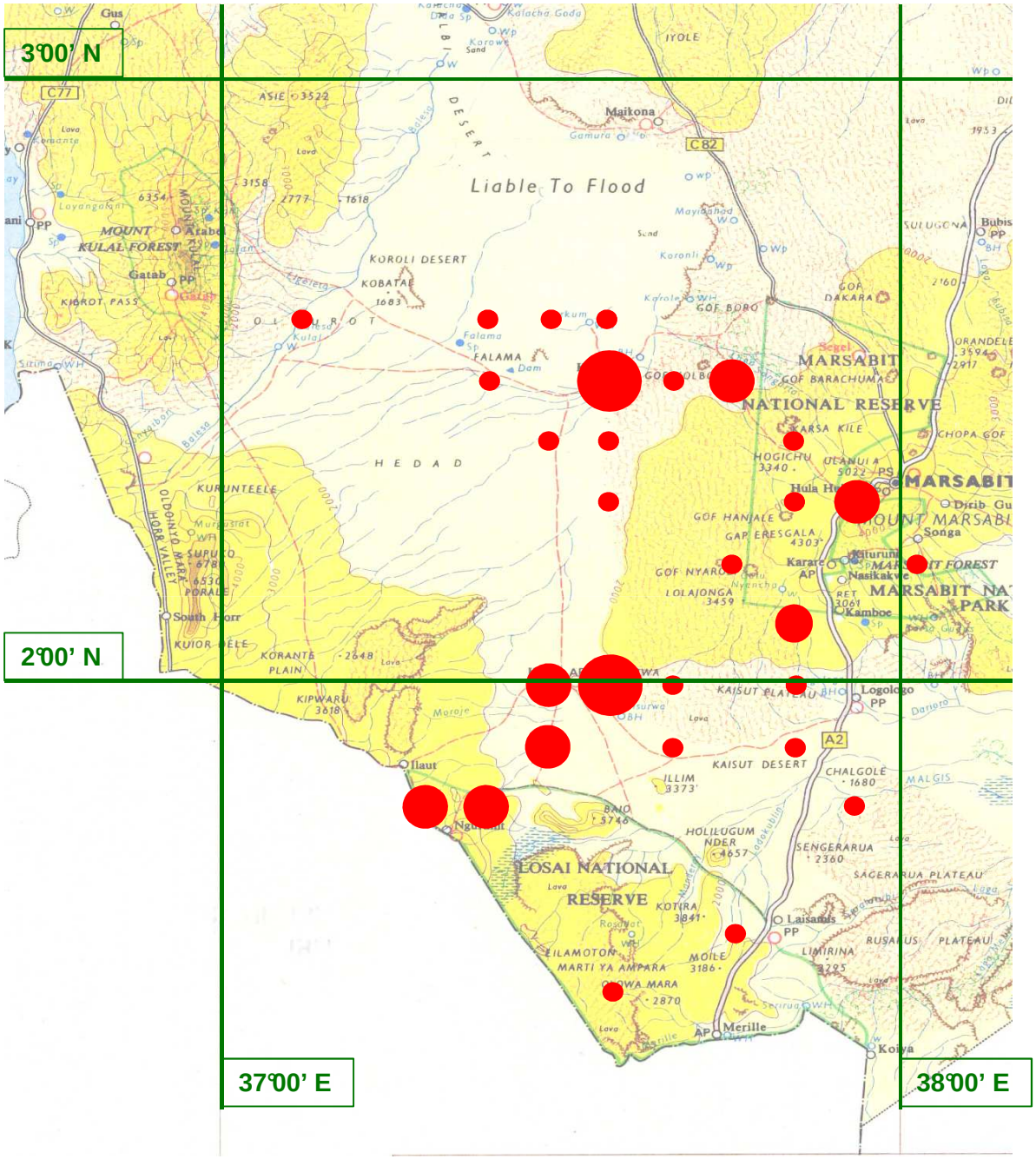


Occupation frequency* of South Western Marsabit District recorded for seven Rendille gobs for the time period 1941 - 1949

*number of in-migrations into defined 10x10 km grid squares

- 1 - 2
- 3 - 5
- 6 - 10
- 11 - 20
- > 20

- pre-1941 sites



Occupation frequency* of South Western Marsabit District recorded for seven Rendille gobs for the time period 1971 - 1978

***number of in-migrations into defined 10x10 km grids**

- 1 - 2
- 3 - 5
- 6 - 10
- 11 - 20
- > 20

Aerial Survey of all Rendille Settlements over two years 1978 - 1980

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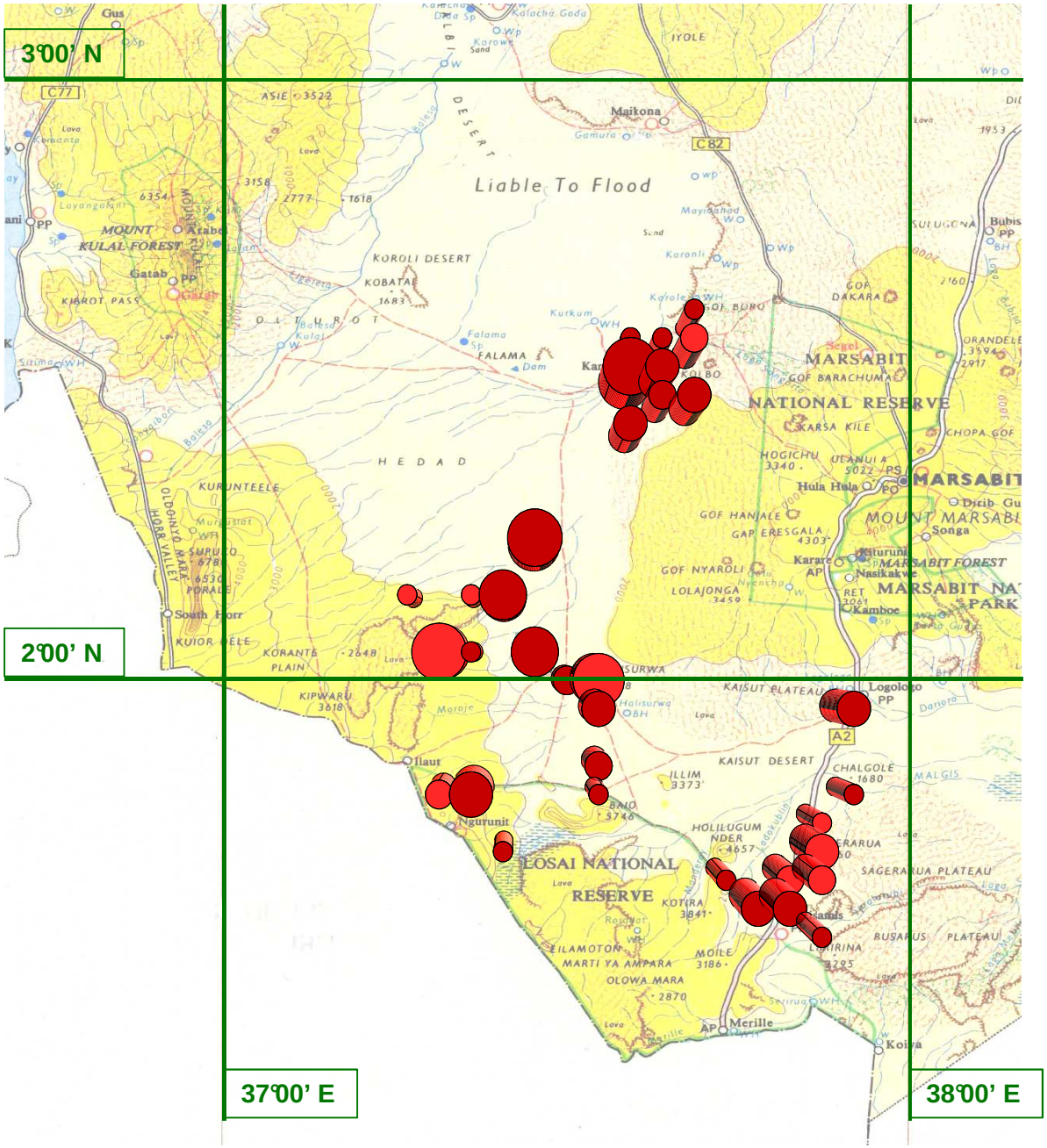
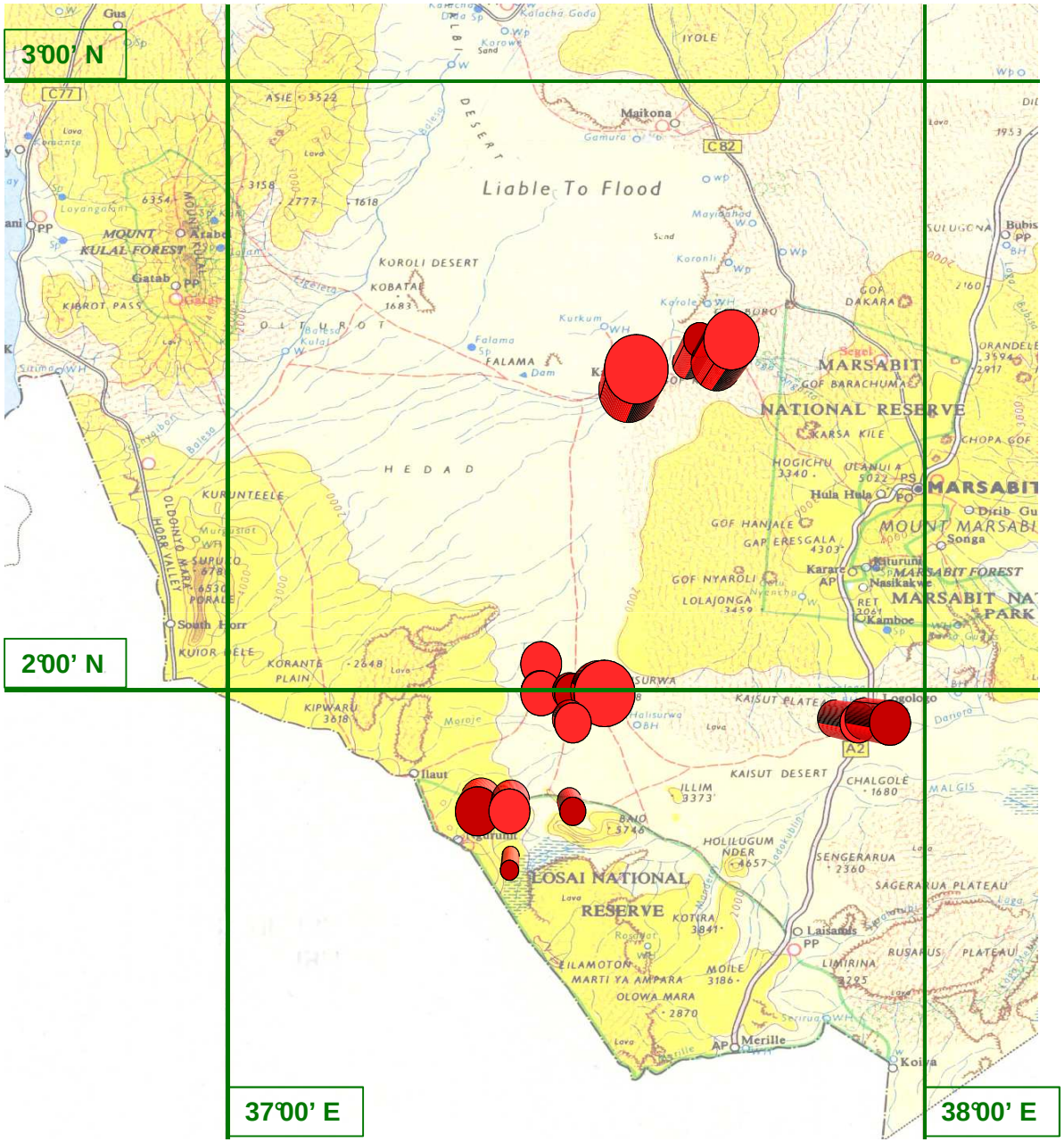
Survey season, number of grid squares occupied and total count of households and livestock at nine aerial survey dates between August 1978 and September 1980

Survey number	Survey season	# Grids occupied	# households	TLU/ household	HHDs/grid square
3	late rainy	36	2646	10.15	73.5
5	early dry	32	3247	12.04	101.5
6	mid dry	24	3348	5.89	138.5
7	end dry	15	3040	3.95	202.6
8	late rainy	20	3315	8.79	165,8
9	early dry	32	2984	3.78	93.2
10	mid rainy	26	3743	5.8	143.9
11	mid dry	22	2328	13.8	105.8
12	end dry	28	3356	3.72	119.8



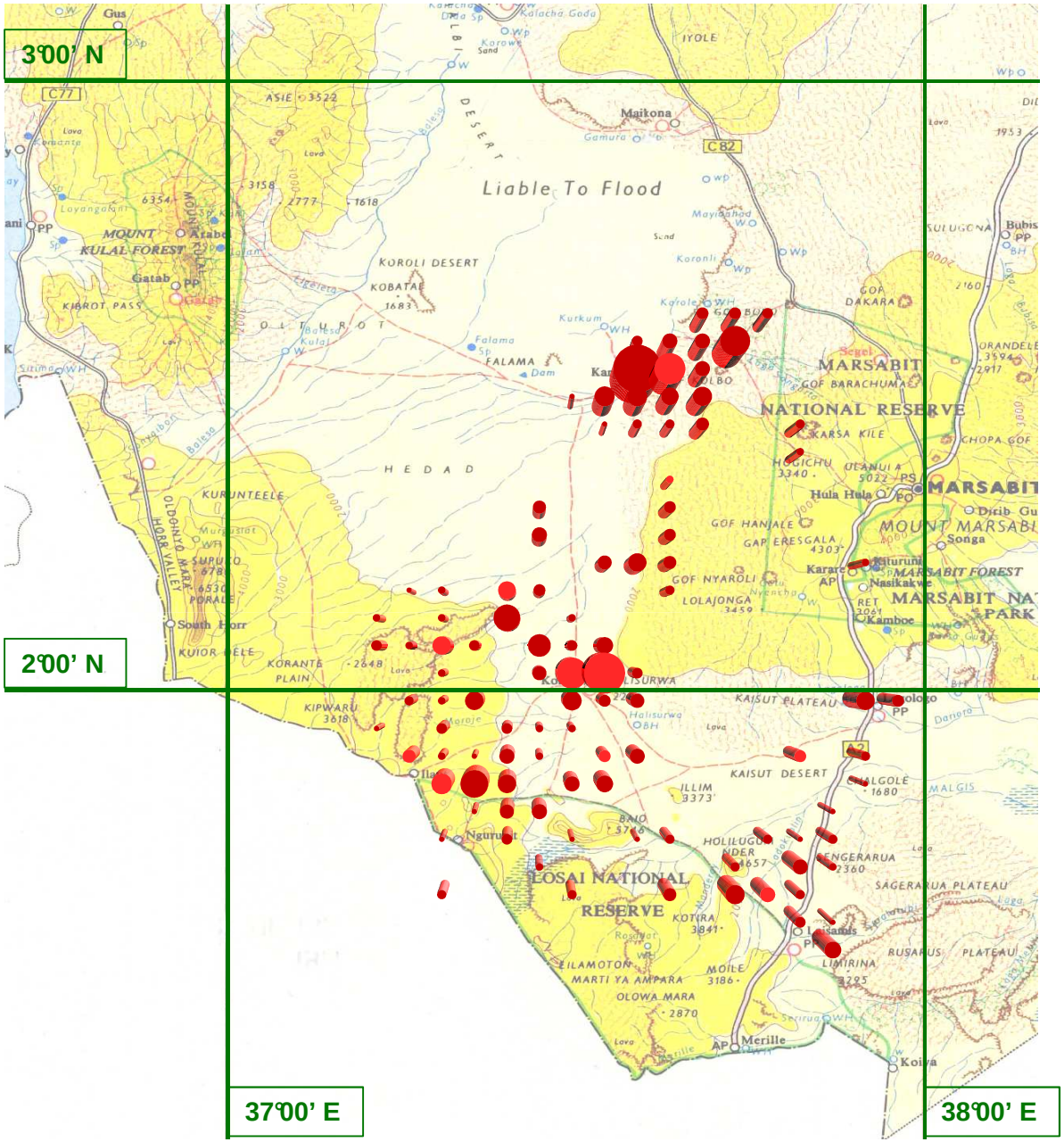
Distribution of gobs recorded during Survey 3, late rainy season , April 1979

Maximum spatial dispersal

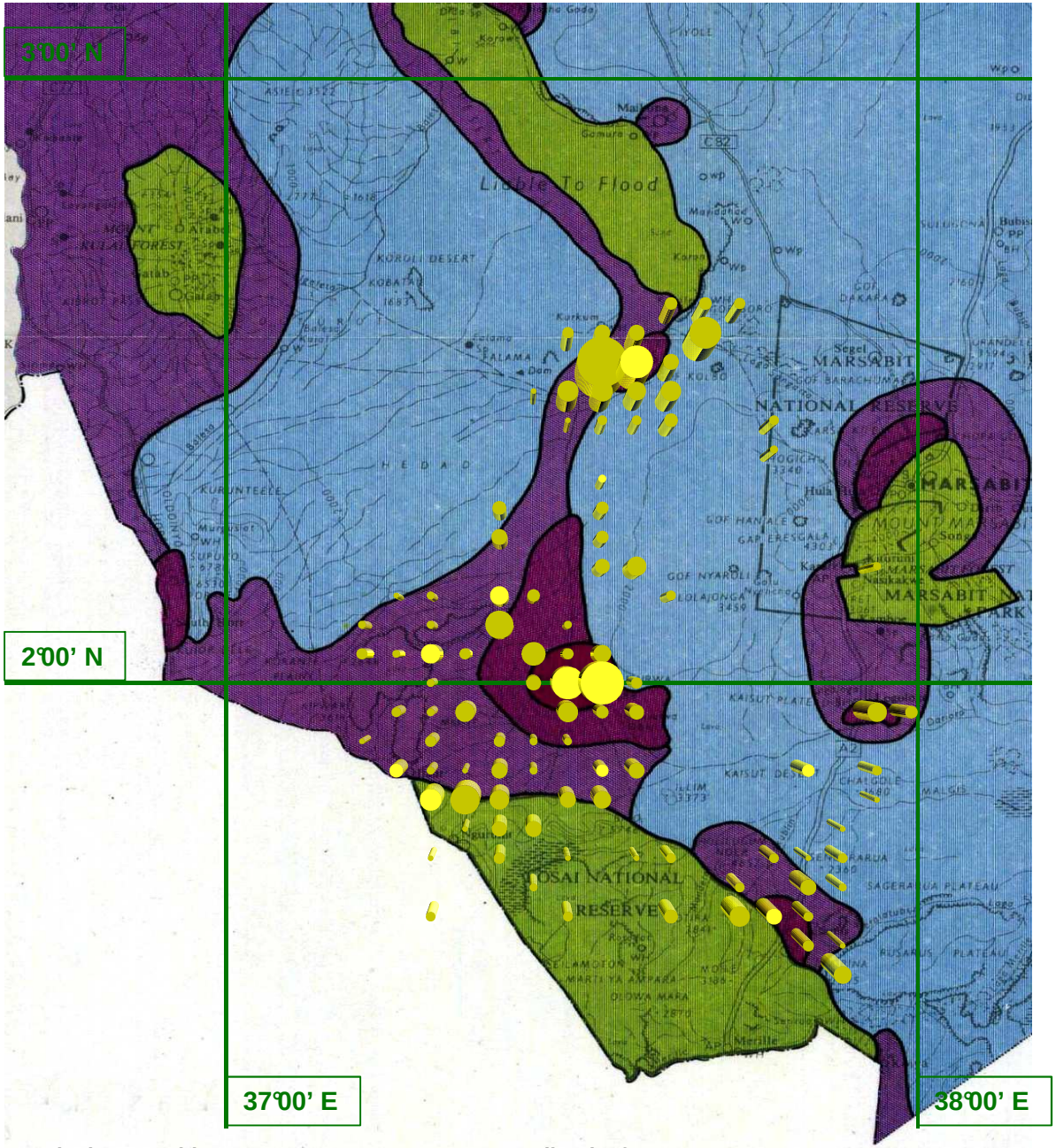


Distribution of gobs recorded during Survey 7, end of dry season, September 1979

Minimum spatial dispersal



Cumulative distribution of gobs recorded at nine aerial survey dates, between October 1978 and September 1980



Herlocker & Walther 1990: Range Management Handbook of Kenya, MOLD & GTZ

Map of range condition in five different classes

and cumulative distribution of gobs recorded at nine aerial survey dates, between October 1978 and September 1980

Range Condition Classes:

- Good
- Fair/Good
- Fair
- Poor
- Very Poor
- Non Rangeland

Digital Globe Survey of the Distribution of Rendille Settlements 2012 - 2014

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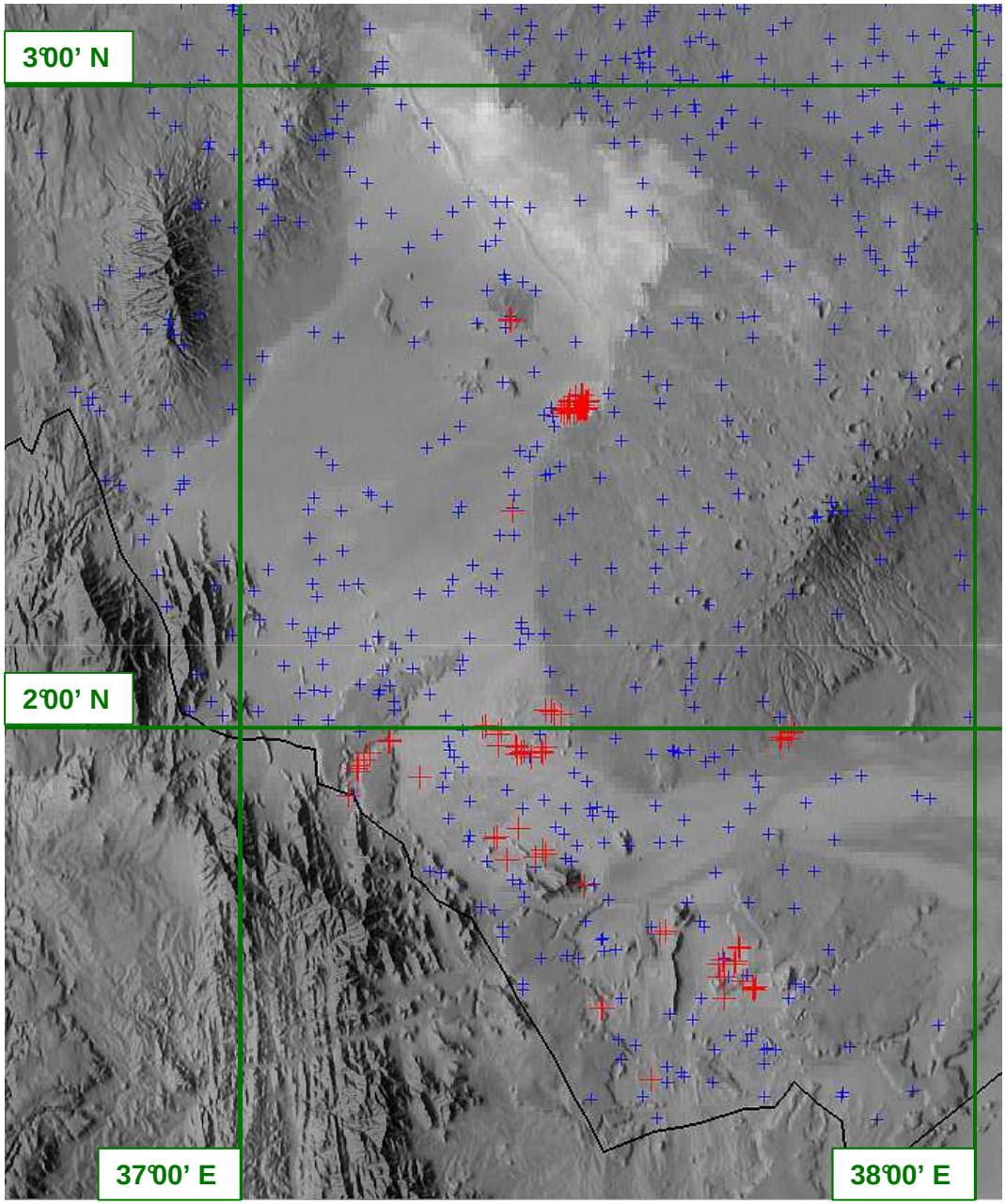


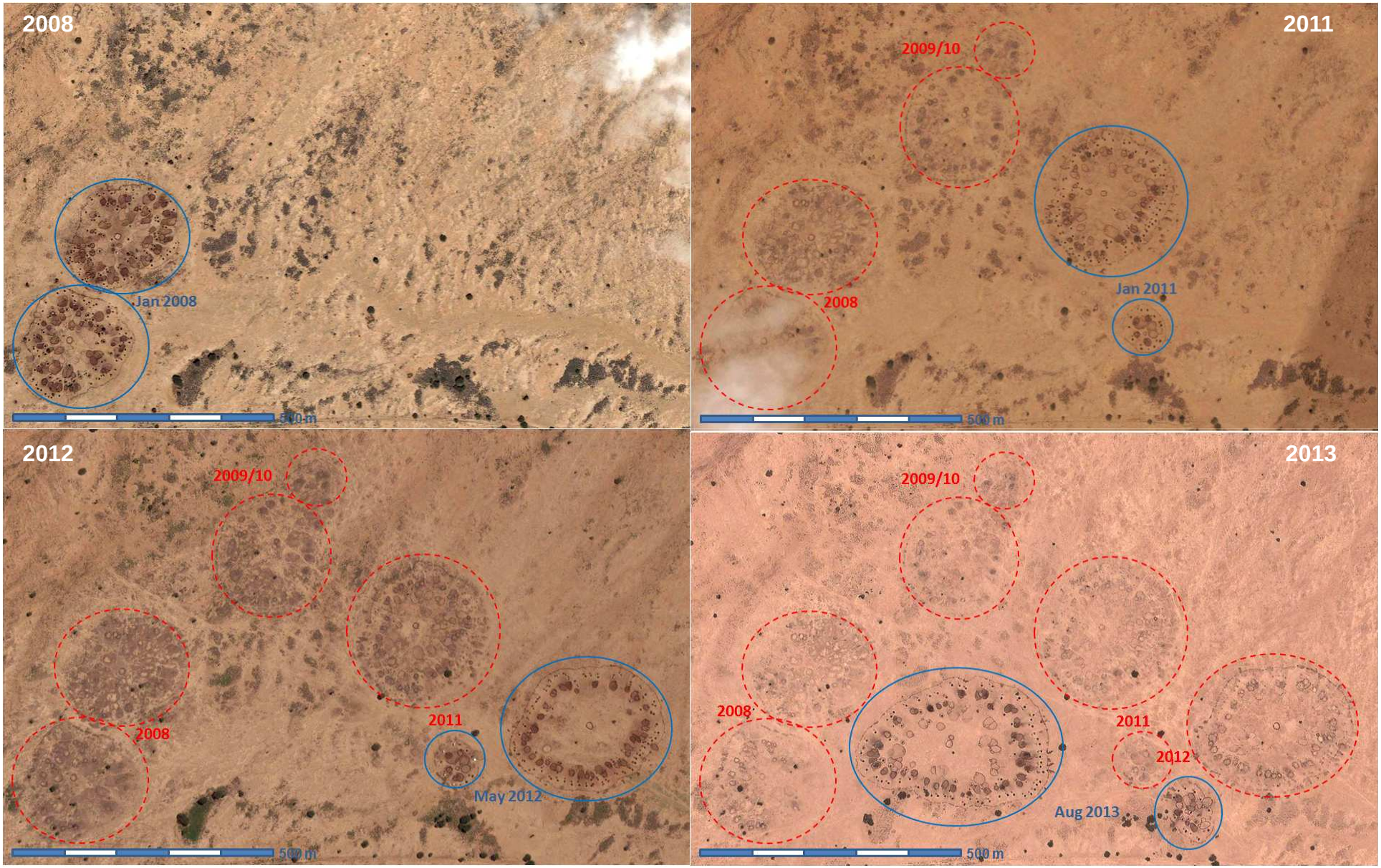
Digital Elevation Model: AFSIS

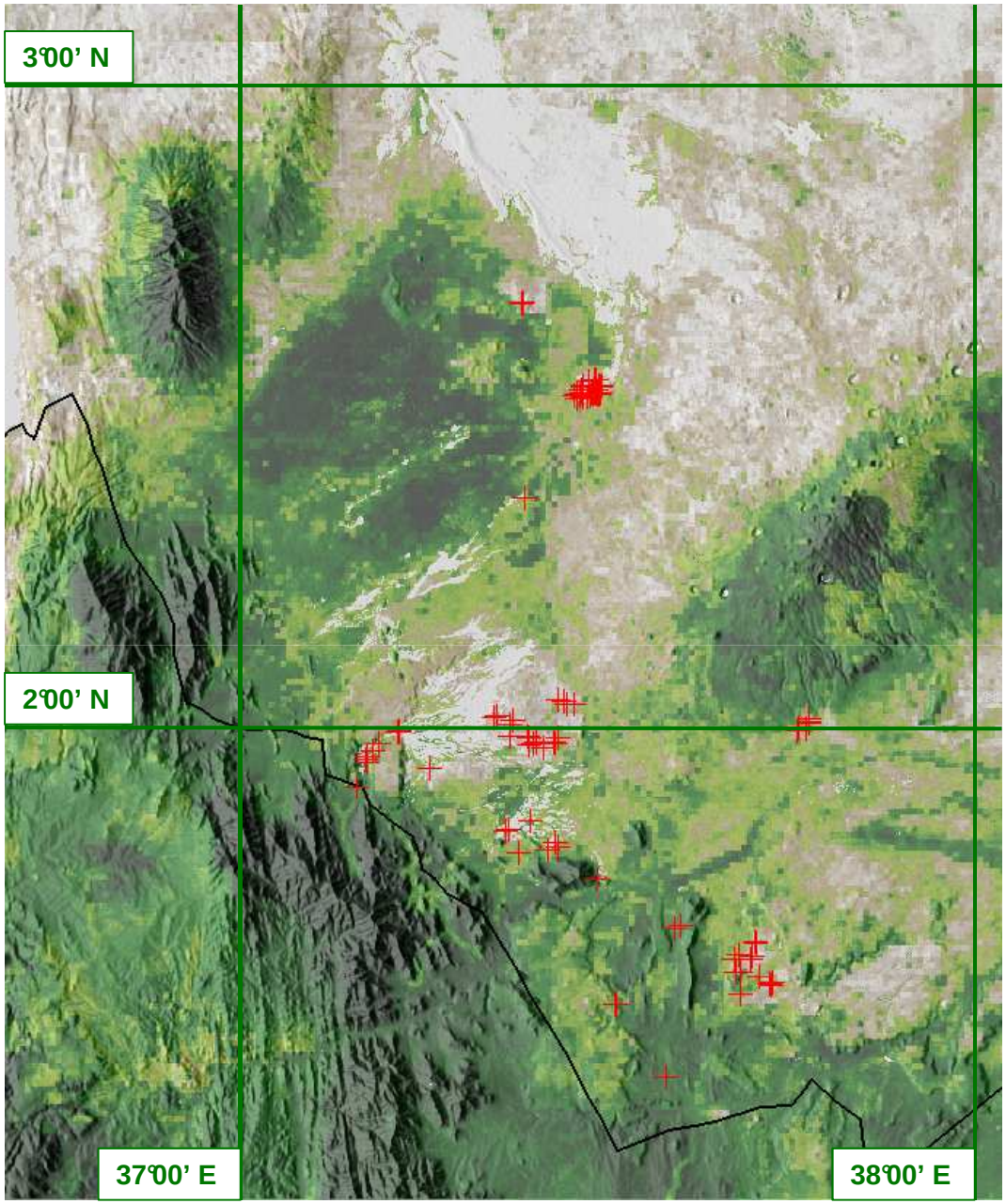
Geo-referenced distribution of Rendille gobs [+] between 2012 and 2014 over digital elevation map; [+] signify abandoned gobs, fora camps, or settlements of other ethnic groups

[+] from a crowd sourcing exercise under https://geosurvey.qed.ai/ Marsabit District

Extreme clustering of Rendille Gobs near Kargi throughout 2012

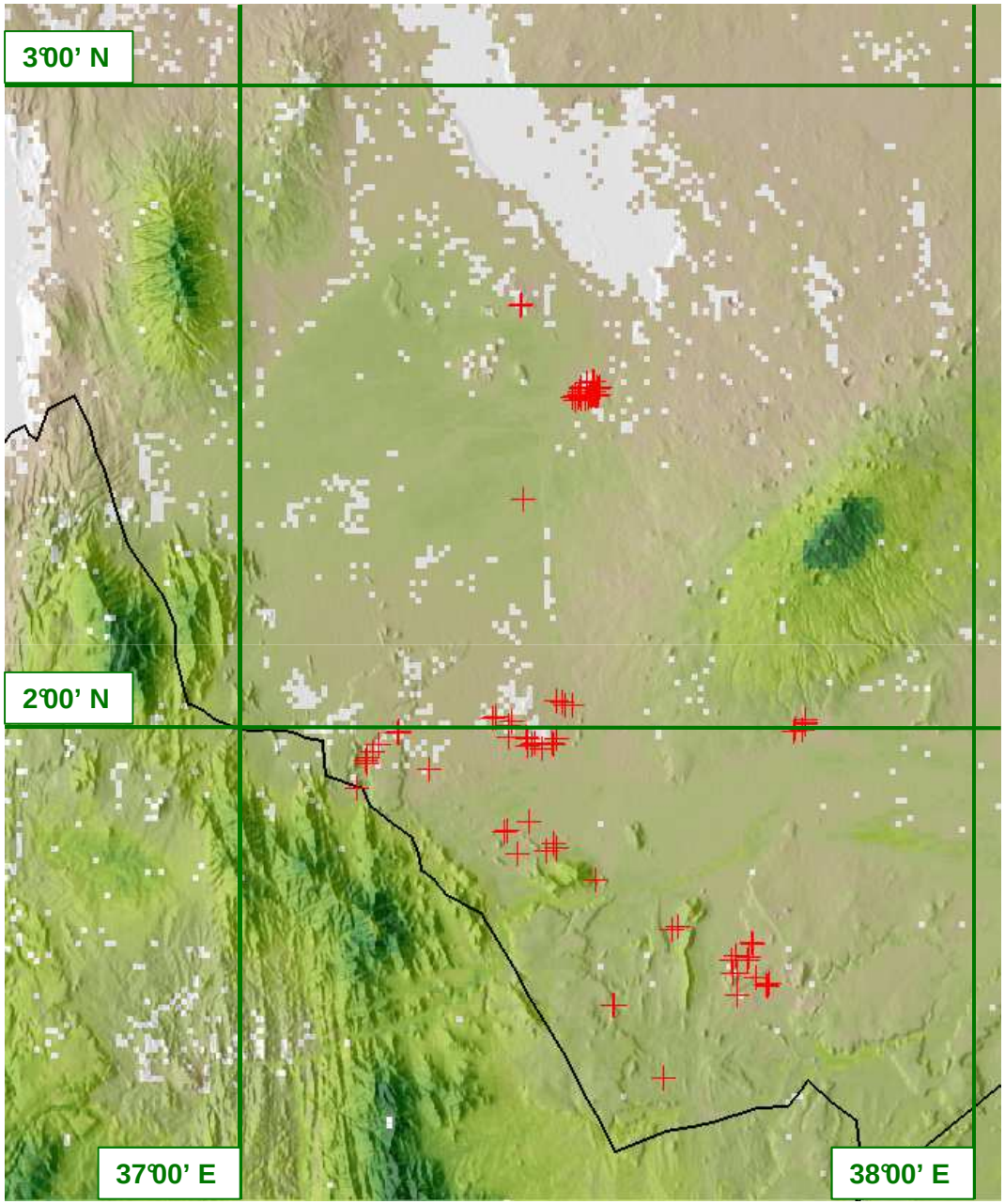
Minimal migration distances of two Rendille gobs during five years





Rendille settlement locations [+] between 2012 and 2014 over map of probability of 60% woody vegetation cover in South-West Marsabit District

Probability Map: AFSIS



FPAR map: MODIS Terra & Aqua data

Rendille settlement locations [+] between 2012 and 2014 over map of FPAR* of South-West Marsabit District

***Fraction of absorbed Photosynthetically Active Radiation**