

## **Grazing indicators used by *Gabra pastoralis* and other factors influencing their grazing decisions in Northern Kenya**

Msc Thesis at the Department of Agricultural and Biosystems Engineering

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### Summary

Livestock in pastoral production systems in Northern Kenya depends fully on forage from natural pasture areas. These pasture areas are under communal use and are characterized by high spatial variability with regard to bio-physical characteristics. High temporal and spatial variability of rainfall contributes to a pronounced patchiness of the available pasture resources. In this situation the amount of feed livestock can intake depends on the decisions of the pastoralists which grazing unit to use at which time. The decisions underlying the grazing itineraries in northern Kenya is not known. hence grazing management is described as opportunistic. This study was conducted among *Gabra* pastoralists in Charbi District of Marsabit County, Northern Kenya. The aim of the study was to identify suitability indicators and social factors considered by the *Gabra* pastoralists in selection of the grazing units. The study also sought to identify the retrospective grazing itineraries. Moreover, the study tried out efficacy of solar backpacks in identifying on-time itineraries of the herder.

Data collection involved the following steps. a) Participatory mapping and characterization of the grazing units in three different locations: pastoralists completed a map indicating grazing units and characterized the grazing units used for grazing of the goats based on their own knowledge: b) Herder preference ranking of grazing units was conducted to identify the attributes of various grazing units, the grazing units were then classified into most preferred, medium preferred and least preferred based on the attributes. c) Calendar communication tool was used to retrospectively document the grazing itineraries of 401 goat herds, d) On-time herder-based ecological monitoring using solar based GPS data loggers were tried out with 3 pilot herders. The methods were accompanied by own monitoring of sampled grazing unit using pastoral rangeland scouts.

The results of the study are: there are 128 grazing units identified\_ The characterization of grazing units is based on: livestock species, clan, soil colour, land surface features and vegetation type. The preferred ecological attributes of grazing units are; fodder trees of less than 2 metres in height, availability of trees such as Acacia to that can provide shade and fodder, grazing units with white soils, at least 6094 land cover of pebbles. and key pasture species like Tribbilus termstis. The negative attributes that can read to not selecting grazing unris are boulders\_ grazing units with red soils, grazing unit with ticks and grazing units close to permanent human settlements and boreholes. The animal-based indicators used by Gabra pastoralists to make grazing decisions are milk yield, mating frequency, weight gain. growth rate of the goat kids and animal behaviour like snoring and playing

The medium, least and most preferred grazing units were utilized for 51.4%. 25.9% and 22.7% of the herding months studied respectively. The most preferred grazing units were the less utthzed grazing units. In 99 herding months, the grazing units were selected because of the social factors but not because of its suitability for the goat herds. The social factors, for example, insecurity, labour shortage and months of salt) can deter selection of suitable grazing units. Therefore. Gabra pasoralists make grazing decisions kn conflicting circumstances and this leads to trade-offs in decision-making.

The voltaic solar charger converter backpack and its supporting software were more efficient in capturing on-time herder itineraries than the Kraftwerk trekking rucksacks. The solar backpack method revealed dajly, weekly and monthly mobility of the herder. For example, the average length of herder itineraries was 21..9 km per day and 2.05 km per hour. The herder moved to 7 different camps during the 65 days of study\_ The solar 77 backpack method showed to be appropriate in assessing to and spatial pattern of the mobile grazing system.

The result from the retrospective grazing itineraries and on-time herder itineraries revealed long-range and short-term mobile grazing system which is aimed at strategic resource use, The mobility of the Gabra goat herds depend on ecological indicators of the grazing units, animal-based indicators and the social factors influencing the selection of the grazing units.