

# The influence of pastoral movement patterns on livestock weight gains & losses in the Dzungarian Gobi, Mongolia



UNIVERSITY OF HOHENHEIM

LENA MICHLER<sup>1</sup>, PETRA KACZENSKY<sup>2</sup>, ANNA C. TREYDTE<sup>1,3</sup>

<sup>1</sup>University of Hohenheim, Ecology of Tropical Agricultural Systems, Germany

<sup>2</sup>Inland Norway University of Applied Sciences, Department of Forestry and Wildlife, Norway

<sup>3</sup>Stockholm University, Department of Physical Geography, Sweden



## Introduction

In Mongolia, nomadic pastoralism is still practiced by around 1/3 of the population (Mongolian Statistical Information Service, 2021).

Mobility is a key strategy for pastoralists in Mongolia to balance grazing pressure across the rangeland and to ensure livestock weight gain during the short vegetation period in summer to get through hard winter months (Coughenour, 1991; Liao et al., 2017).

A trend to less seasonal movements and reduced grazing distances has been observed (Jordan et al., 2016; Tsvegemed, 2018), although, mobility provides livestock with qualitative high forage through diverse vegetation availability (Yoshihara et al., 2013).

Little is known about movement patterns and the effects on weight gains and losses of livestock in the Mongolian steppe region.

**Hypothesis:** Increased movement patterns positively influence weight gains and losses of livestock between seasons.

→ We investigated mobility patterns and the influence of herding management on livestock weight gains and losses.

## Methods

### Study site

In the Great Gobi B Strictly Protected Area (SPA) in south-western Mongolia nomadic people and their livestock share their habitat with threatened wild ungulates like the Przewalski's horse and Asiatic wild ass. The pastoralists of the Great Gobi B SPA are highly mobile with on average 11 camp changes per year following a four-season movement pattern (Michler et al., 2021, unpublished data).

- Seasonal analysis of mean ( $\pm$ ) **daily walking distance (DwD)** in km & **daily grazing time (DgT)** in hours
- Analysis of mean ( $\pm$ ) livestock **weight gain** between April to October 2019 & **weight loss** between October 2019 to April 2020
- Fixed factors: DwD, DgT, animal age, animal sex (male/female) and animal species (goat/sheep)



### Seasonal herd movements:

- GPS collars
- N = 19 livestock herds
- August 2018 to May 2020



### Seasonal weight differences:

- Hanging balance
- N = 15 herds
- N = 144 goats & sheep
- Male/female > 2 years old
- April 2019 / October 2019 / April 2020

HEINRICH BÖLL STIFTUNG

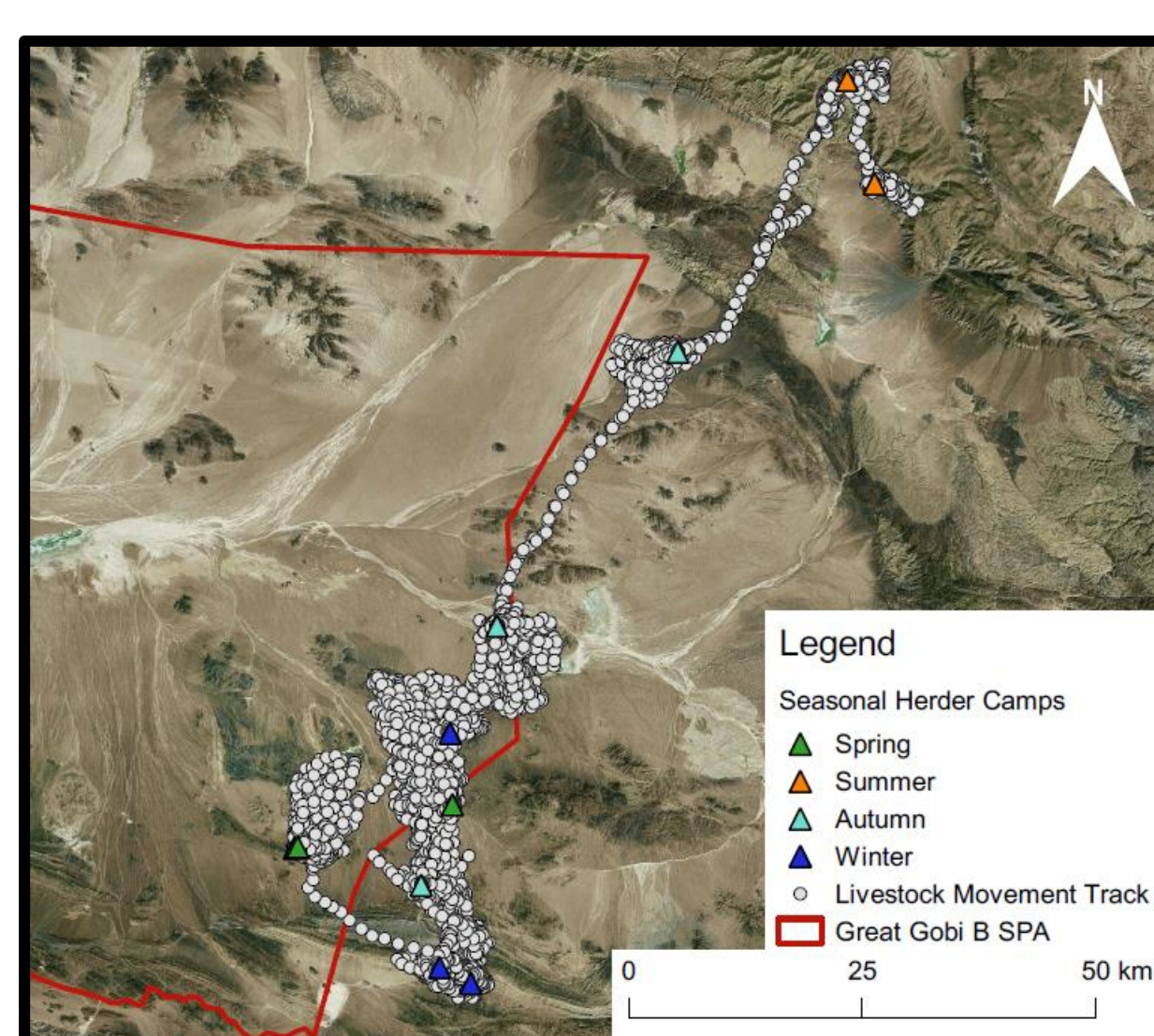


Fig. 1: Movement pattern by one example livestock herd and seasonal pastoral camps in the Great Gobi B SPA in Mongolia

## Results

### Livestock mobility:

- Four-season movement pattern (Fig. 1)
- Mean DwD (km) highest during spring and lowest during winter
- Mean DgT (h) highest during summer and lowest during winter (Tab. 1)

Tab. 1: Mean ( $\pm$ ) daily walking distance (DwD) in km and daily grazing time (DgT) in h in spring, summer, autumn and winter season of 19 livestock herds around the Great Gobi B SPA in Mongolia

Season	DwD [km]	DgT [h]
Spring	11.75 $\pm$ 2.52	10.87 $\pm$ 3.26
Summer	10.17 $\pm$ 2.52	12.85 $\pm$ 2.21
Autumn	9.58 $\pm$ 1.48	9.64 $\pm$ 1.63
Winter	8.37 $\pm$ 1.37	7.82 $\pm$ 1.48

### Weight differences between seasons:

- DwD & DgT do not influence the weight gains and losses of sheep and goats (Fig. 2)
- Age, sex, and species significantly influence weight differences between seasons

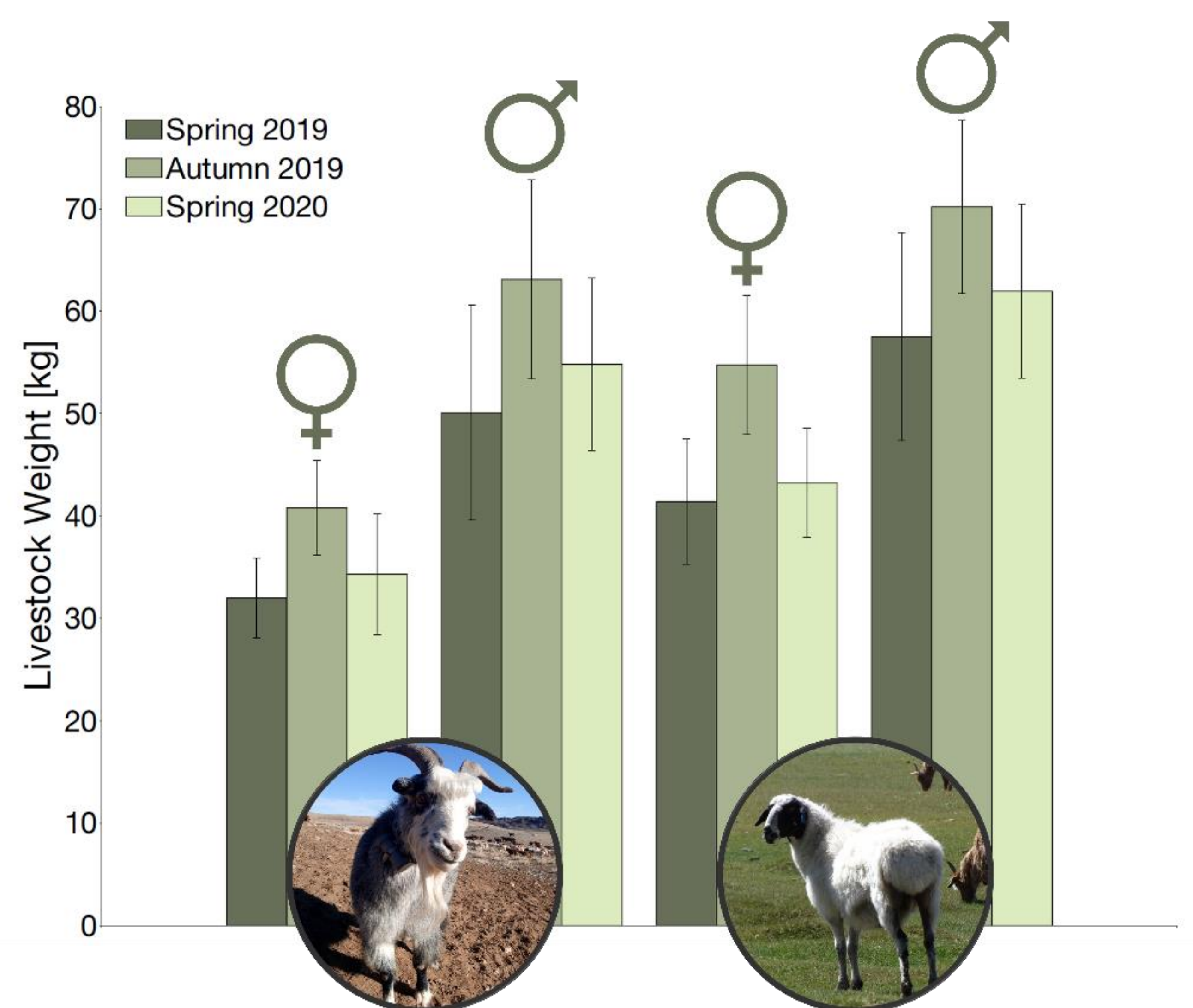


Fig. 2: Mean ( $\pm$ ) livestock weight (kg) of male and female adult goats and sheep in spring 2019, autumn 2019 and spring 2020 of N = 120 animals around the Great Gobi B SPA in Mongolia.

## Conclusion

- Movement patterns vary strongly between seasons
- Pastoral movement patterns, however, do not influence livestock weight gains and losses between the seasons
- Weight differences depend on animal age, sex and species

### Acknowledgements

We thank the management of the Great Gobi B SPA, especially, the rangers who helped to collect data. We are deeply thankful to the herder communities who allowed us to track and weigh their livestock. The first author (L.M.M) was financially supported through a scholarship of the Heinrich Boell foundation and received research funds by the International Takhi Group (ITG).