

I. INTRODUCTION

Natural grasslands yield a notable part of the world's animal protein production, but little is known about the sustainable potential of different areas.

We examine

1. The aboveground biomass that is sustainably available for grazers on the world's grasslands
2. Carrying capacities: number of animals area can sustainably hold
3. Differences between actual livestock densities and theoretical capacities

II. DATA & METHODS

Net Primary Productivity (**NPP**) and Land Cover Types (**MCD**): NASA-MODIS

Forest Coverage: Hansen et al. 2013

Slopes: IIASA

Temperature: Worldclim-v2

Growing period: FAO/GAEZ

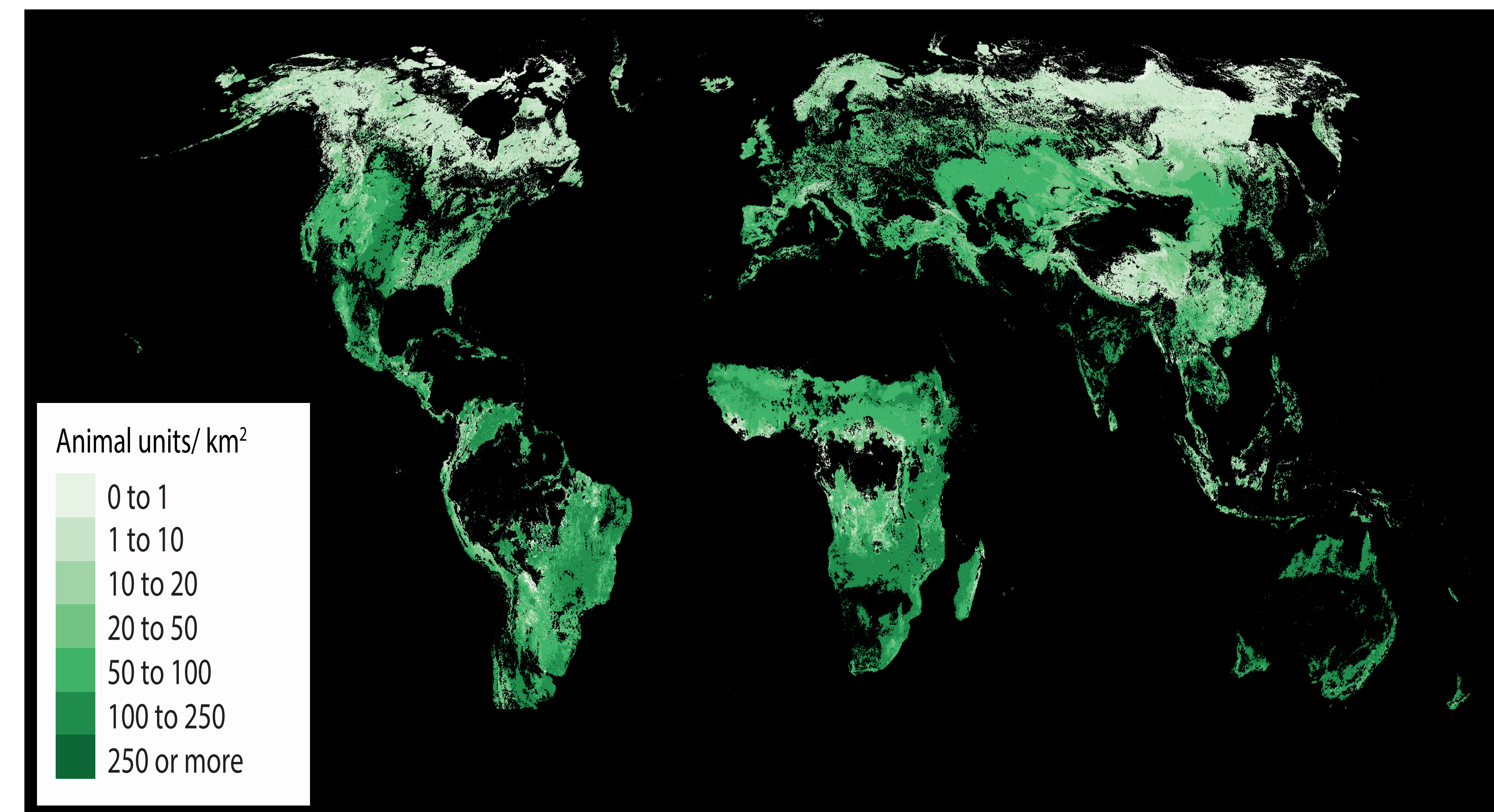
Gridded Livestock of the World (**GLW**): FAO

- Primary production converted to biomass and then adjusted by forest, slopes, and land degradation.
- Next, we examined how many animal units sustainably available feed can maintain.

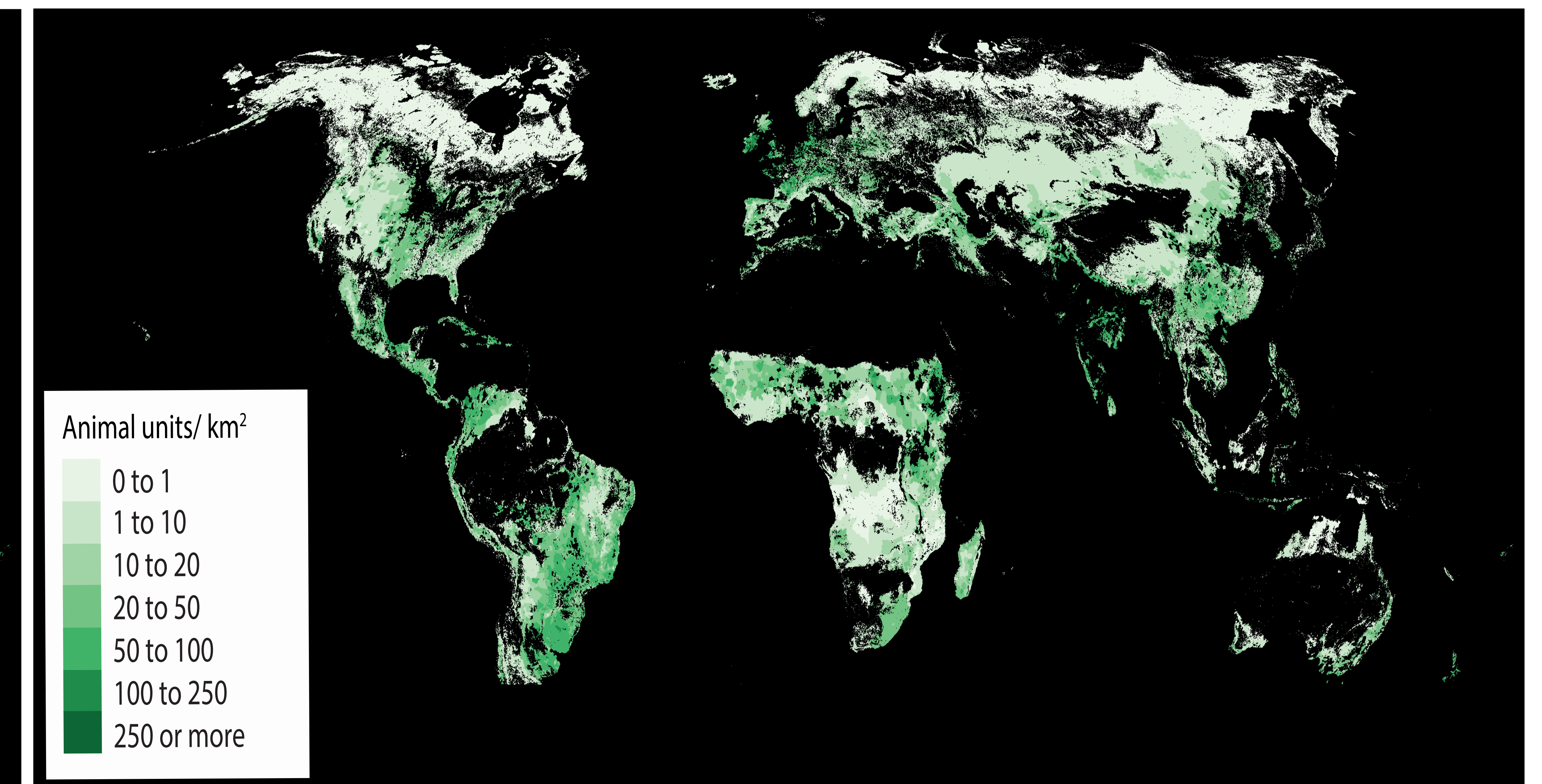
III. PRELIMINARY RESULTS

1. Production already concentrates on areas where theoretical carrying capacity is high

Carrying capacities on world's grasslands (Animal Units/km²)

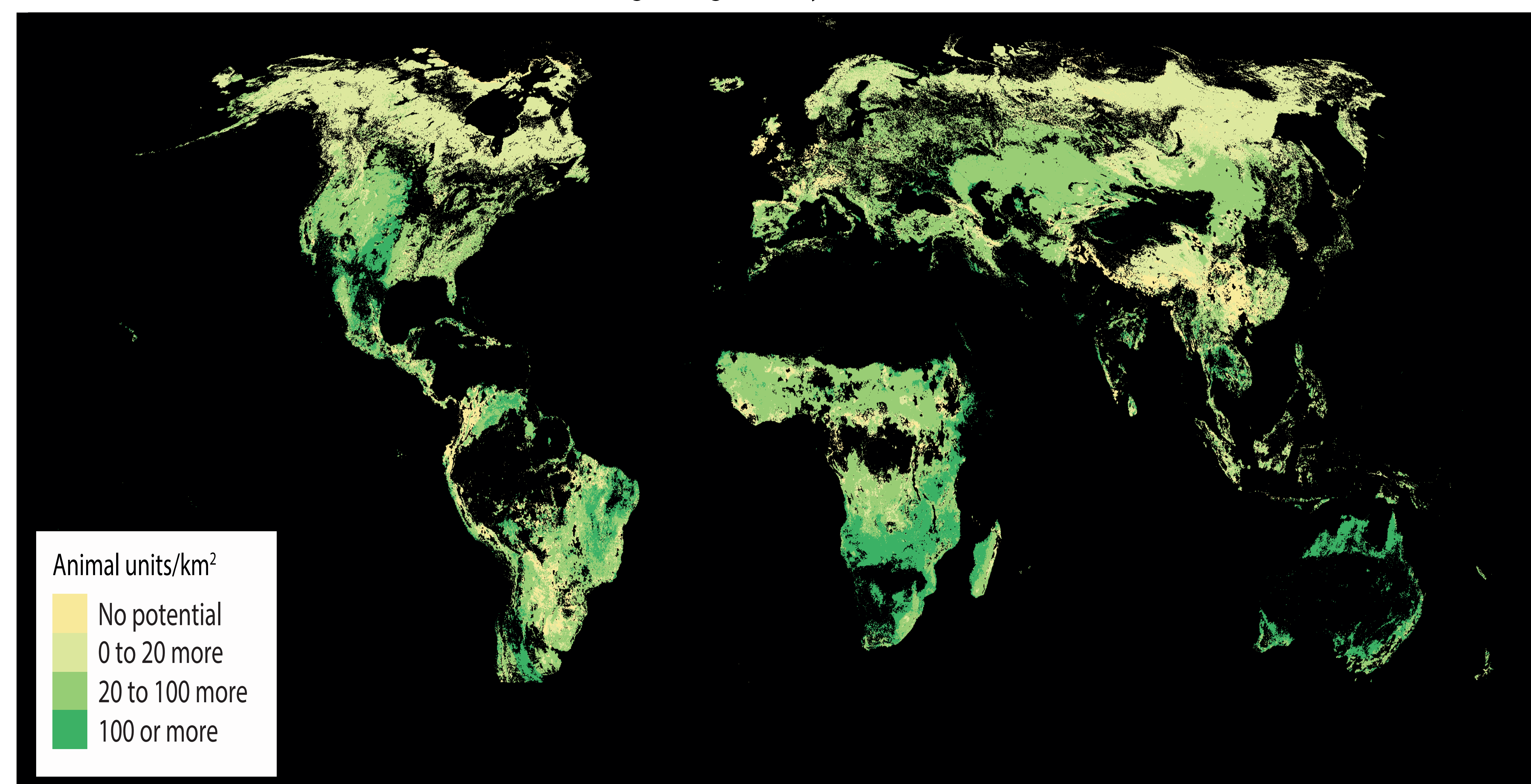


GLW: Actual livestock distribution on world's grasslands (Animal Units/km²)



2. Local overgrazing. No notable yield gaps in the northern hemisphere. Opportunities especially in Africa.

Potential to increase grazing density (Animal Units/km²)



IV. CONCLUSIONS

The computational maximum of the carrying capacity is notably larger than the actual livestock distribution. The results are encouraging as, based on this approach, the theoretical limits are not completely transgressed. However, even this grass-based approach implies signs of overgrazing.

Grasslands are underutilized as the present livestock production utilizes many other feed components besides the grass and merely the availability of the biomass does not explain the stocking densities.