

Bringing food availability to scale

Mapping livelihood activities
for household food availability across Uganda

Jannike Wichern

*Contributing authors: Katrien Descheemaeker, Sytze de Bruin, Joost van Heerwaarden,
Piet van Asten, Mark van Wijk, Ken Giller*



Rural livelihoods in sub-Saharan Africa (SSA)

- Most rural households' food security depends on own food production
- Mainly smallholder farmers, but large contribution to national food production & food security
- Highly heterogeneous livelihood activities!



Rural livelihoods in sub-Saharan Africa (SSA)

- Most rural households' food security depends on own food production
- Mainly smallholder farmers, but large contribution to national food production & food security
- Highly heterogeneous livelihood activities!



- How to target identify vulnerable households?
How to plan interventions country-wide?
- **Bottom-up food security approach** that identifies different livelihood activities across country

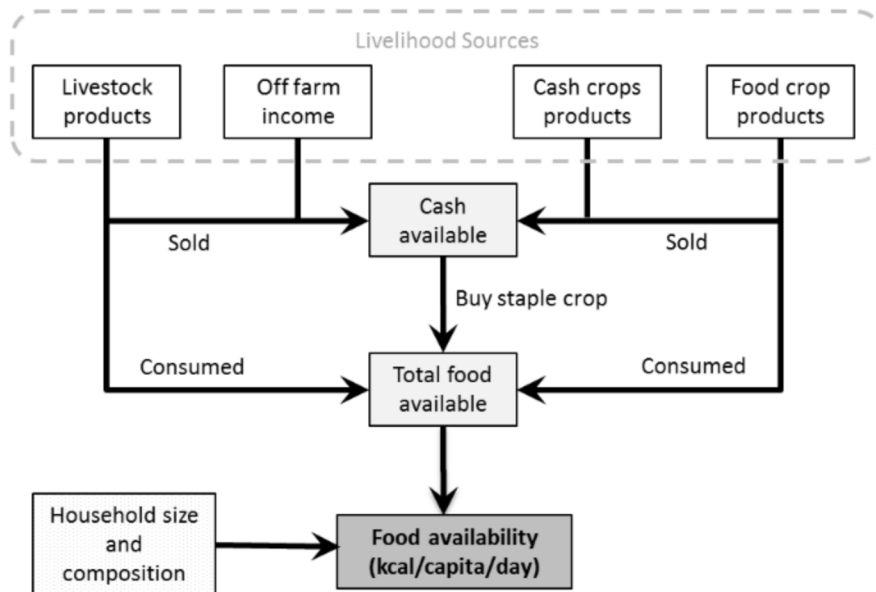
Bottom-up food security approach

- Household survey data:
World Bank **L**iving **S**tandard **M**easurement **S**urvey (LSMS)
- **Household food availability** (FA) indicator approximating food security

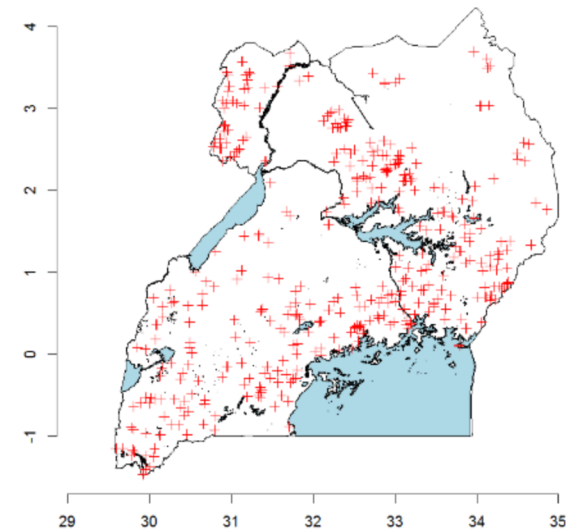
LSMS countries



World Bank 2016

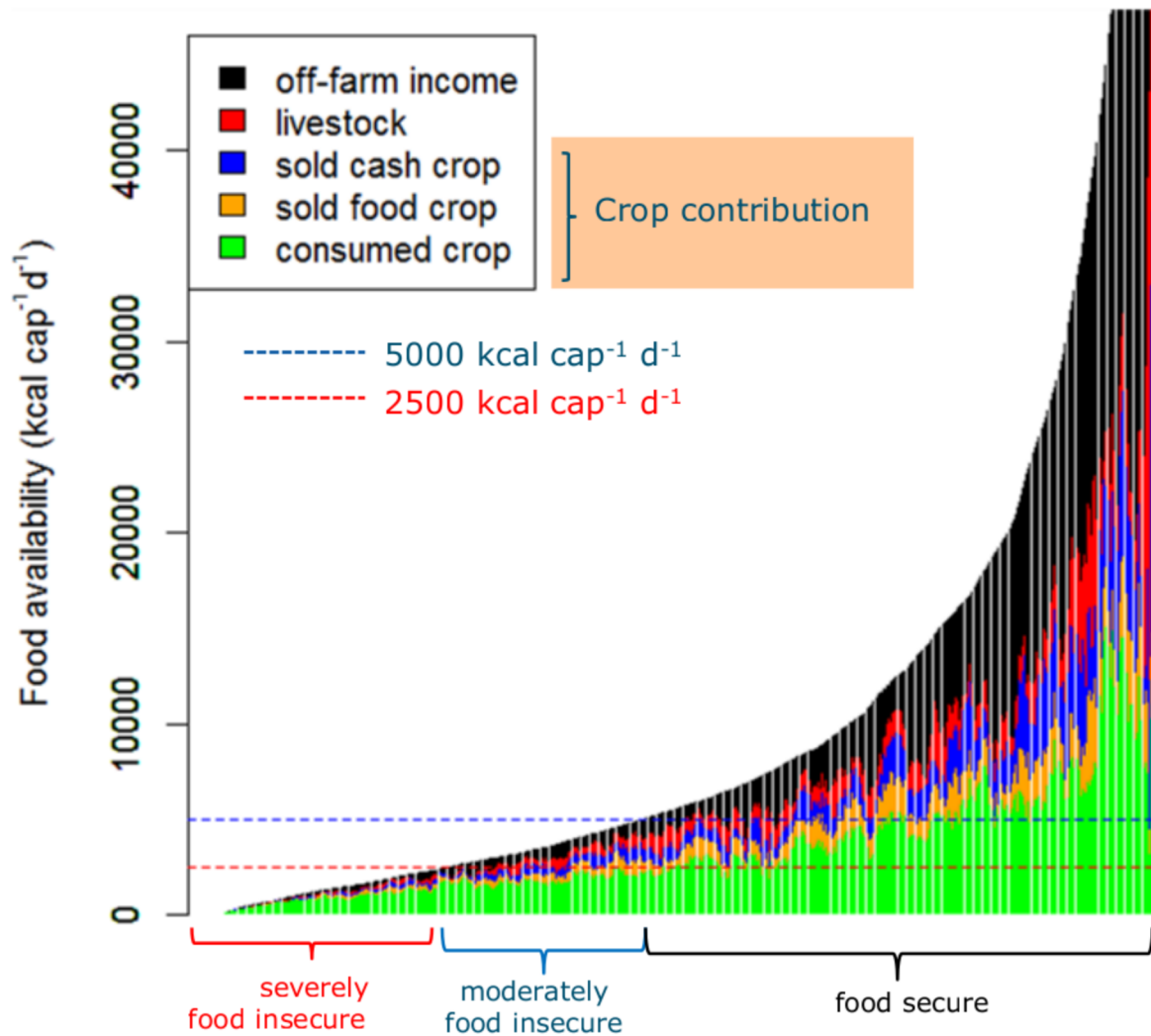


Frelat et al. (2016)

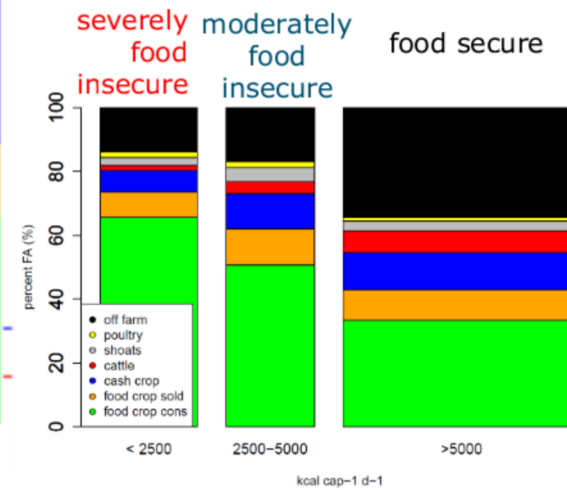
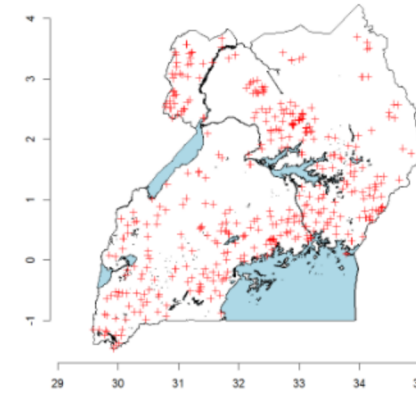


Uganda, n=1927
sample year 2010/11 4

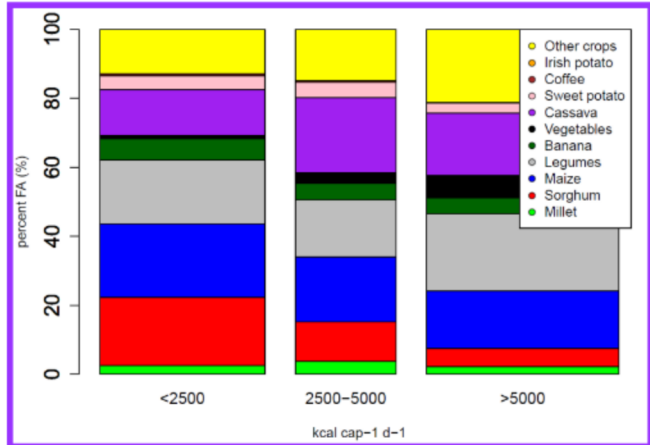
Bottom-up food security approach



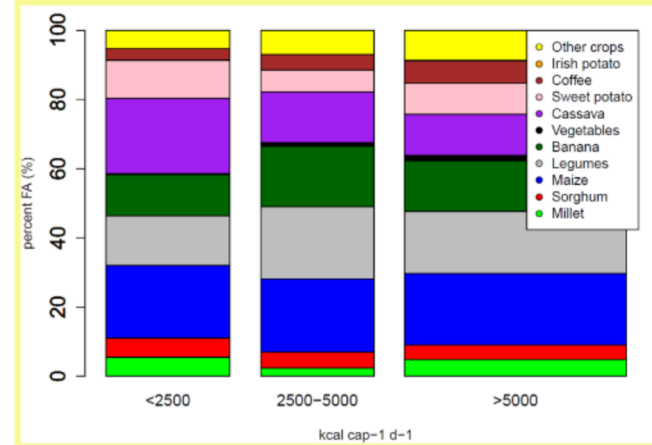
Uganda, $n=1927$



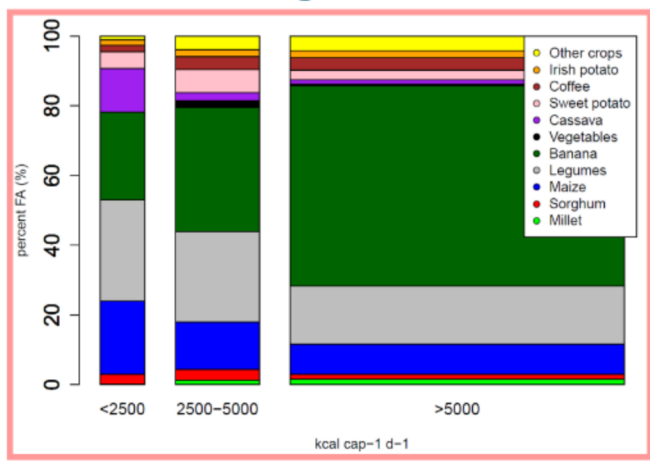
Crop contribution per region



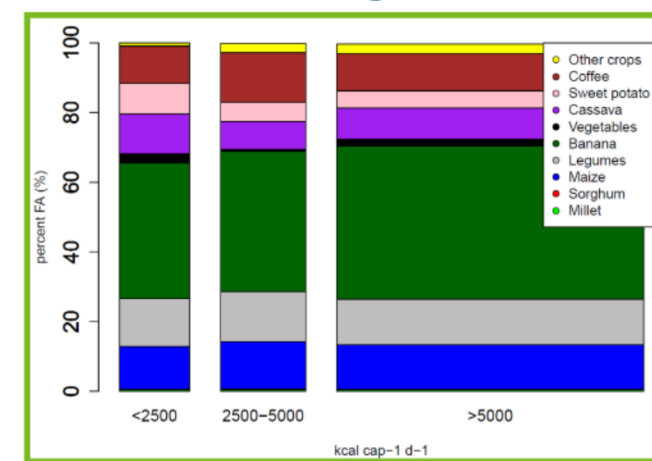
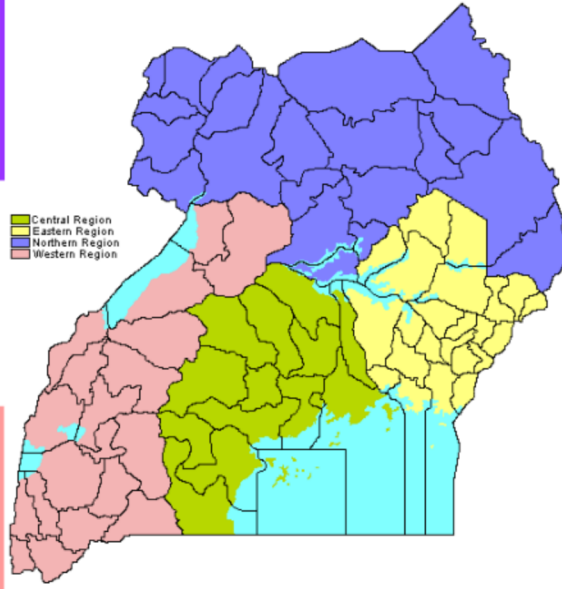
Northern Uganda



Eastern Uganda



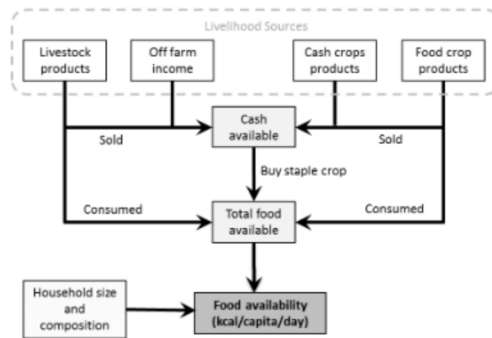
Western Uganda



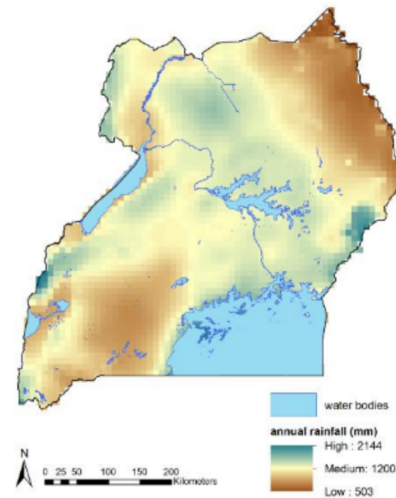
Central Uganda

Spatial Scaling Framework for food availability

Household food availability analysis



Spatial interpolation



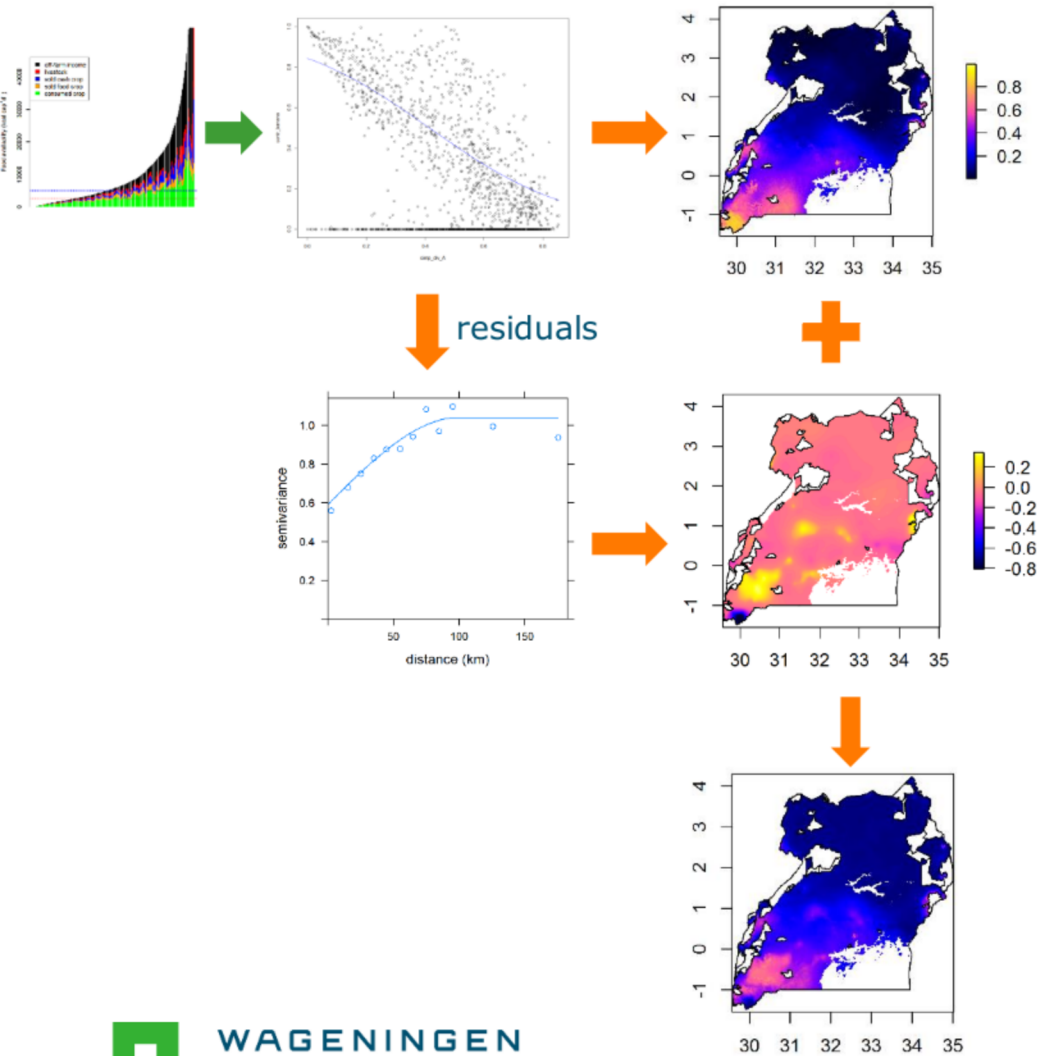
Household survey data on livelihood activities and food security

→ **What** livelihood activities are important for **which households?**

Spatially continuous data on biophysical & socio-economic characteristics

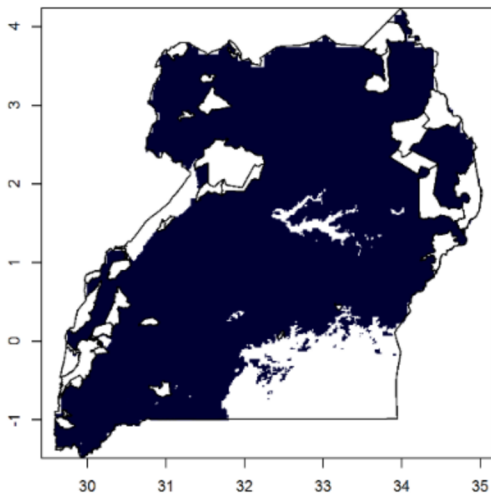
→ **Where** are these households?

Spatial interpolation: Regression kriging

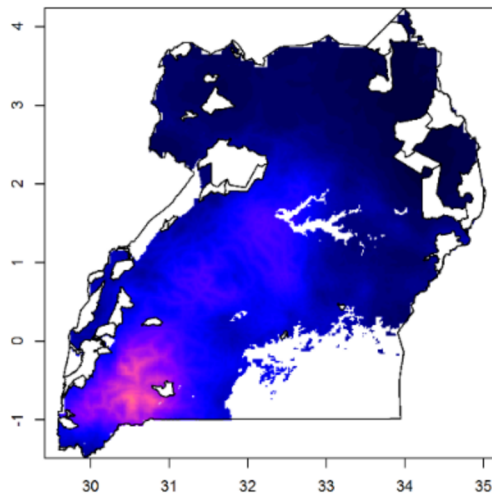


Food availability: Clear patterns but large uncertainty

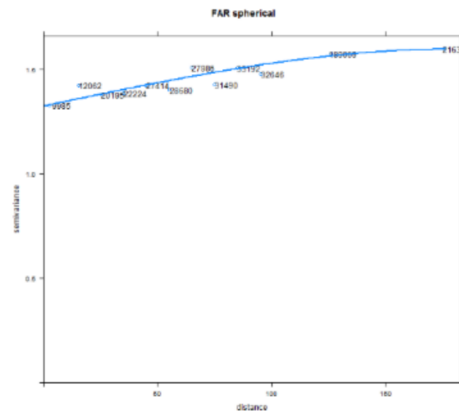
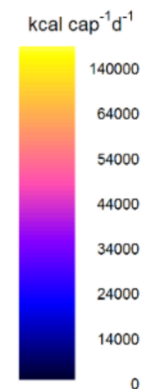
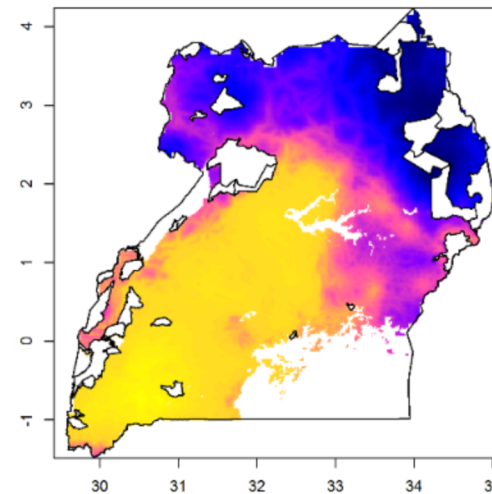
Lower 95 % confidence bound



Mean food availability



Upper 95 % confidence bound



Wichern et al. subm.

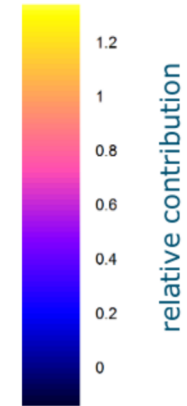
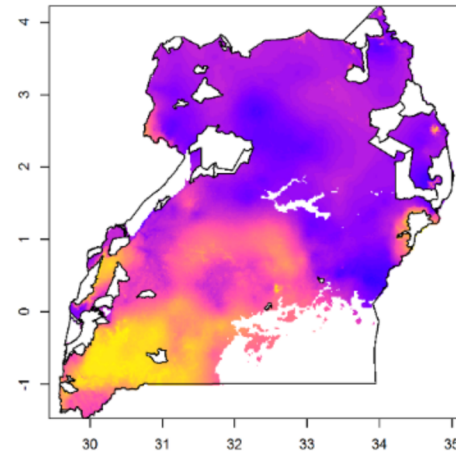
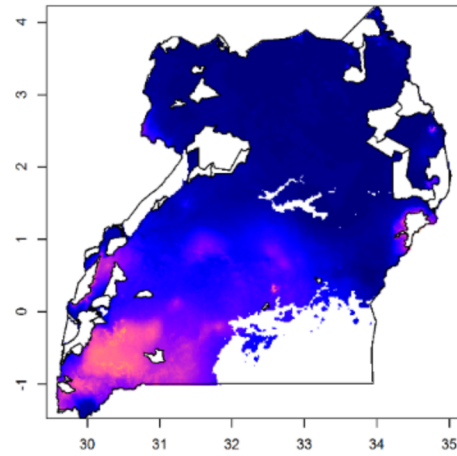
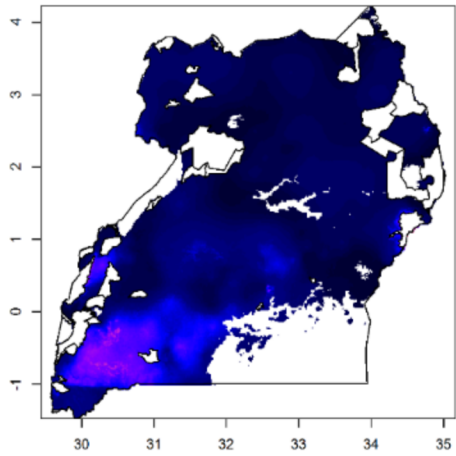
Clearer patterns for banana than for cattle

Lower 95 % confidence bound

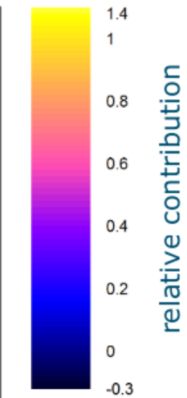
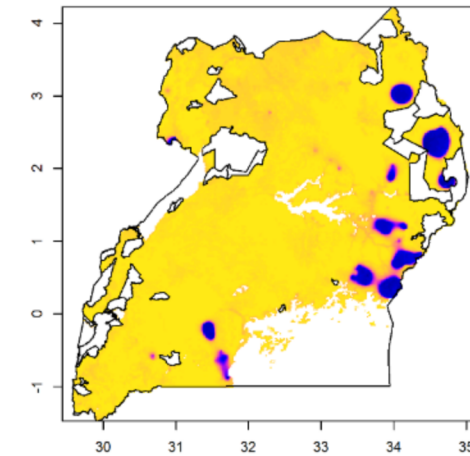
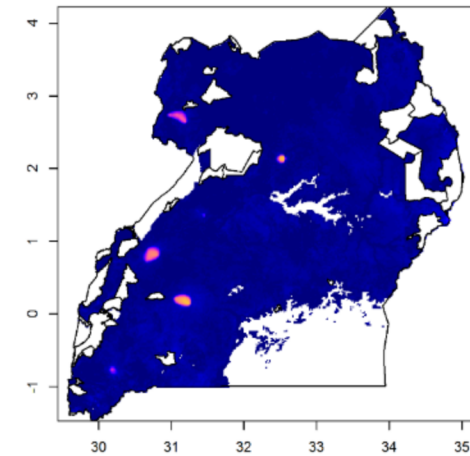
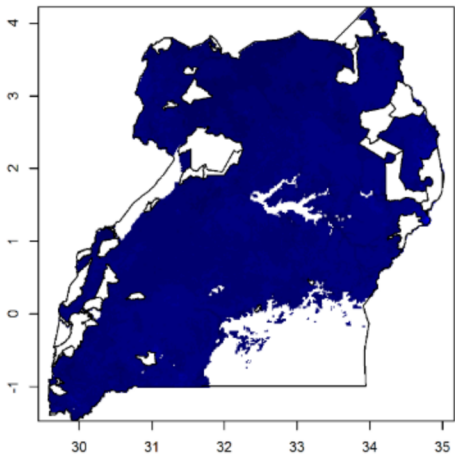
Median contribution

Upper 95 % confidence bound

Contribution of **banana** to household food availability



Contribution of **cattle** to household food availability



Wichern et al. subm.

Conclusions

- Results provide **quantitative & spatially explicit** information on important livelihood activities for food availability

Conclusions

- Results provide **quantitative & spatially explicit** information on important livelihood activities for food availability
- Heterogeneity of households reflected in large local variability of food availability
- While key crops (e.g. banana) showed clear spatial patterns, livestock (e.g. cattle) varied more locally than across areas

Conclusions

- Results provide **quantitative & spatially explicit** information on important livelihood activities for food availability
- Heterogeneity of households reflected in large local variability of food availability
- While key crops (e.g. banana) showed clear spatial patterns, livestock (e.g. cattle) varied more locally than across areas
- Framework can provide **basis for further analyses to identify vulnerability** of regions and households to climate change and enables to quantify (vulnerable) target groups

Questions?

Contact:

jannike.wichern@wur.nl

Wichern et al. (subm.): Bringing food availability to scale: Mapping livelihood activities for household food availability across Uganda. Submitted to Agriculture, Ecosystems & Environment

Wichern et al. (2017): Food Availability and Livelihood Strategies among Rural Households across Uganda. Food Security (accepted)



Spatially continuous environmental variables

Spatial variable	Source
Bioclimatic variables (mean annual temperature, annual rainfall, temperature range, rainfall variability)	WorldClim (Hijmans et al. 2005)
Length of growing period	HarvestChoice (2015a, 2015b)
Altitude (digital elevation model)	Jarvis et al. 2008
Human population density	Worldpop (2015)
Market access (travel time to nearest town of +50.000 inhabitants)	Nelson (2008)
Soil carbon stock	AfSIS (Hengl 2015)