Achieving mitigation through adaptation: climate smart livestock solutions in Southern Africa

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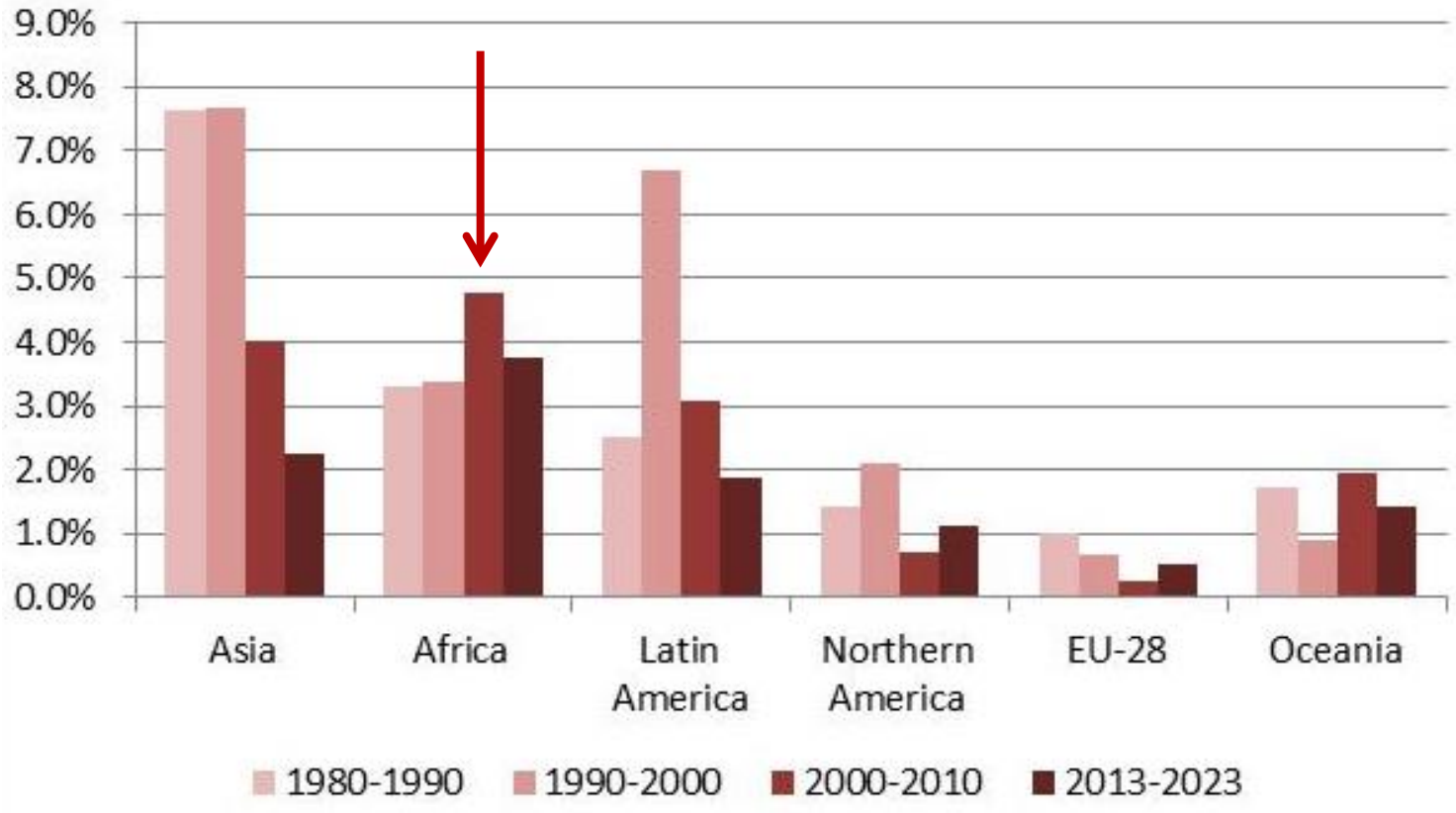
An FAO multi disciplinary project “Building the basis for scaling up Climate Smart Agriculture in Southern Africa”

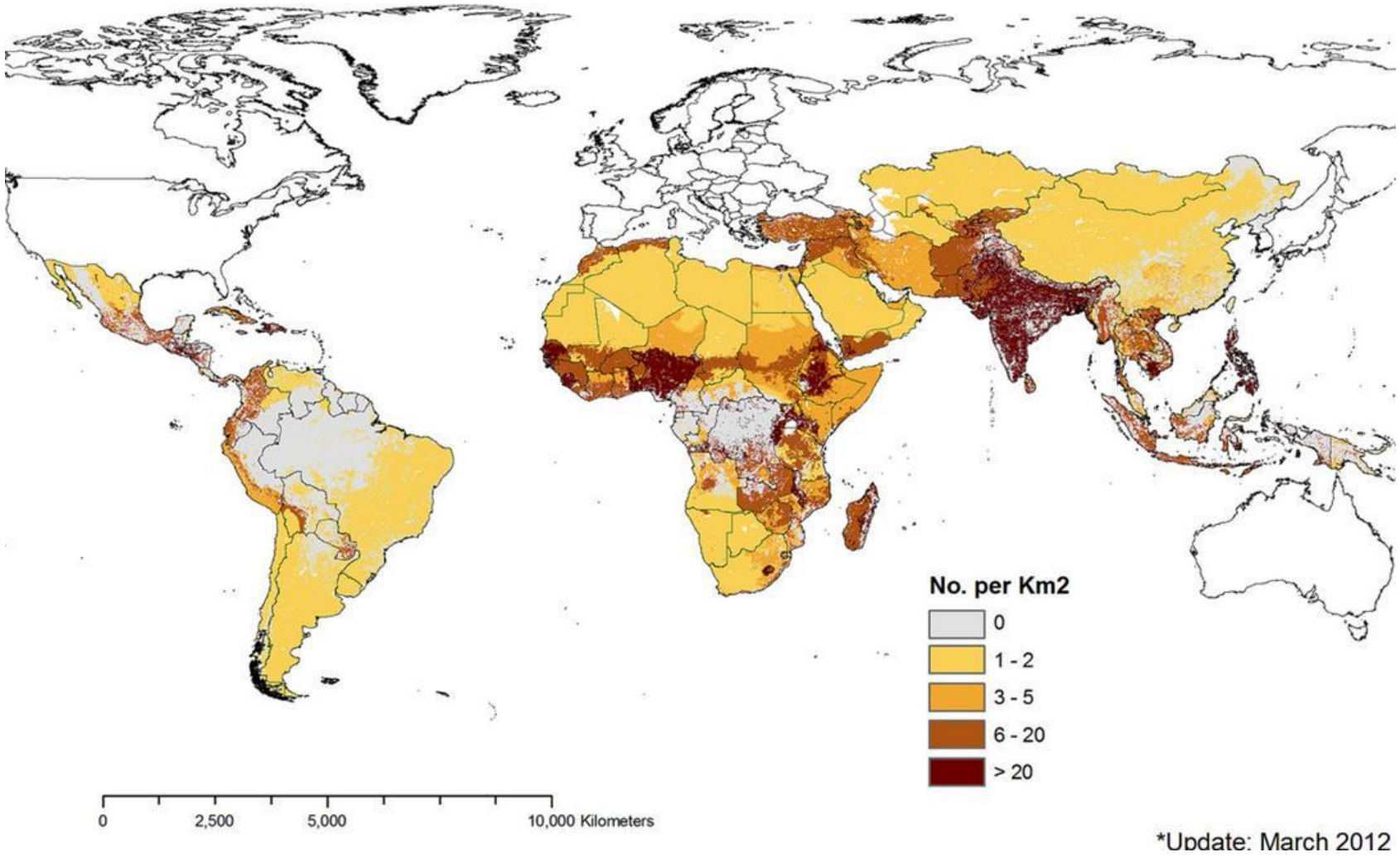
In Southern Africa, demand for animal products will double between 2006 and 2050

- Need to increase production and/or imports
- Role of livestock in food security and nutrition, income and livelihood for millions of smallholders is growing



Annual meat consumption growth rate
Source: FAOSTAT & FAO-OECD Agricultural Outlook

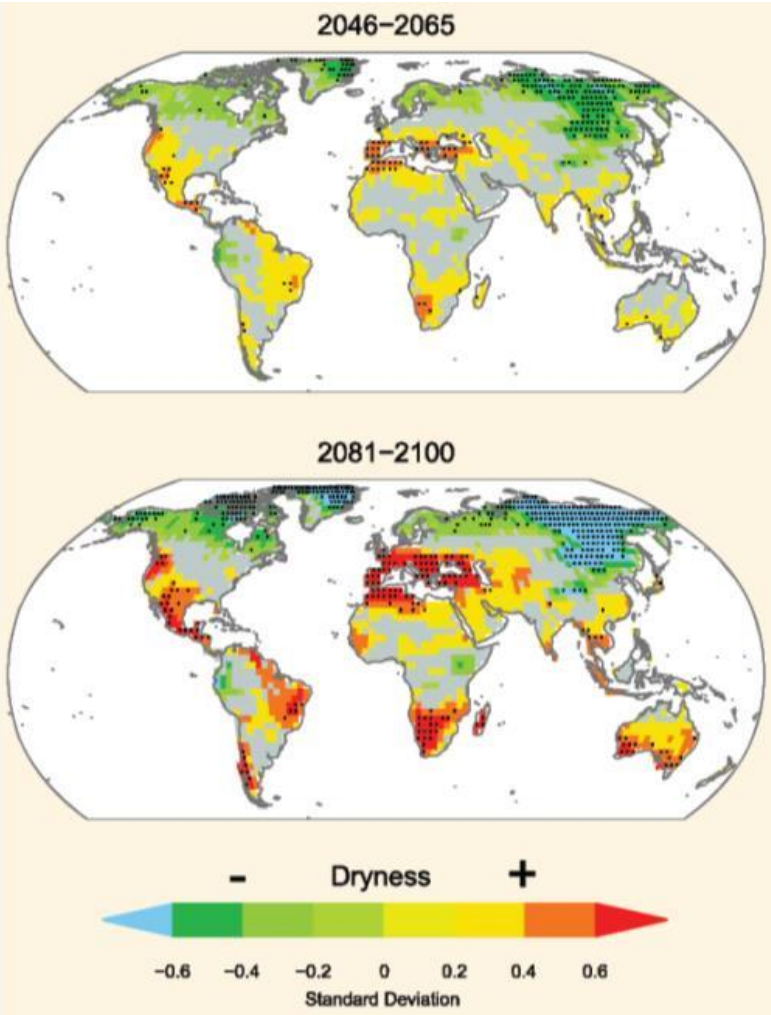
Density of poor livestock keepers



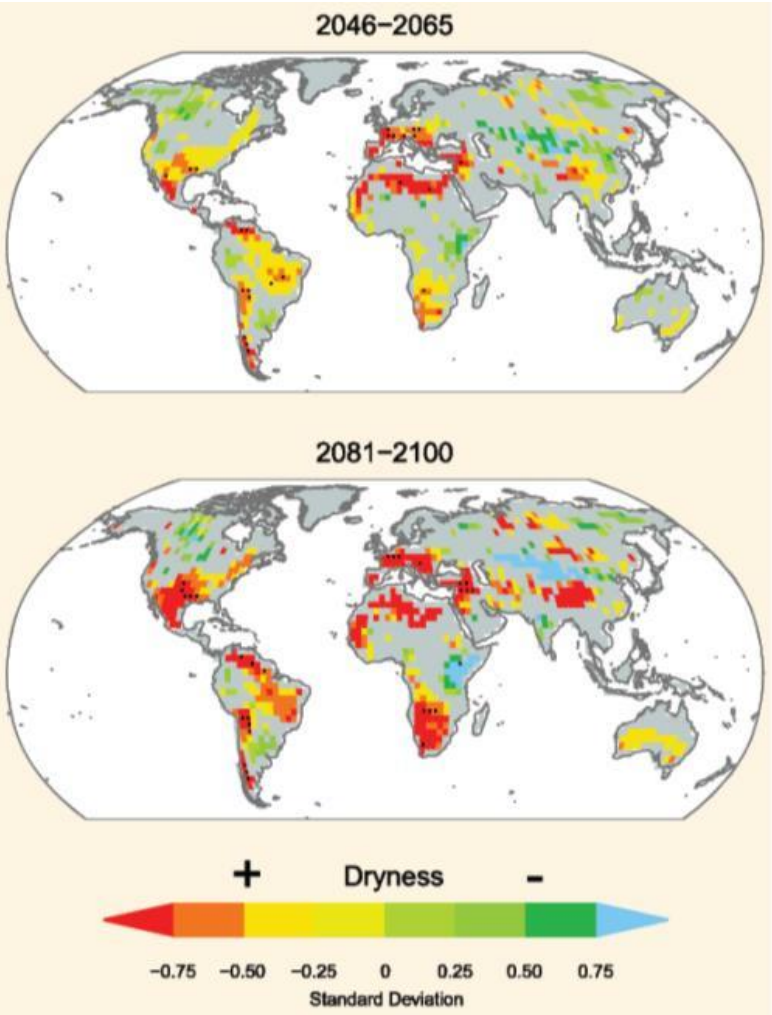
- 45% of Zambian population malnourished
- 5.1 millions of poor livestock keepers in Zambia

Source: ILRI

Consecutive dry days



Low soil moisture



Extreme drought events in the future

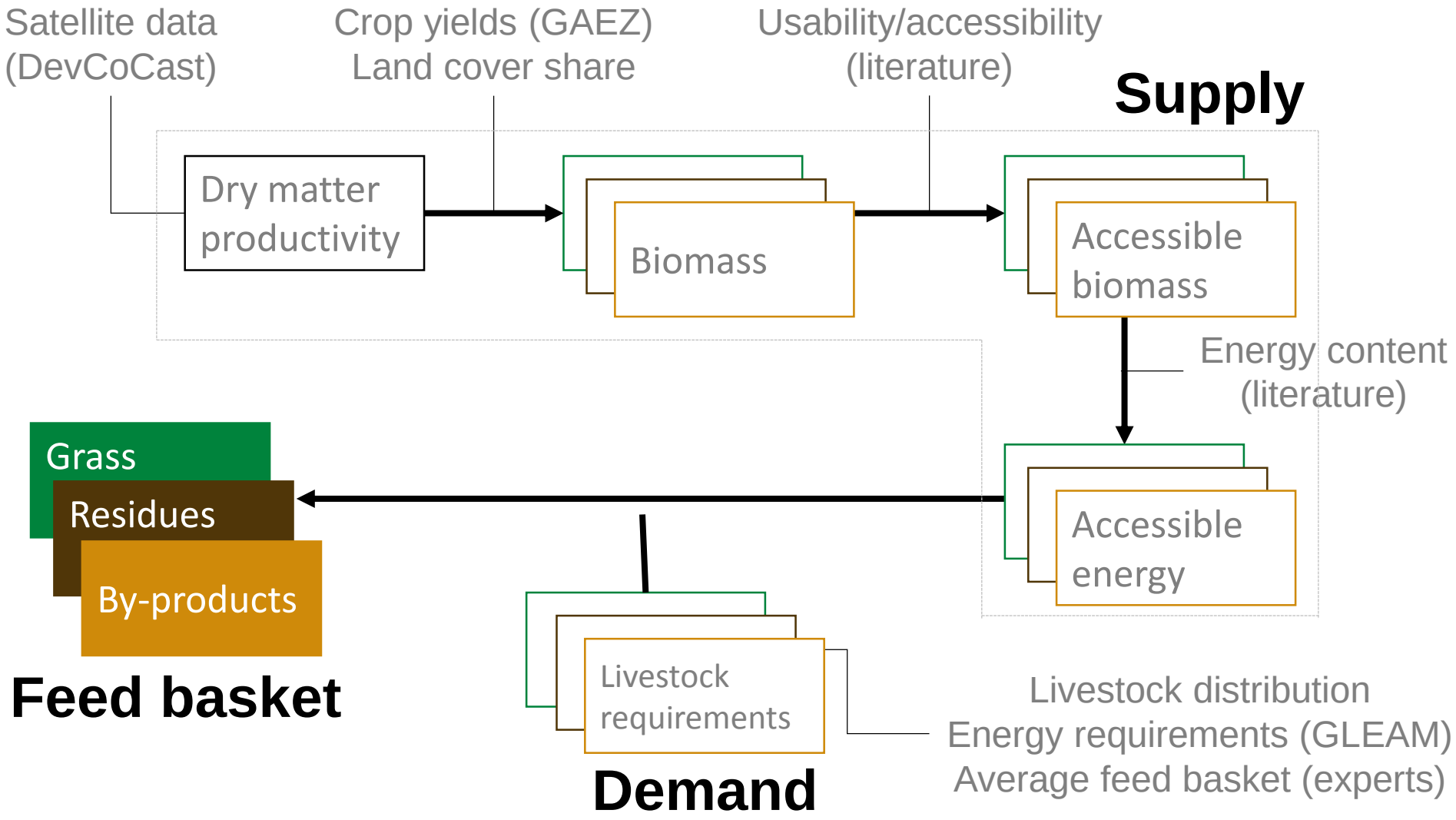
- Most exposed region: recurring draughts affecting agricultural yields and forage availability and change in rainfall patterns
- Strong focus on adaptation, but generally exclude livestock except emergency types of response (early warning systems and disease control)
- Priority not given to livestock in Zambia and Malawi despite high potential

Source: IPCC, Special Report on Extreme Events, 2011

Questions

- What is the role of livestock in building resilience in Southern Africa? The example of Zambia
- Can interventions aiming to improve production and reduce variability also decrease GHG emissions?
- How can we support policy makers in addressing adaptation and mitigation issues through livestock?

Approach - (1) calculating feed baskets



Method– scenarios 2012-2030

Vegetation (supply)

2012-2030 scenarios

- Baseline
- Drought

Livestock (demand)

Improvement options

- Animal husbandry & health
- Feeding practices (improved grasslands and replacement of part of the CR)

Production

Cow milk, beef and goat meat

Adaptation

Transmission of inter-annual variability from biomass to animal products

Mitigation

GHG emissions and emission intensity

Approach – seasonality

Vegetation (supply)

- Crops: all grown in humid season (except wheat)
- Grass: lower growth and energy content in dry season

Livestock (demand)

- By products: used in both season
- Crop residues: only used in the dry season
- Grass: lower requirements in dry season (weight and yield losses)

Approach – (2) impact on incomes

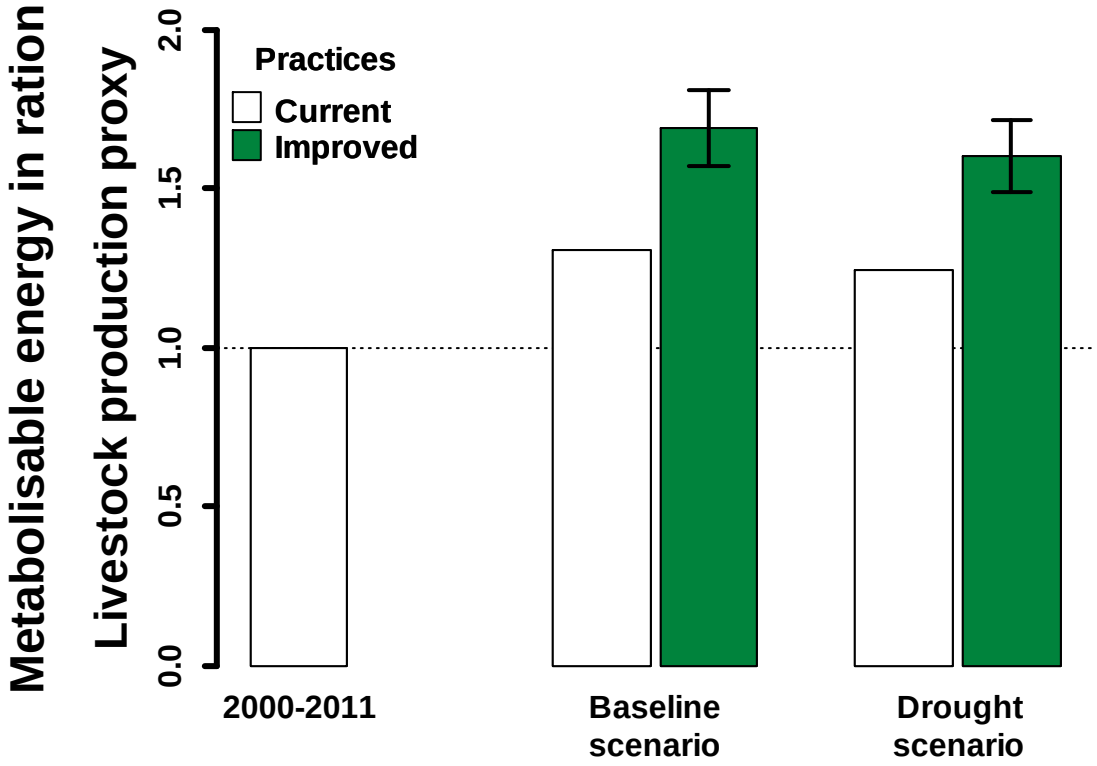
- Large-scale household panel data from the Zambian Rural Agriculture Livelihoods Survey (CSO, 2012). 2011/2012 cropping season, 8279 farms.
- No time series available : variability among districts
- Climatic variables to determine if 2011/2012 had been a dry year for the farms, compared with the previous 10 years: historical rainfall data from the Africa Rainfall Climatology version 2 (ARC2) of the National Oceanic and Atmospheric Administration's Climate Prediction Center (NOAA-CPC).

Results - Production

- Sector growth: +24-30% production compared to 2000-2011

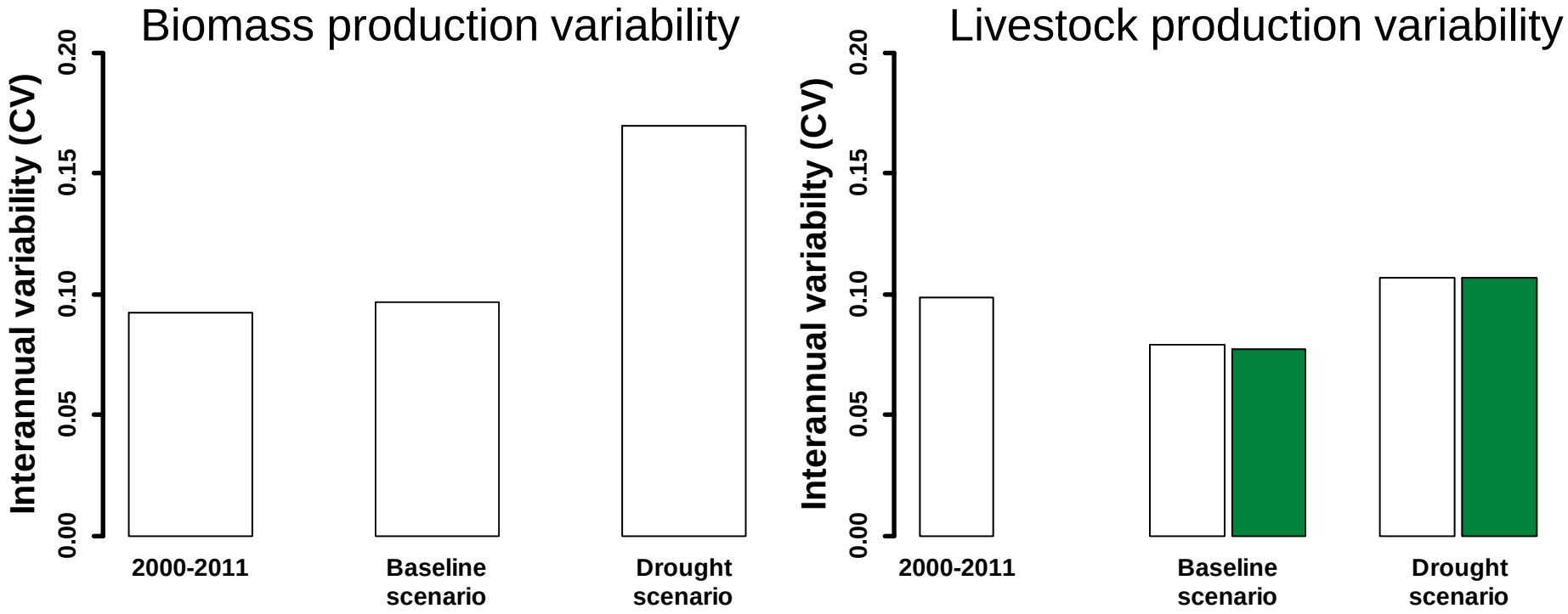
- Improved practices: +57-80% in the baseline scenario,

+49-71% in the drought scenario



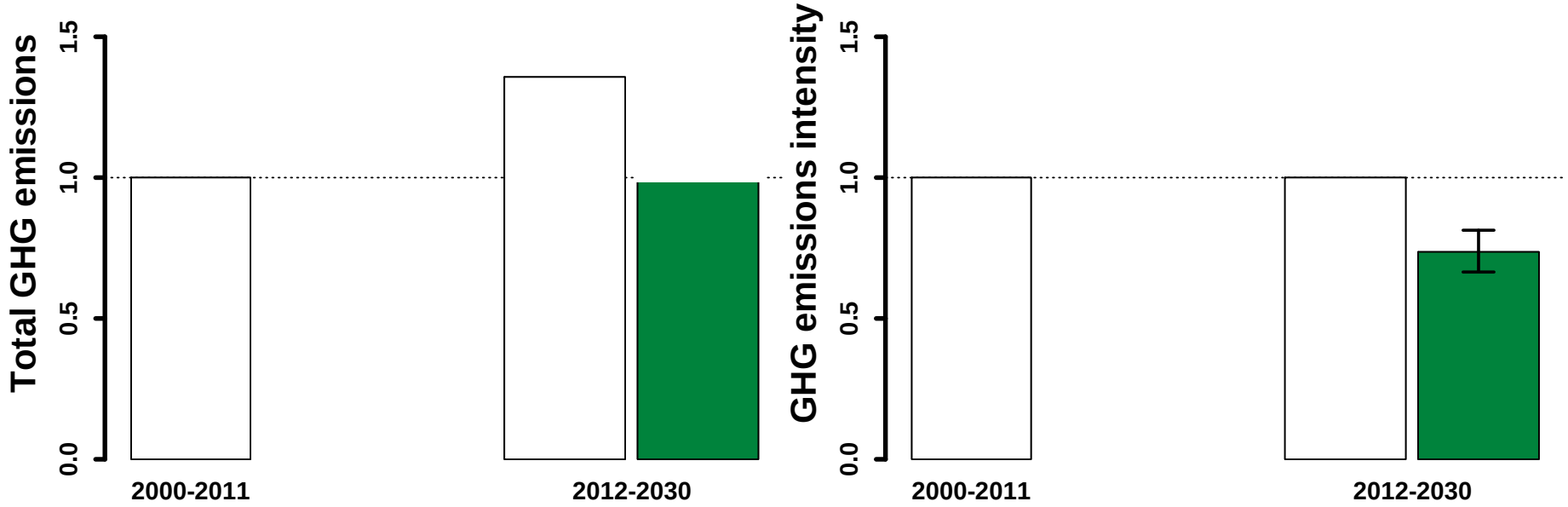
Results - Adaptation

- Lower variability of livestock production compared to biomass availability, especially in the drought scenario
- More reduction when including market stratification as improvement



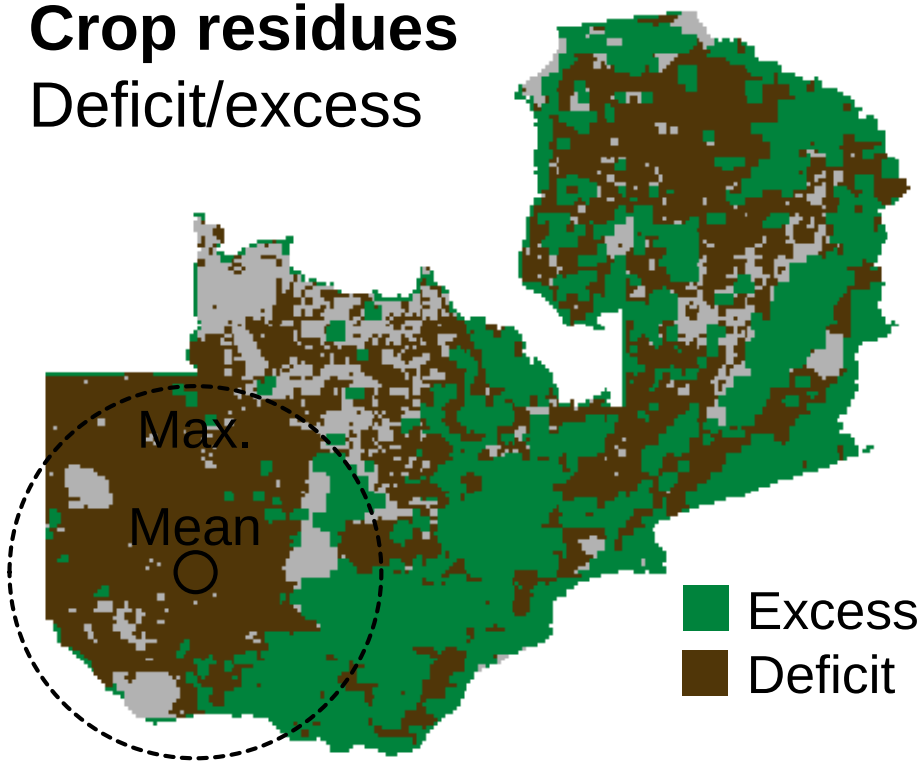
Results – Mitigation

- Emission intensities reduced through improvements options
- Absolute direct emissions increase due to sector's growth and interventions reducing mortality
- When accounting for C sequestration in pastures through legume sowing and stocking rates adjustments (Henderson et al, 2015), absolute emissions reduced by 25 to 31%

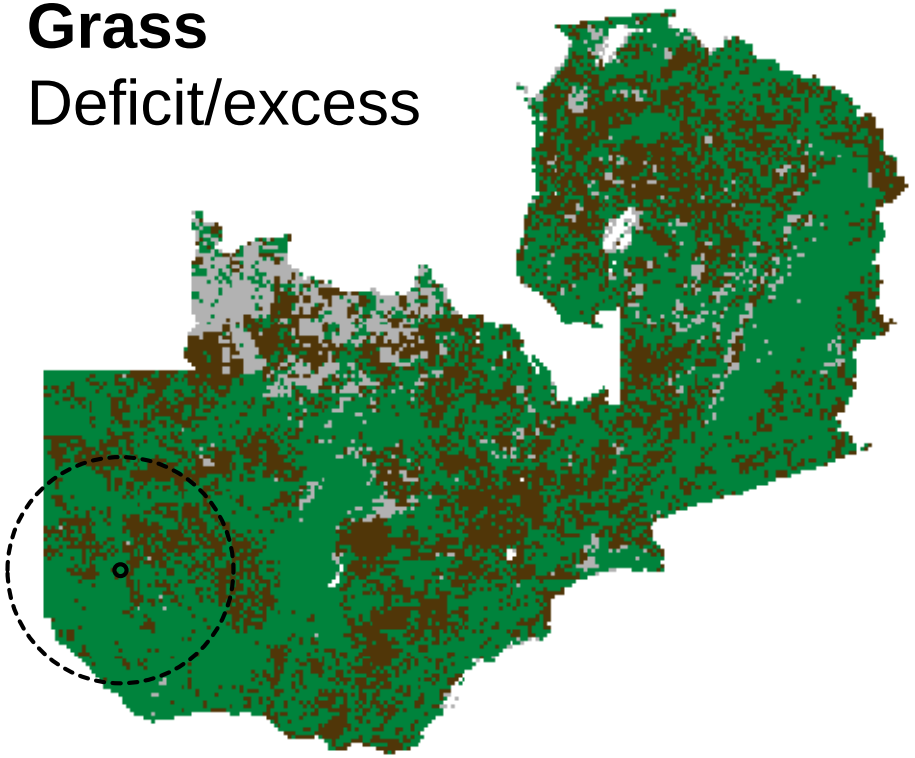


Feed balance for residues and grass (dry season)

Crop residues
Deficit/excess



Grass
Deficit/excess



- Higher deficit for crop residues than for grass
- Higher distance to cover to fill deficit in crop residues

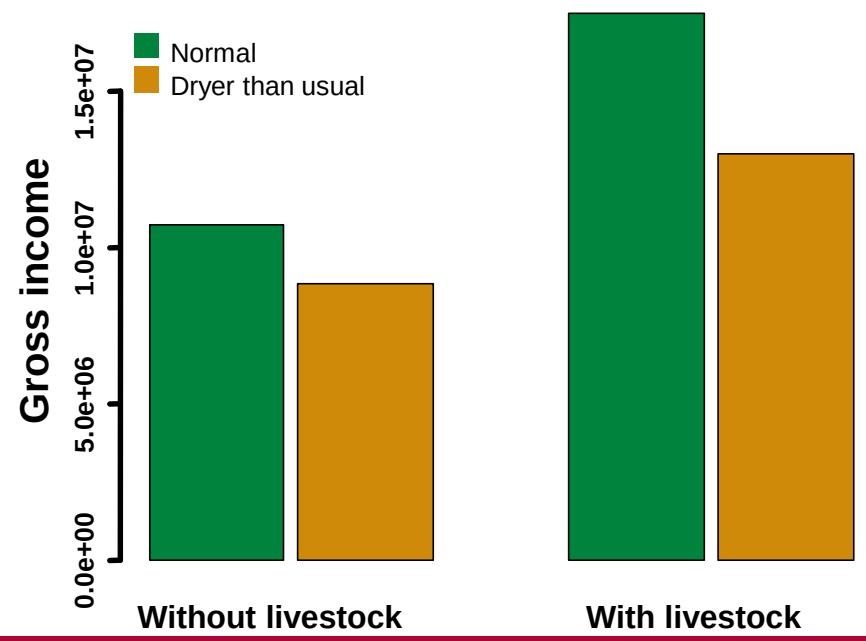
○ 31 km

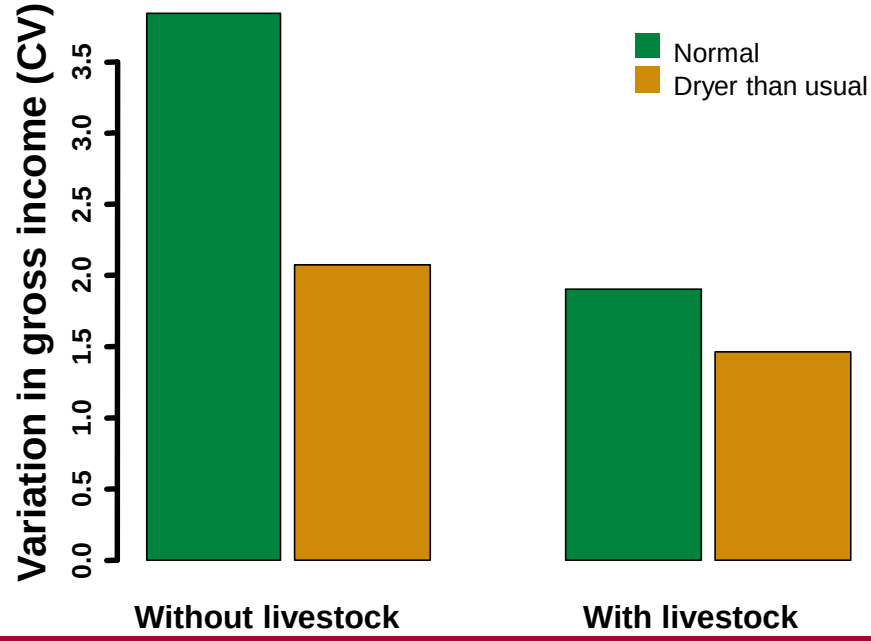
8 km ∘

Average distance to cover to fill deficit

Livestock effect on income and its variability

- Higher income in farms with livestock, including in dry years
- Lower income variation across farms, in farms with livestock





Methods and data caveats

- Scare livestock technical performance data
- Inexistent data on natural vegetation accessibility for animal feed
- Partial knowledge on animal mobility
- Scarce information on characterization of feed resources and their quality
- Inexact livestock numbers official statistics

Next steps:

- Work with newest income survey 2014-2015
- Integrate climate scenarios and their effects on natural biomass productivity
- Upscale Zambian and Malawi case studies at regional level

Policy implications and conclusions

- Improving feed digestibility: need extension and to address possible competition and improved availability of legume seeds (currently only velvet beans and lablab)
- Improving animal husbandry and animal health: need extension
- Improve grassland management: access to land and tenure systems. Limited investments needed but capacity development on grassland restoration, rotational grazing and grazing planning required.
- Livestock buffers variability in climate and available biomass, which results in more stable food production and income.
- Most climate research in Sub-Saharan Africa focuses on adaptation needs, but interventions in the livestock sector can also yield significant mitigation while contributing to increase productivity.

→ **We cannot separate adaptation and mitigation**

Thank you!