

Climate Change and Rangeland Degradation in Eastern Sudan

Which Adaptation Strategy Works Well?

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Based on Chapter 21 of Springer Book “Nile River Basin: Ecohydrological Challenges, Climate Change and Hydropolitics”, By Assefa Melesse, Wossenu Abteu, Shimelis Gebriye Setegn.

The chapter is coauthored by Hussein M. Sulieman.

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- Pastoralists' adaptation and coping strategies to CC,
- Conclusions.

Threats to Pastoralism (1/2)

- Climate change has destructive impacts on many sectors, they cannot be totally avoided,
- Hence, adaptation to climate change remains an indispensable option,
- In east Africa, pastoralists' decades-long applied measures to help them coping with CC,
- Recently, they face a number of challenges that hinder their way of life and ↓ their ability to adapt to changes in their external environment,
- (Watkinson and Ormerod, 2001; Oxfam, 2008; El Hadary et al. 2012; Sulieman and Elagib, 2012).

Threats to Pastoralism (2/2)

- Are pastoralist communities marginalized? (geographical remoteness, ethnicity, and livelihood),
- Outmoded lifestyle? Needs replacing with “modern” livelihood systems? (Ahmed 2008; Oxfam 2008; Sulieman 2013),
- In Gadarif State of Sudan, pastoralism has been declining (mechanized agriculture, population growth, and other human activities),
- Shifted to areas with marginal primary productivity (Shazali and Ahmed 1999; Sulieman 2013).
- Are pastoralists aware of their traditional land rights and basic services? (Oxfam, 2008).

Pastoralists and Climate Change (1/2)

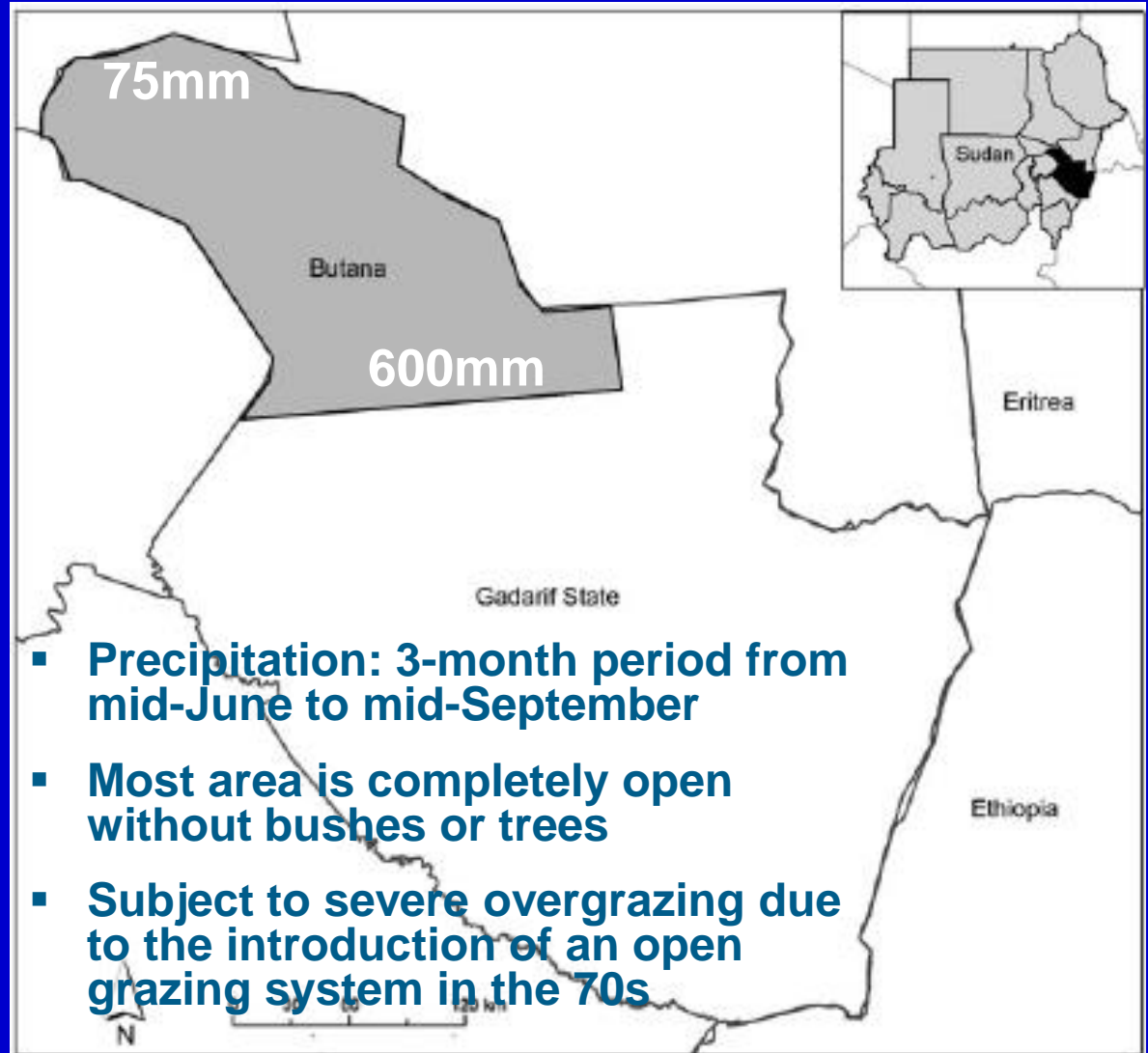
- Widespread consensus that climatic conditions are changing, regardless of the cause,
- Changes may continue, may become more apparent, or may happen more rapidly (Christensen et al. 2007),
- The rate of change is expected to accelerate beyond what modern humans have experienced (Williams and Jackson 2007),
- Hence, evaluation of local pastoralists' adaptation measures remains an imperative issue,

Pastoralists and Climate Change (2/2)

- CC is global in scale, adaptive strategies are local or regional in nature and must consider the ecological, social, and economic drivers (IPCC, 2001),
- Adaptation varies across sectors, individuals, communities, locations and across participants (Smit et al., 2001),
- The way that CC is perceived locally determines the formulated strategies to cope with in the short run and to adapt to in the long run (Deressa et al. 2011),
- This study discusses local perceptions and possible local adaptation measures applied in eastern Sudan.

Study Area

- Gadarif State
- The Butana area
- Good pasture area
- Excellent grassland vegetation
- Rainfall variations



Data and Methods

- Household survey (206 randomly selected pastoralists' households),
- From 13 villages in the Butana area, in April 2013,
- Respondents selected with the assistance of local leaders,
- Wide range of data: demographic, herd composition, people's perceptions of RD and CC, and adaptation as well as constraints to adaptation.

Selected Findings

Demographic Indicators

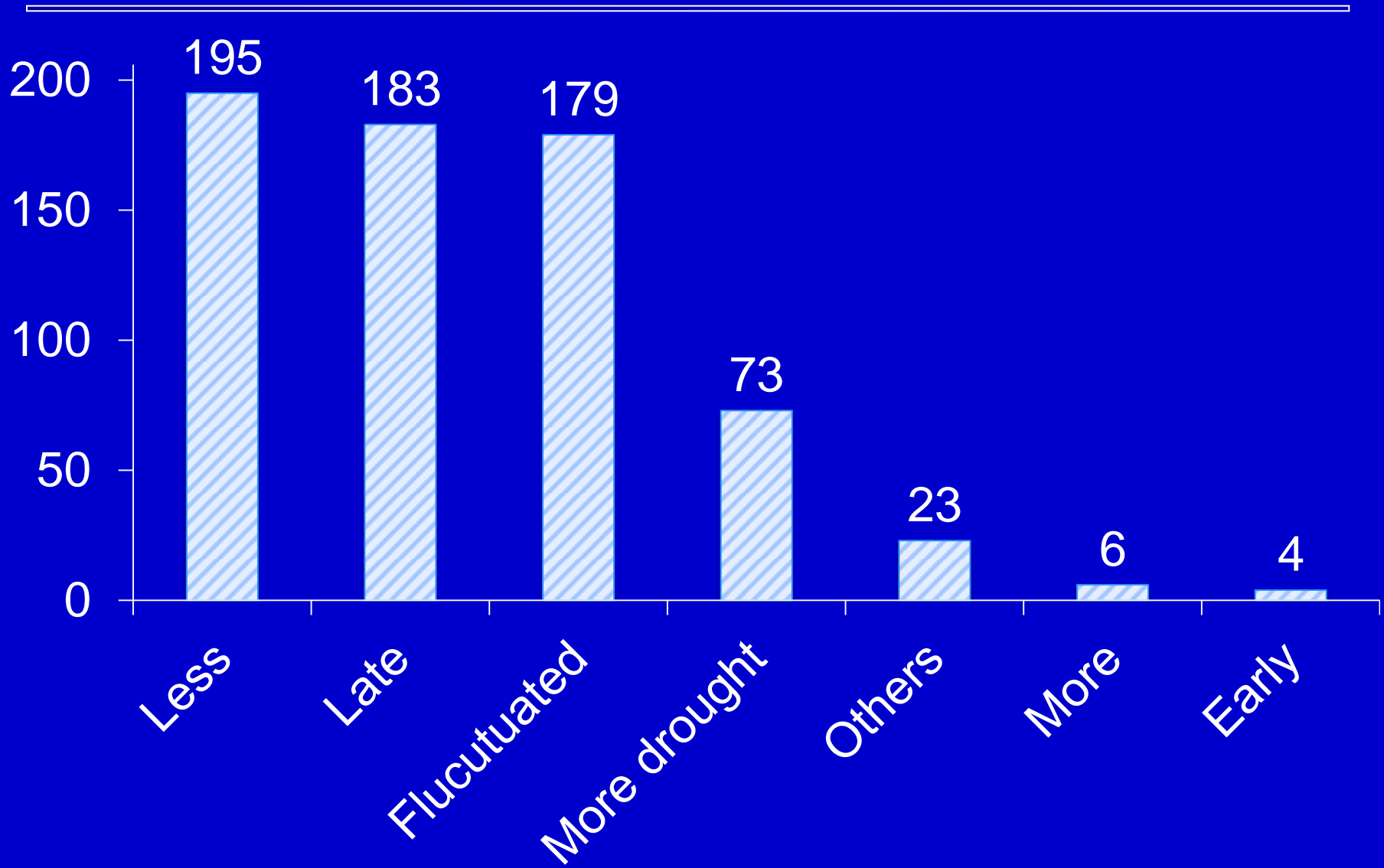
Demographic Indicators

- Gender: 165 (80%) are male; 41 (20%) are female,
- Age: 14 to 90 years, average age 43 years,
- Average household members: 6.5,
- HHs with large sizes have enough labor to take up adaptation measures in response to CC,
- All households were headed by males,
- Education: 87 (42%) were illiterate; lack of influence on decisions impacting their system (Sulieman, 2013),
- 68 (33%) attained primary school level education.

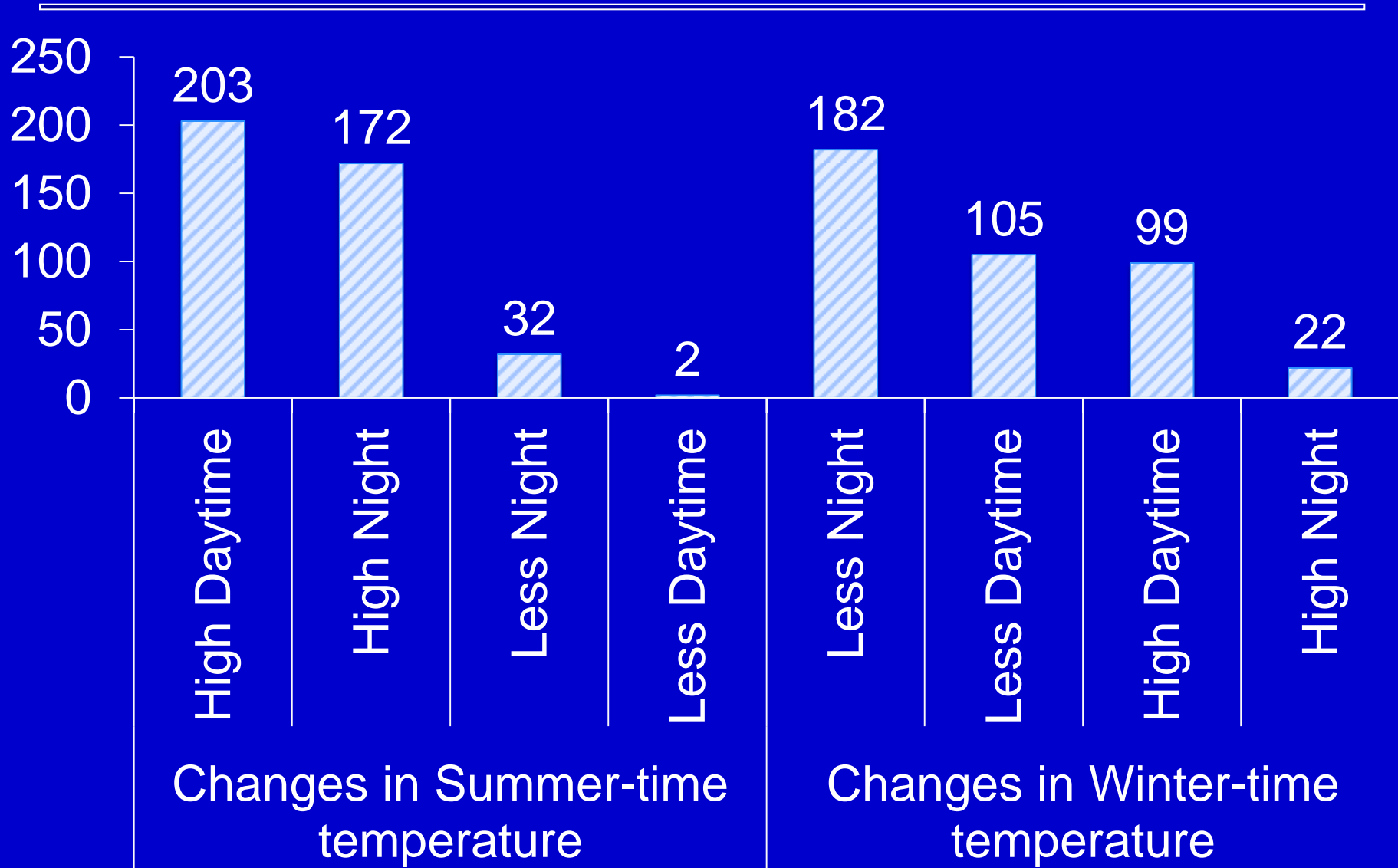
Selected Findings

Perception to changes in main climate parameters

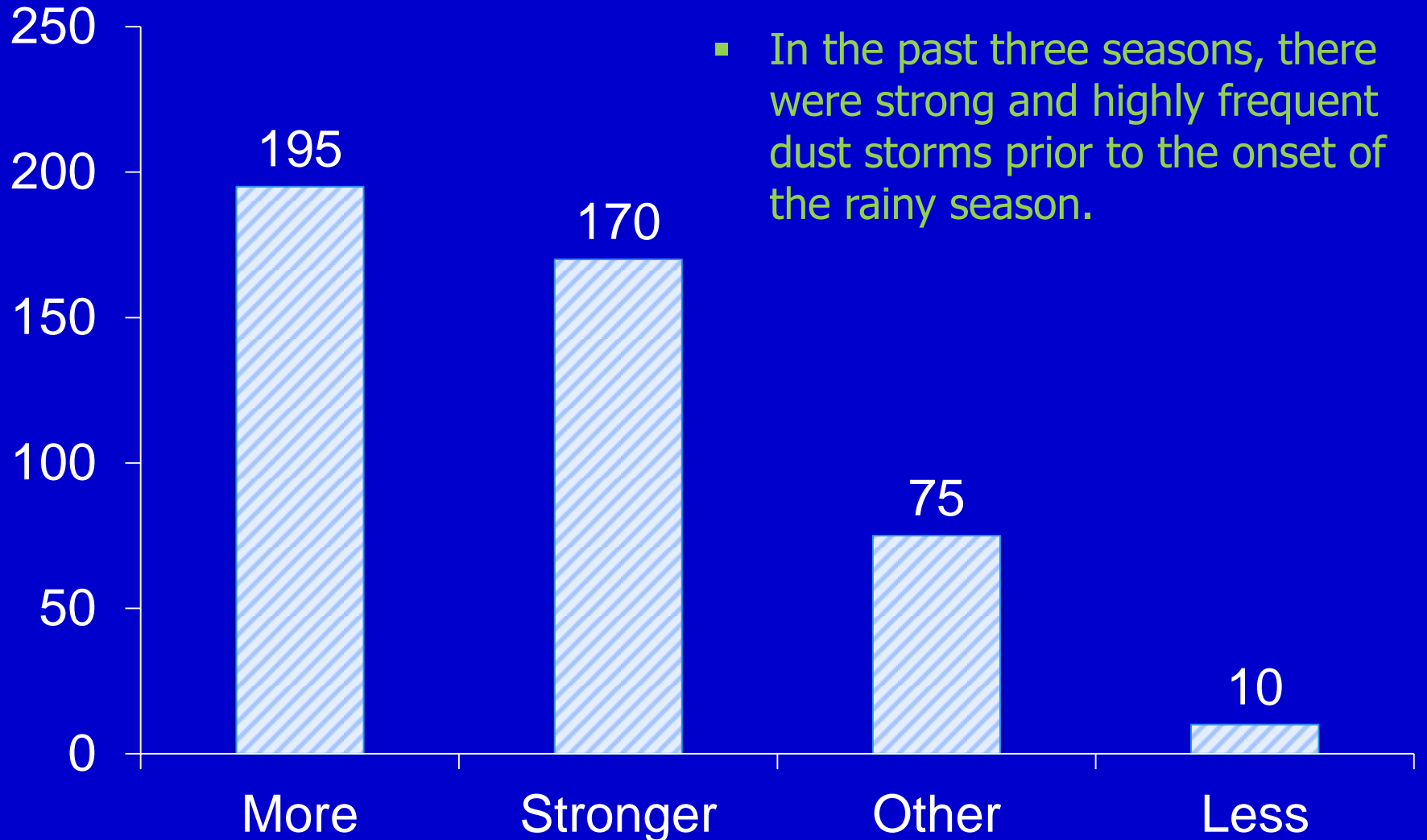
Changes in rainfall pattern in the last decade



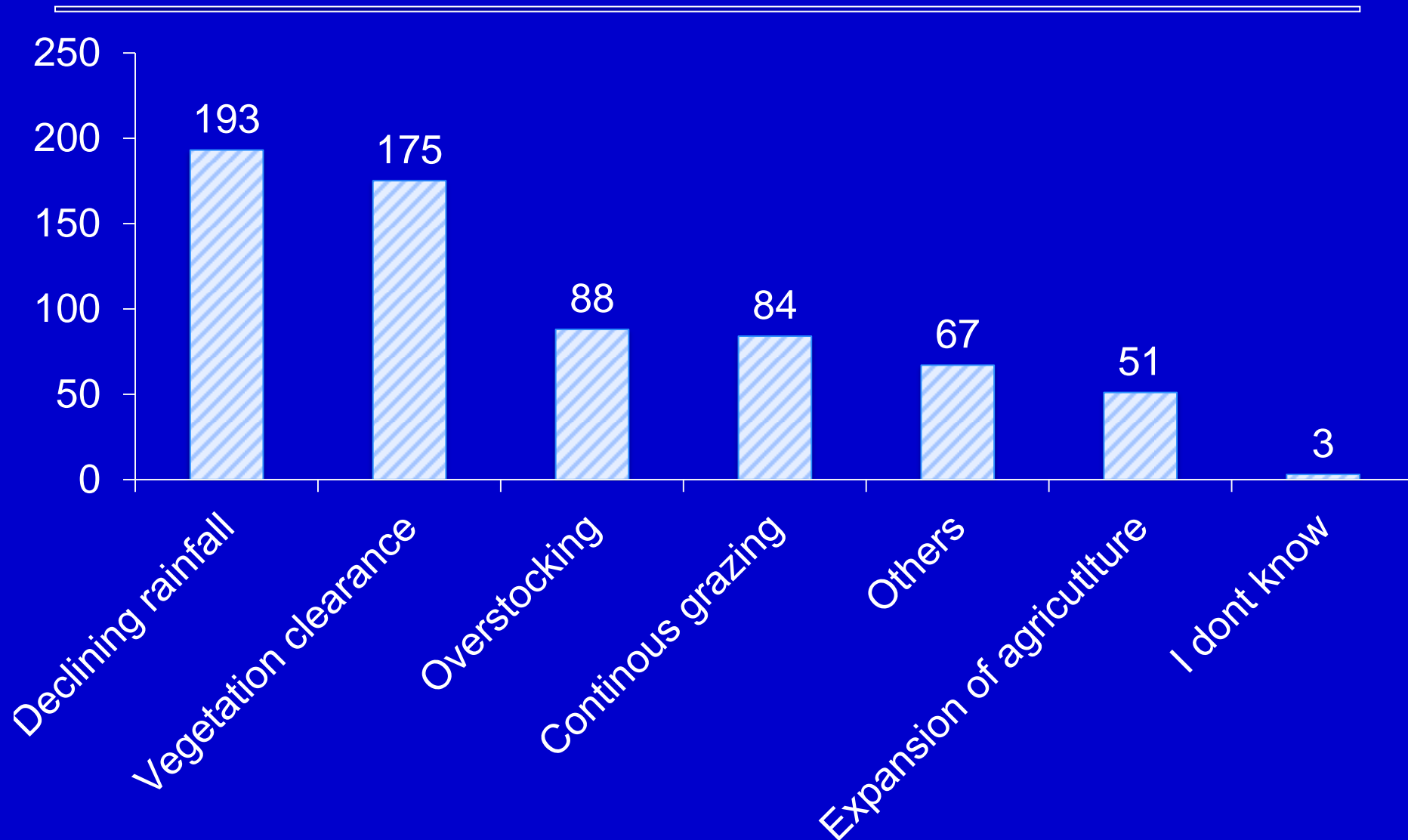
Changes in temperature during the last decade



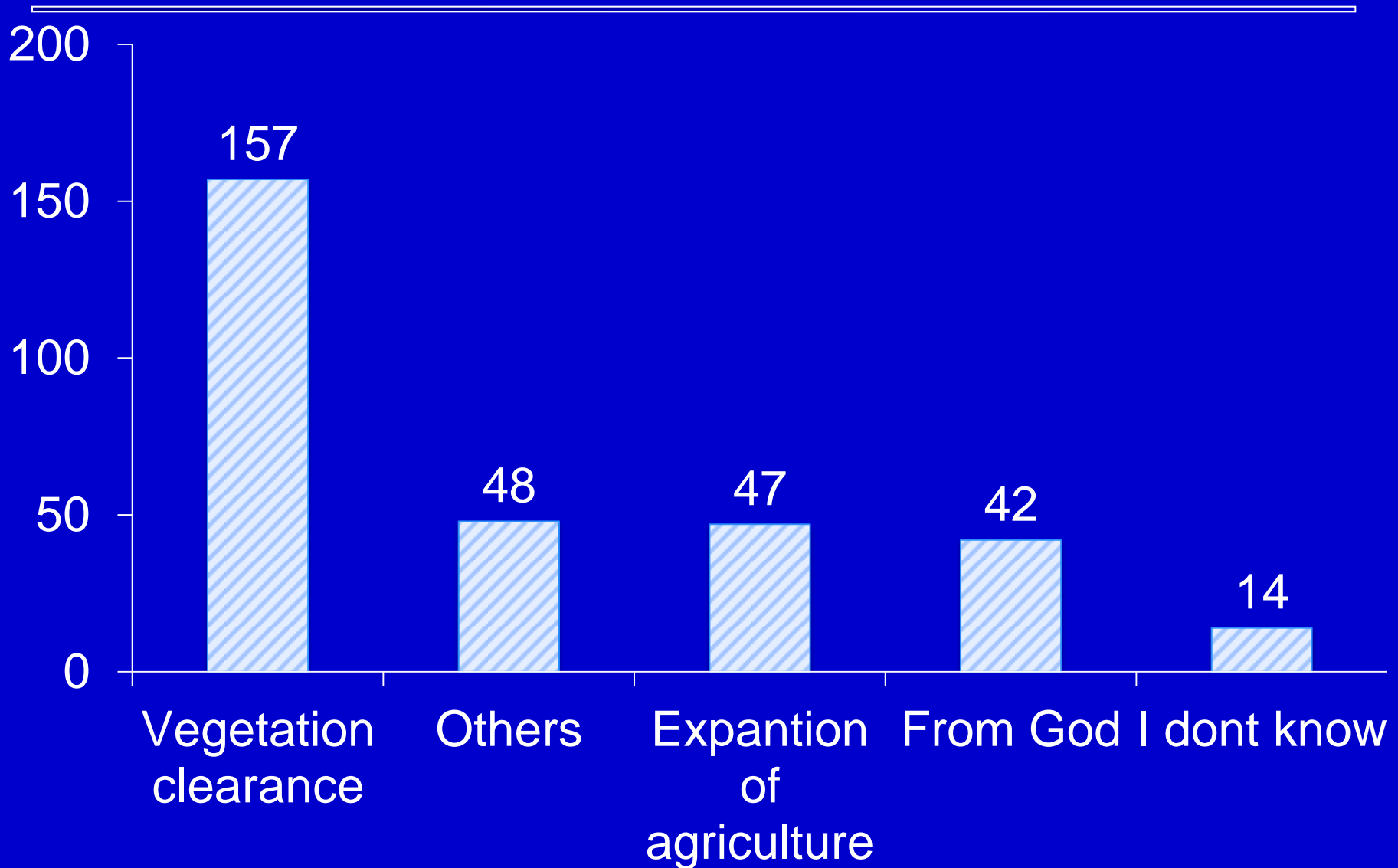
Changes in wind speed and frequency during the last decade



Drivers of rangeland degradation



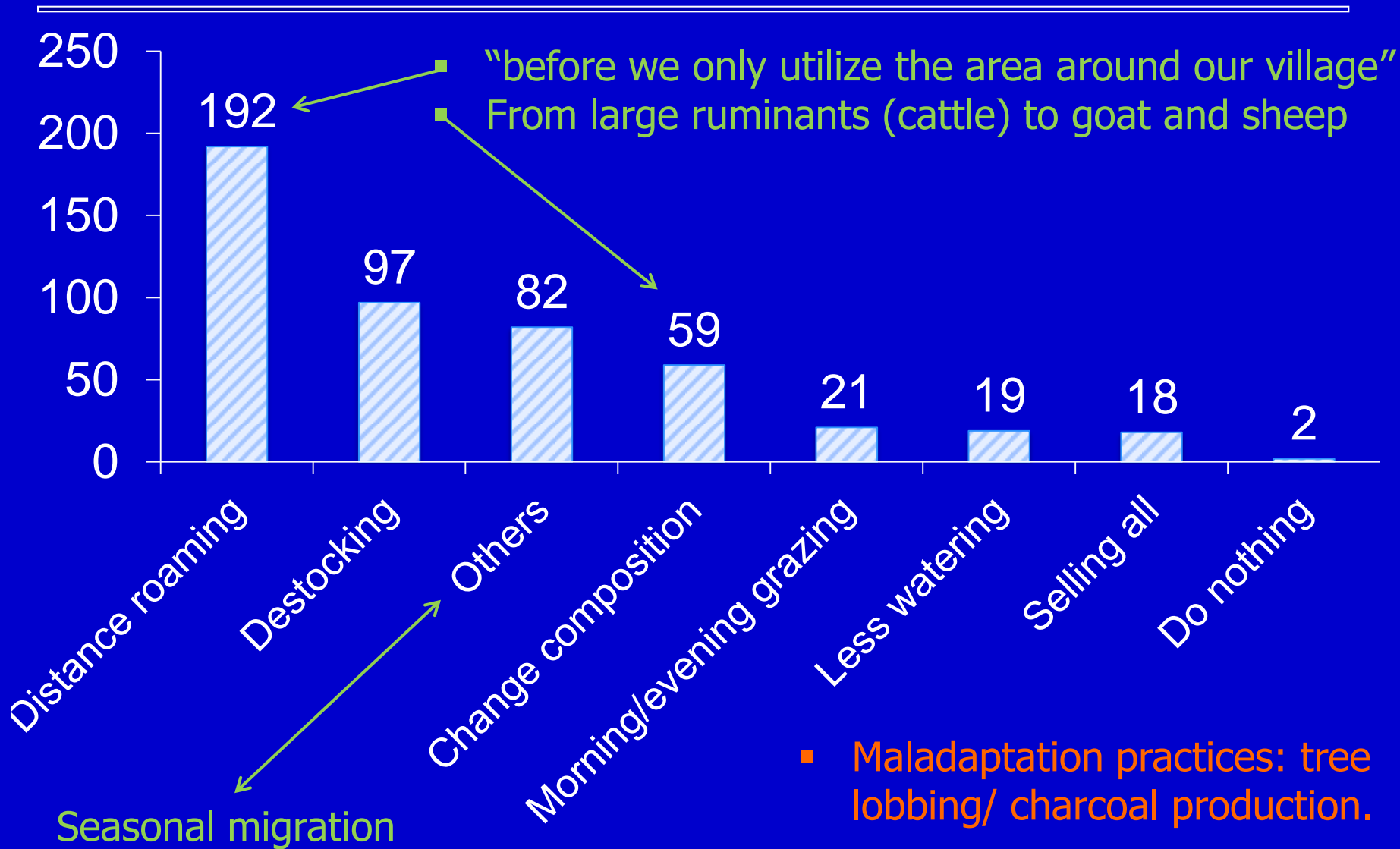
Drivers of climate change



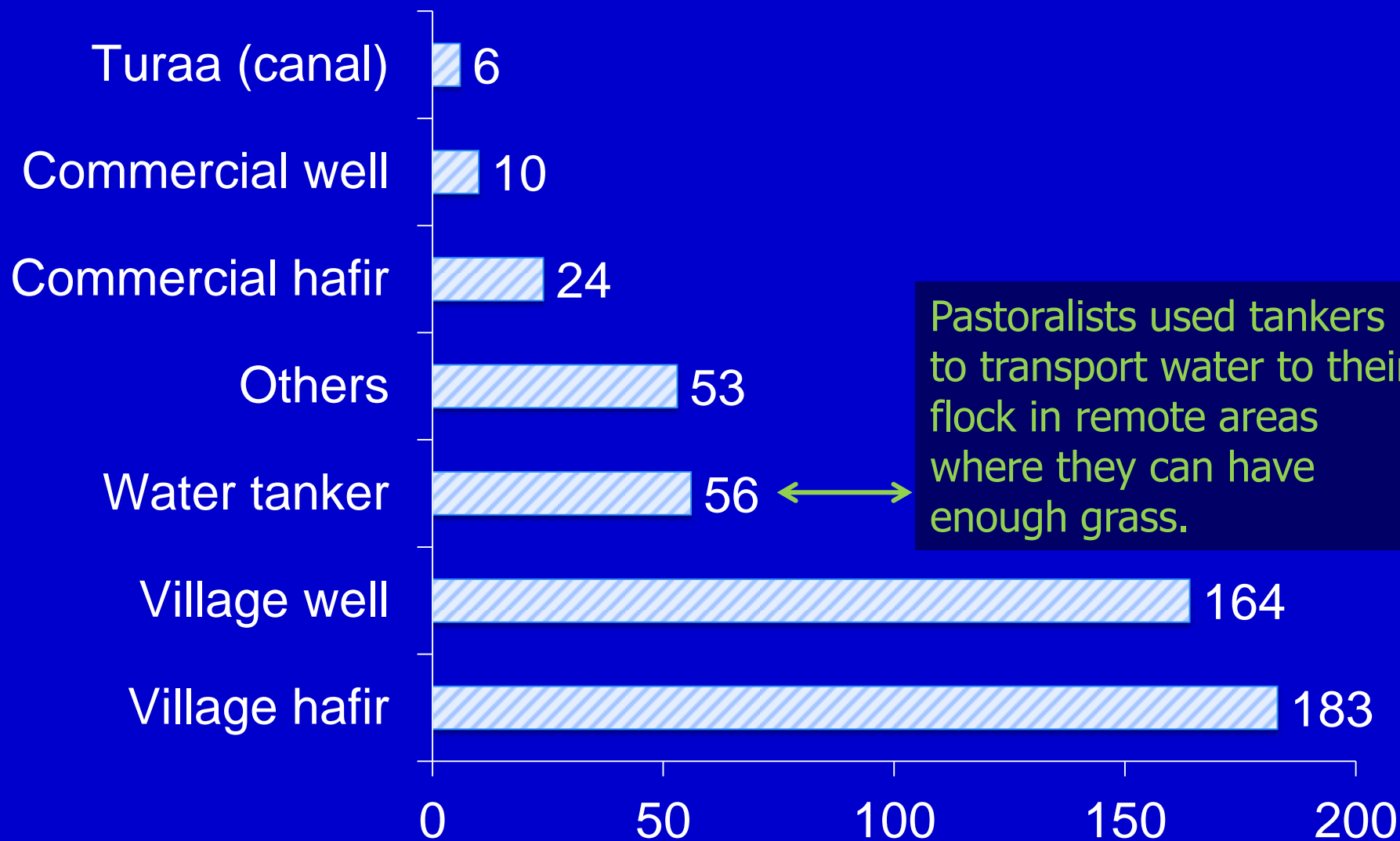
Selected Findings

Adaptation Measures

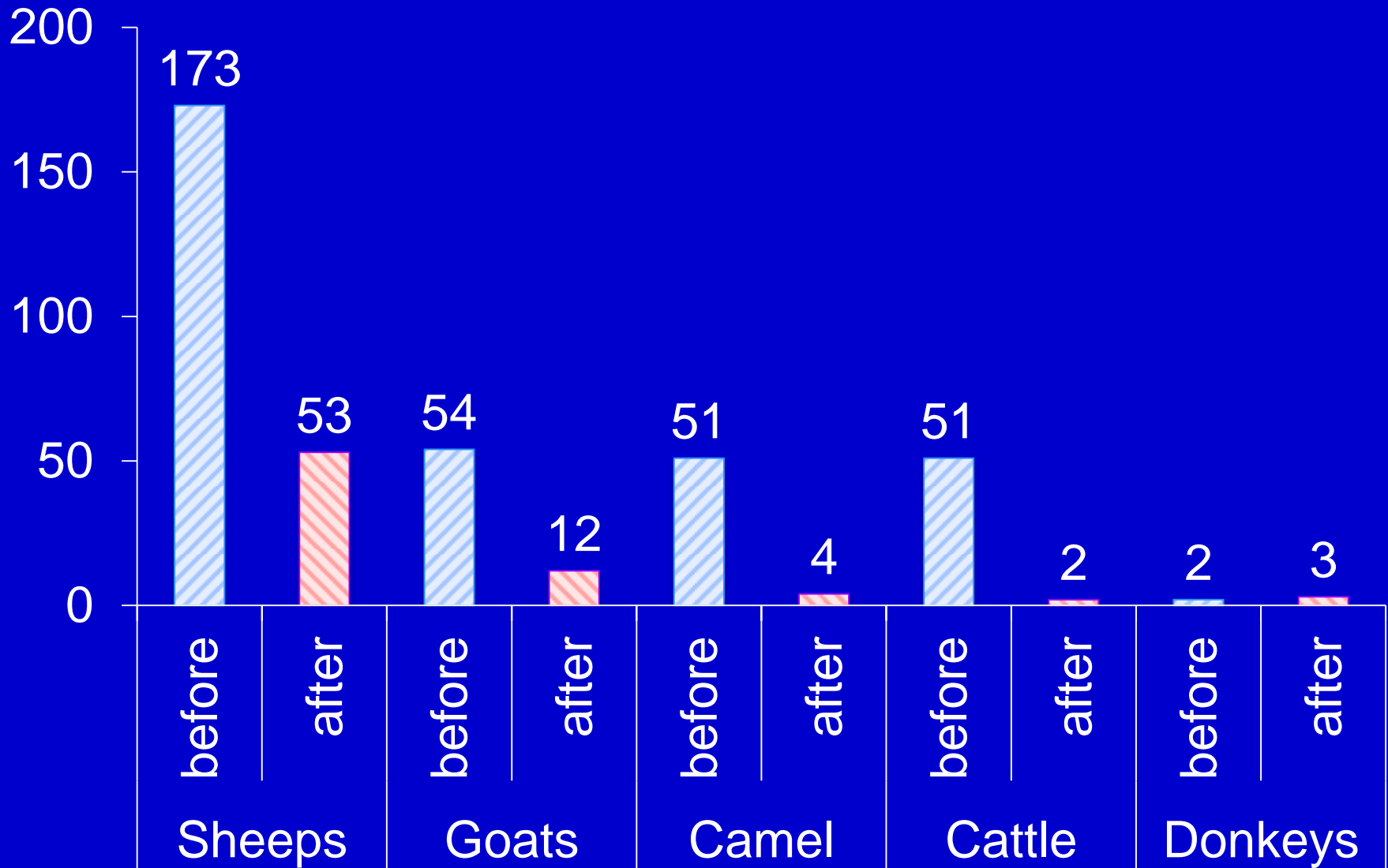
Pastoralists' adaptation measures to cope with climate change



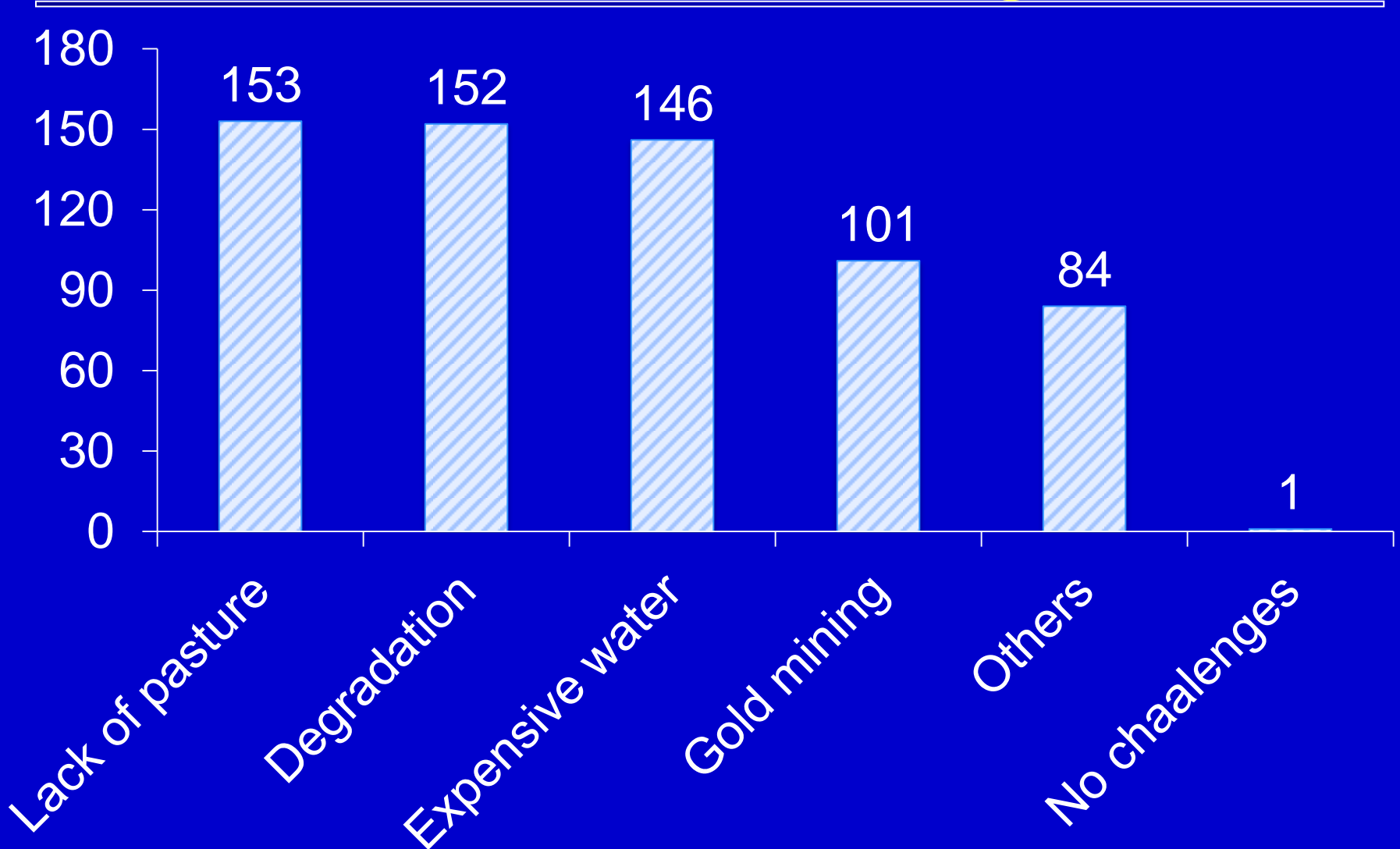
Main watering sources for livestock



Average number of livestock per household before and after adaptation



Challenges facing pastoralists in the face of climate change



Challenges facing pastoralists in the face of climate change

- Pastoralists reported that competition over water has caused clashes between villagers and transhumance groups,
- Due to the observed CC (e.g., early drying of hafirs, rapid vegetation dry-up), such clashes may transform to local herder–villager conflicts,
- Grazing areas rendered accessible under dry conditions are normally controlled by specific groups such as farmers and villagers,
- They might not fully accept opening it to all herders
↔ unclear property rights (Sulieman 2013).

Conclusions

Conclusions (1/2)

- The pastoral resources in the Butana region are under pressure from unwise human activities and CC,
- Pastoralists are forced to follow permutations of adaptation measures that led many small keepers to lose their livestock and others to leave the business altogether,
- The study assessed possible adaptation measures, initiatives, and strategies applied to face RD and CC,
- Destocking, changing herd composition, less watering frequency, changing grazing time, water transportation, and buying crop residue are applied,

Conclusions (2/2)

- Pastoralists' perception to climate change is in accordance with meteorological observations,
- Some applied measures led to deplete households' assets,
- Pastoralists need to pay a high price for supplement forage and to water their flock,
- There is a significant drop in number of livestock heads owned by households,
- It is clear that the applied measures are not reducing their vulnerability to RD and CC.

Thank you...

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