



# **Climate change, land degradation and food security in the Sahel – The relevance of migration as adaptation strategy**

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Forschungszentrum

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## ■ Background

- Debate about migration as adaptation strategy to climate change

## ■ Results from empirical research in Mali and Senegal

- Research project „Migration, climate change and environment in the Sahel“ (micle)





# Background

## Debate on climate-induced migration

- Increasing interest in interactions between climate change, environment and migration
- Popular discourse about rising numbers of „environmental migrants“ or „climate refugees“
- Lack of reliable estimates of number of people moving as result of climate & environmental change
- Relevance of environmental factors & climate in migration decisions debated
- Migration as „option to avoid“, “adaptive/coping strategy“ or „agency“?



# Consensus in scientific debate

- Climate change & environmental stress can contribute to migration, but are usually not the root causes of migration
  - No deterministic relationship between environmental degradation and migration
  - Multi-causality and complex interactions between social, economic and ecological factors
  - Differentiation necessary
    - Rapid onset vs. slow-onset of environmental changes
    - forms of migration (temporary/permanent, short-term/long-term; internal/international etc.)
- ➔ Case studies required

# Project „migration, climate change & environment in the Sahel“ (micle)



Analysis of social-ecological conditions of population mobility in Mali and Senegal



## Cooperation partners

- ISOE – Institute for social-ecological research (Project coordination)
- Geographical Institute, University of Bayreuth



## Partners in Mali und Senegal

- Point Sud – Center for Research on Local Knowledge, Bamako, Mali
- LARTES – Laboratoire de Recherche sur les Transformations Economiques et Sociales, Université de Dakar, Senegal

Duration: September 2010 - April 2014



# Overall objective & research question of micle



- Analysis of interactions between climate change, land degradation and migration in Sahelian regions Senegal and Mali
  - Local population's perception and evaluation of climate and environmental changes
  - Motives for migration and migration patterns
  - Role of climate and environmental changes in migration decisions
- ➔ Inter- and transdisciplinary research approach





# Study Regions Linguère & Bandiagara



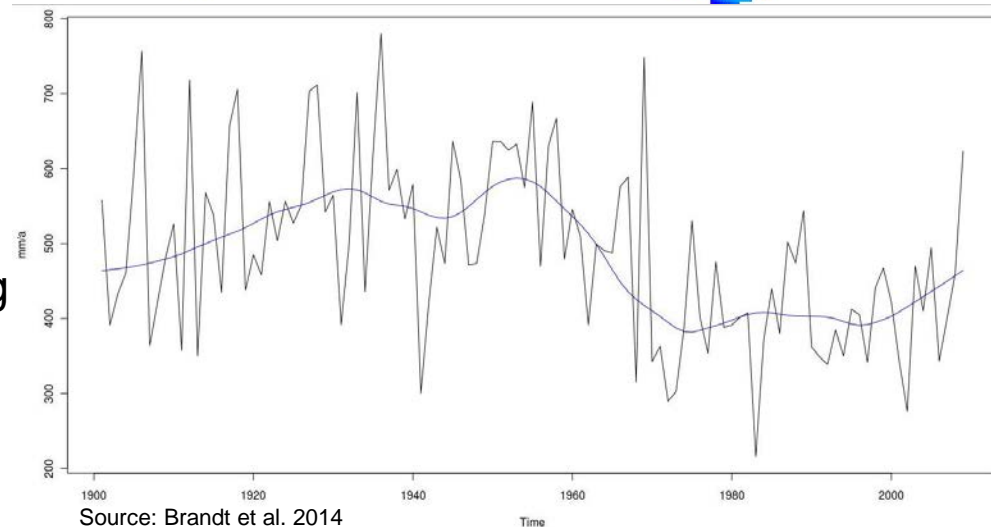
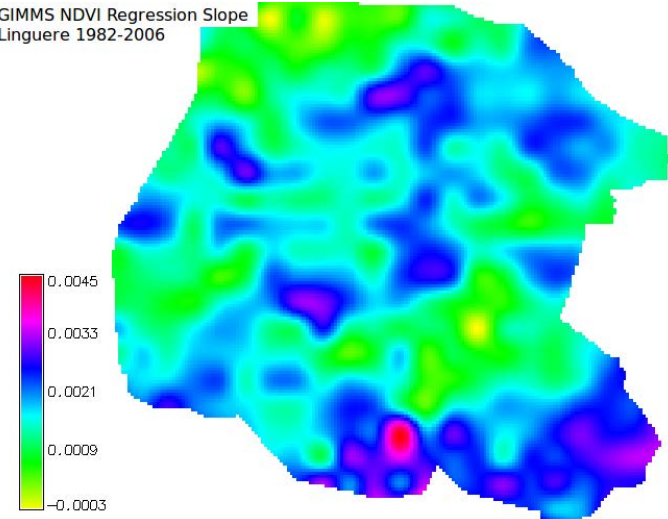
- High population mobility & migration deficit
- Increasing rainfall variability and land degradation

# Physio-geographical analysis – methods

*Temporal-spatial patterns of climate variability (temperature, precipitation) & vegetation changes*

- Comparison & evaluation of existing climate data and localization
- Long-term time series and high resolution time series
- Validation of changes with higher resolution systems (Landsat, Rapideye)
- On-site field work: Ground truthing interviews with local population

GIMMS NDVI Regression Slope  
Linguere 1982-2006



Source: Brandt et al. 2014





## Quantitative and qualitative methods

- Standardized survey (n=905) in the study regions (sending areas) and Bamako & Dakar (destinations)
- Multi-sited ethnography (ca. 120 qualitative interviews)
- Participatory observation



Source: van der Land 2012

# Environmental changes – land degradation and biodiversity



Degraded land area in Linguère, SN, Sept. 2012 (M. Brandt)



Field with high woody cover in Linguère, SN, Sept. 2012 (M. Brandt)

- Significant changes of flora, fauna and soils in rural study areas as result of climate change and human activities
- Increasing rainfall variability
- Decreasing diversity of tree species
- Anthropogenic factors significant factors for land degradation
- Co-existence of greening and degradation
- Positive trends: agro-forestry, reforestation

# Livelihoods and economic activities

- Agriculture most important activity in rural areas (67%)
  - Arable farming, livestock breeding
- Majority follows several economic activities
- 76% without formal education, high illiteracy rate (69%)
  - Low education level among women
  - Non-agriculture economic activities rise with level of education
- Dependence on agriculture impacts vulnerability to environmental changes
- Trend towards lower involvement of young people in agriculture



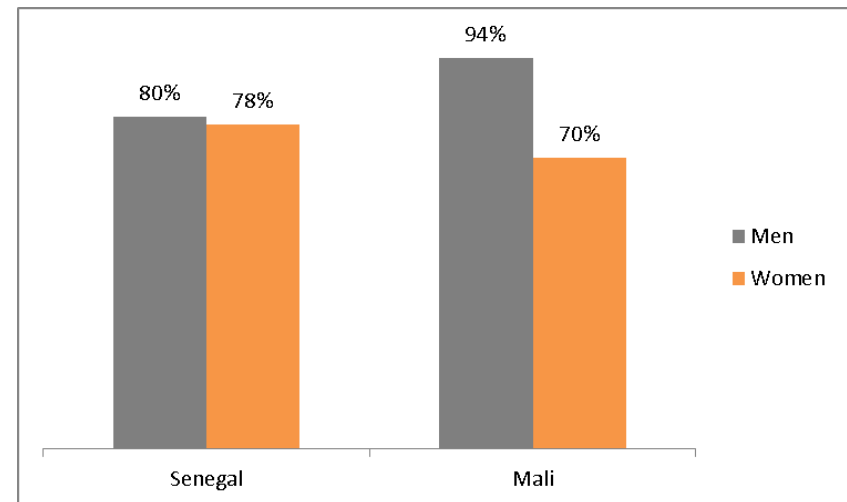
Source: V. van der Land 2012



## *Migration is deeply rooted in history and culture*

- Great majority of respondents (87%) have migration experience
- 86% of respondents regard migration as positive

- Increasing importance of female migration
- Supportive social networks influence migration and destination choice

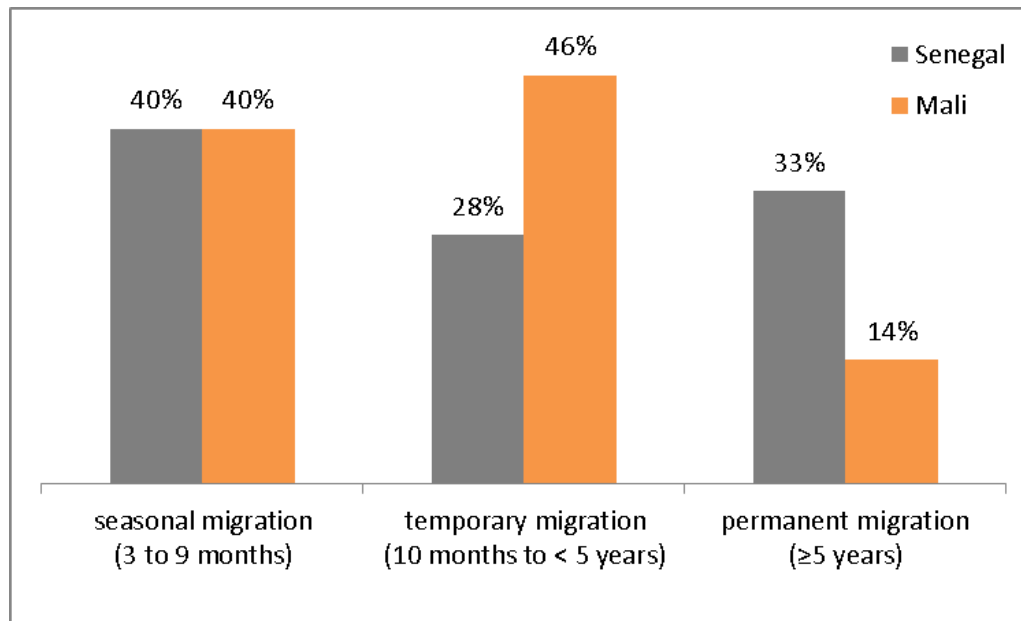


Source: micle survey 2012



# Temporal migration patterns

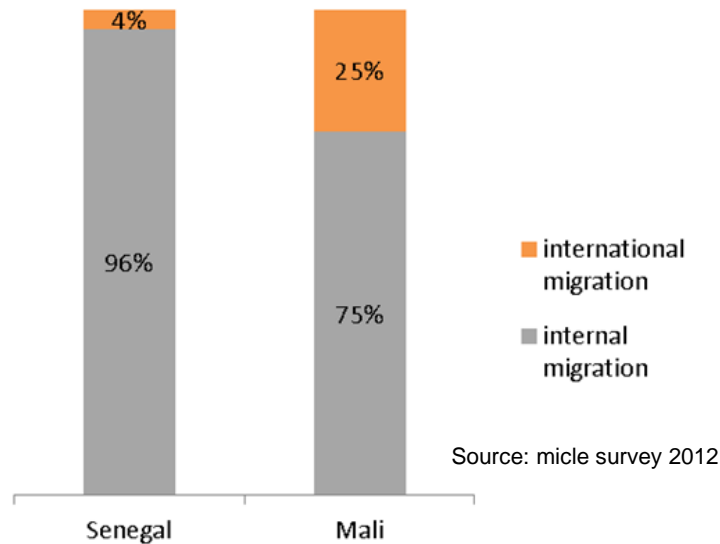
- Mainly temporary and seasonal migration
- Longer absence and outmigration of young people



Source: micle survey 2012

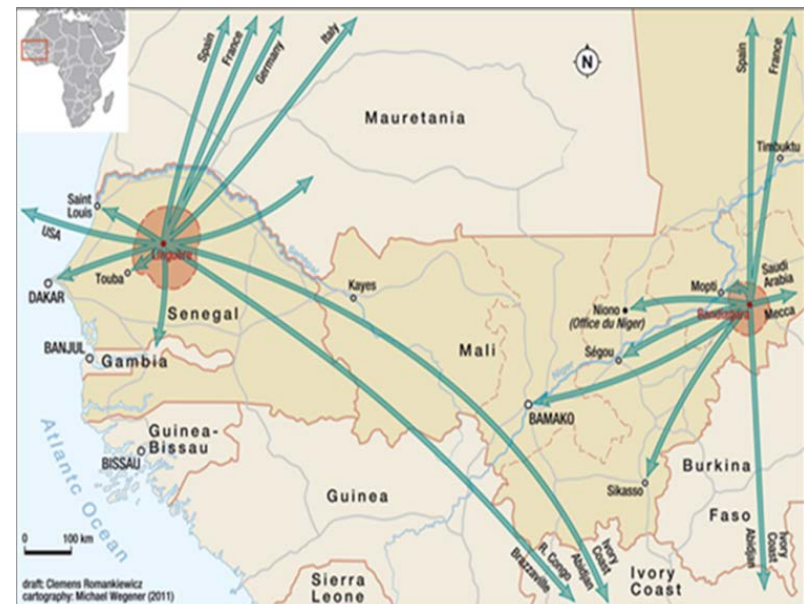


# Spatial migration patterns

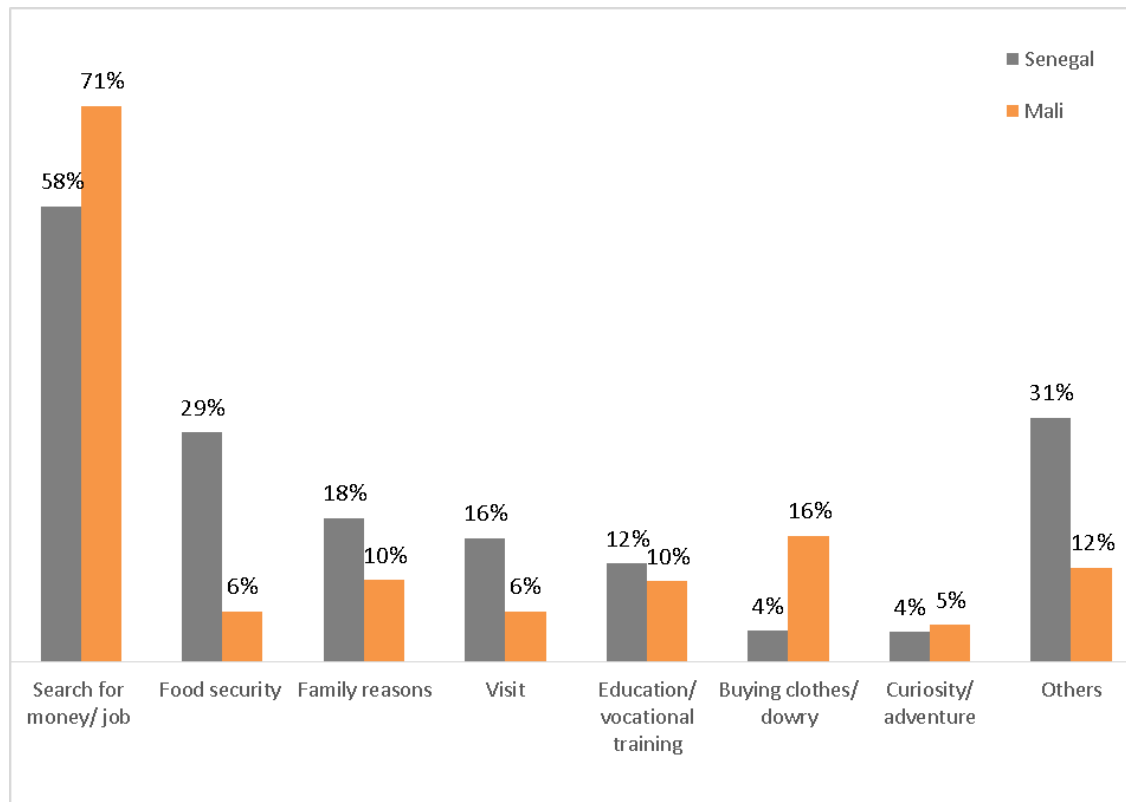


- Migration is predominantly internal or regional
- Migration within the countries prevails
  - to cities and capitals

- Few international migration to
  - Europe, USA & Gulf States: more common in Linguère, rare in Bandiagara
  - Abidjan/Cote d'Ivoire: most important destination for migrants from Bandiagara



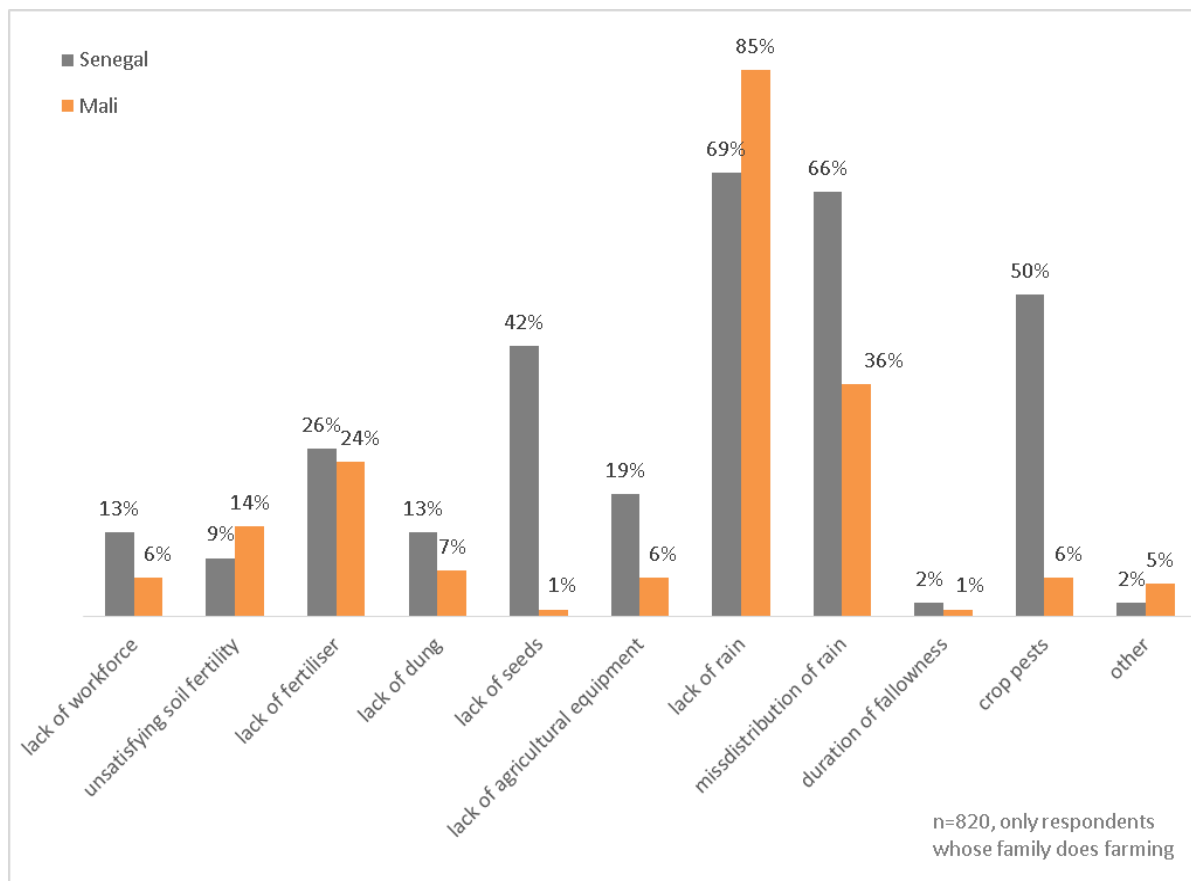
# Motives for migration



Source: micle survey 2012

- Migration motives overlap and change over time
- Economic motivations most important reason for moving
- Food security significant motive in Senegal
- Differences in migration motives across sex/gender, age and education level

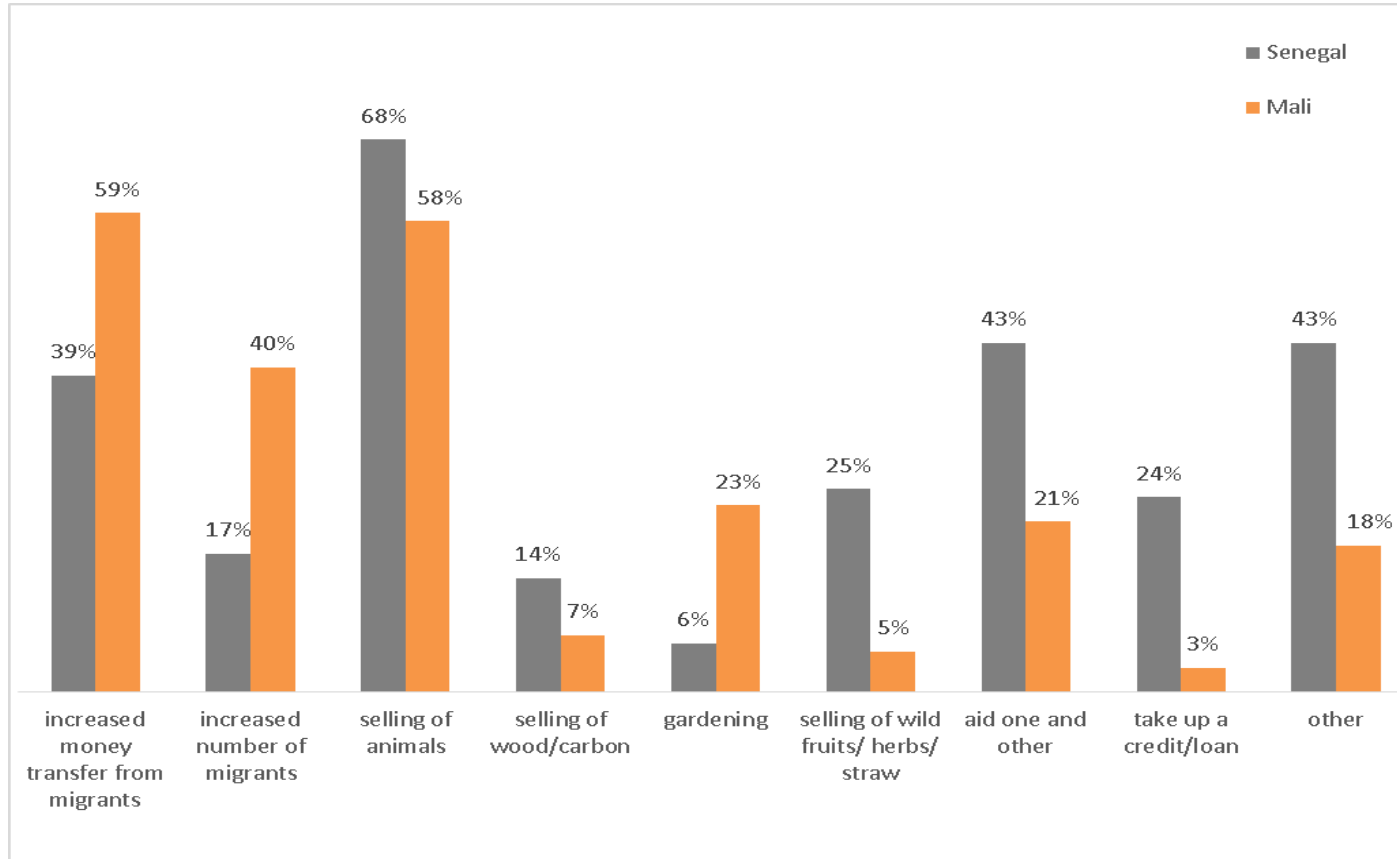
# Agricultural outcome and limiting factors for yields in 2011



Source: micle survey 2012

- 72% of respondents in Senegal & Mali indicate insufficient yields in 2011
- Lack & misdistribution of rain, pests, lack of seeds & fertiliser crucial
- Main problem of poor yields: shortage of food

# Strategies to compensate poor yields



Source: micle survey 2012

# Migration as adaptation and livelihood strategy



- Significance of climate and environmental changes increases with
  - strong dependency on agriculture
  - few opportunities to derive income from non-farm activities
  - low access to social and financial capital
- Migration as important strategy
  - to compensate environmental changes and negative consequences for food security
  - for diversification of income and minimizing risks
- Migration
  - part of livelihoods in study areas
  - often pro-active choice
  - serves more than one purpose



# Policy implications

- Positive potential of migration for development
- Integrated regional development strategies: investments in sustainable agriculture & employment in other economic sectors
- Improvement of opportunities for young people
- Investments in formal education
- Consideration of gender inequalities and empowerment
- Participation of people concerned in strategy development, decision-making and policy implementation



# Thank you very much!

