Social ‘tipping points’ under climate/environmental change

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Social ‘tipping points’ under climate/environmental change
I could have talked about...
Social ‘tipping points’ under climate/environmental change
I could have talked about Nouakchott, Mauritania where small rainfall perturbations can have big effects including migration
Social ‘tipping points’ under climate/environmental change
I could have talked about Cotonou, Benin, where ‘immobility’ of trapped population has a huge impact on precarity
Two processes of habitats’ loss
Dynamic of settlements

Progressive replacement of standing houses by makeshift houses near the coastline

Rapid destruction of the recent makeshift houses
New habitat on the lake is yearly exposed to floods.
Social ‘tipping points’ under climate/environmental change

I also could have talked about Cap-Haïtien, Haïti, where a mix of social inhabitability lead to a long-term maladaptation mechanism to climate change
Cap-Haïtien, Haïti
Cap-Haïtien, Haïti
Social ‘tipping points’ under climate/environmental change

I will talk about Niger, to question the immunity of the ‘system’
### Perception of climate change (rainfall)

#### Arid Sahel
- Mean annual rainfall: 300-500 mm
- Perception of change: NC +
- Source / Indicator: Yearly total rainfall

<table>
<thead>
<tr>
<th>Source / Indicator</th>
<th>Yearly total rainfall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Akponikpé et al. (2010)</td>
<td>91</td>
</tr>
<tr>
<td>Nielsen &amp; Reenberg (2010)</td>
<td>62</td>
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<tr>
<td>Mertz et al. (2012)</td>
<td>83</td>
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<tr>
<td>Diessner (2012)</td>
<td>90</td>
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<tr>
<td>This study (Niger)</td>
<td>81</td>
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</tbody>
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### Adaptation to climate change (rainfall)

- Temporal migration in response to a drier climate: 4.4%
- Permanent migration in response to a drier climate: 29.8%
- Temporal migration in response to a drought: 35.9%
- Migration in the ‘top 3’ adaptation strategies to climate change: 54%
Measured rainfall
Potential land resources in Niger (FAO, 2015)

- Desert: 64% [81.9 \times 10^6 ha]
- Forest area: 1% [1.2 \times 10^6 ha]
- Permanent meadows and pastures: 22% [28.8 \times 10^6 ha]
- Arable land and Permanent crops: 13% [16 \times 10^6 ha]
Harvested area Vs Arable land and permanent crops potential

<table>
<thead>
<tr>
<th>Period</th>
<th>Harvested area (10^6 ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960s</td>
<td>2</td>
</tr>
<tr>
<td>1970s</td>
<td>4</td>
</tr>
<tr>
<td>1980s</td>
<td>6</td>
</tr>
<tr>
<td>1990s</td>
<td>10</td>
</tr>
<tr>
<td>2000s</td>
<td>13</td>
</tr>
<tr>
<td>2010s</td>
<td>16</td>
</tr>
</tbody>
</table>
Livestock area Vs Permanent meadows and pastures potential

<table>
<thead>
<tr>
<th>Decade</th>
<th>Ha per TLU</th>
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</thead>
<tbody>
<tr>
<td>Equilibrium</td>
<td>2.5</td>
</tr>
<tr>
<td>1960s</td>
<td>7.0</td>
</tr>
<tr>
<td>1970s</td>
<td>6.5</td>
</tr>
<tr>
<td>1980s</td>
<td>6.3</td>
</tr>
<tr>
<td>1990s</td>
<td>5.0</td>
</tr>
<tr>
<td>2000s</td>
<td>3.0</td>
</tr>
<tr>
<td>2010s</td>
<td>2.2</td>
</tr>
</tbody>
</table>
Evolution of some indices in Niger (1961-2013)

Data: FAO, 2014; Ozer et al., 2015
What’s next?

Past & future population in Niger

Population (10^6)

Year:
- 1961
- 1965
- 1969
- 1973
- 1977
- 1981
- 1985
- 1989
- 1993
- 1997
- 2001
- 2005
- 2009
- 2013
- 2017
- 2021
- 2025
- 2029
- 2033
- 2037
- 2041
- 2045
- 2049
Social ‘tipping points’ under climate/environmental change

I will talk about Burkina Faso, where the application of Law 034/2009 on rural land tenure security may turn into a national conflict
Context
Large migration resulting from severe droughts of the 1970s and 1980s
Agricultural land is lacking

- Strong population increase
- Agriculture for exportation

- Agrobusiness & land grabbing
- Returnees from CI in 2002

Increasing local conflicts

Adoption of Law 034/2009 on land registration
Data & methods

Rainfall analysis
1950-2013

Data & methods

Interviews with local & national authorities

Interviews with 200 ‘migrant farmers’ & 100 future land owners

Source: Données administratives (Oras Ge)  
Projection: UTM Zone 30N  
Datum: WGS 1984  
Coordonnées en mètres  
Auteur: KOALA Ouango  
Date d'édition: Juil 2017

Situation de la région de la Boucle du Mouheur

Situation de la province des Banwa

Situation des communes de Balavé et de Solenzo

Légende
Communes d'étude  
Limite de commune
Results

Rainfall

(d) Ouahigouya

De Longueville et al., 2016
Results

Rainfall

(d) Ouahigouya

Period of migration

De Longueville et al., 2016
Results

Rainfall

(d) Ouahigouya

Period of migration

Main reasons of migration

Land degradation (46.5%), drought (28%), lack of land (12%)

De Longueville et al., 2016
Results

Region of departure

Current access to the land for the ‘migrant farmers’

- Borrowing: 92%
- Leasing: 3%
- Owner: 5%

95% of the ‘migrant farmers’ will not have a ‘free access’ to the land after the application of Law 034/2009 on land registration.
Leasing to 'migrant farmers'

Borrowing to 'migrant farmers'

Taking the land back from 'migrant farmers'

Results

What will the future owners do with their land?

How will 'migrant farmers' adapt after the application of Law 034/2009

High risk of limited access to the land since 60% of the 'migrant farmers' live below the poverty line (INSD, 2016)

Many 'migrant farmers' will likely be 'trapped', especially the poorest. 86% of the 'migrant farmers' will not back to their region of origin.
Conclusion

- Increasing climate variability & extreme events
- Population growth (x4 since 1961)
- Limited access to land & land degradation
- New laws such as Law 034/2009 on land registration
- Conflict
Conclusion

- Increasing climate variability & extreme events
- Population growth (x4 since 1961)
- Limited access to land & land degradation

Conflict

- ‘Migrant farmers’ are Mossi

New laws such as Law 034/2009 on land registration
Conclusion

Increasing climate variability & extreme events

Population growth (x4 since 1961)

New laws such as Law 034/2009 on land registration

Limited access to land & land degradation

Conflict

‘Migrant farmers’ are Mossi