



World Bank



Centre Africain des Risques Catastrophiques  
African Centre for Catastrophe Risks



المشركة المغربية لإعادة التأمين  
Société Centrale de Réassurance  
GROUPE CGD

International congress on insurance and reinsurance of agricultural risks  
Marrakech - 29th and 31st January 2014

Variability and recent evolution of climate in West Africa:  
evidences and consequences for index based insurance

Bertrand Muller, CIRAD – AfricaRice – ISRA/CERAAS  
[bertrand.muller@cirad.fr](mailto:bertrand.muller@cirad.fr)



AfricaRice

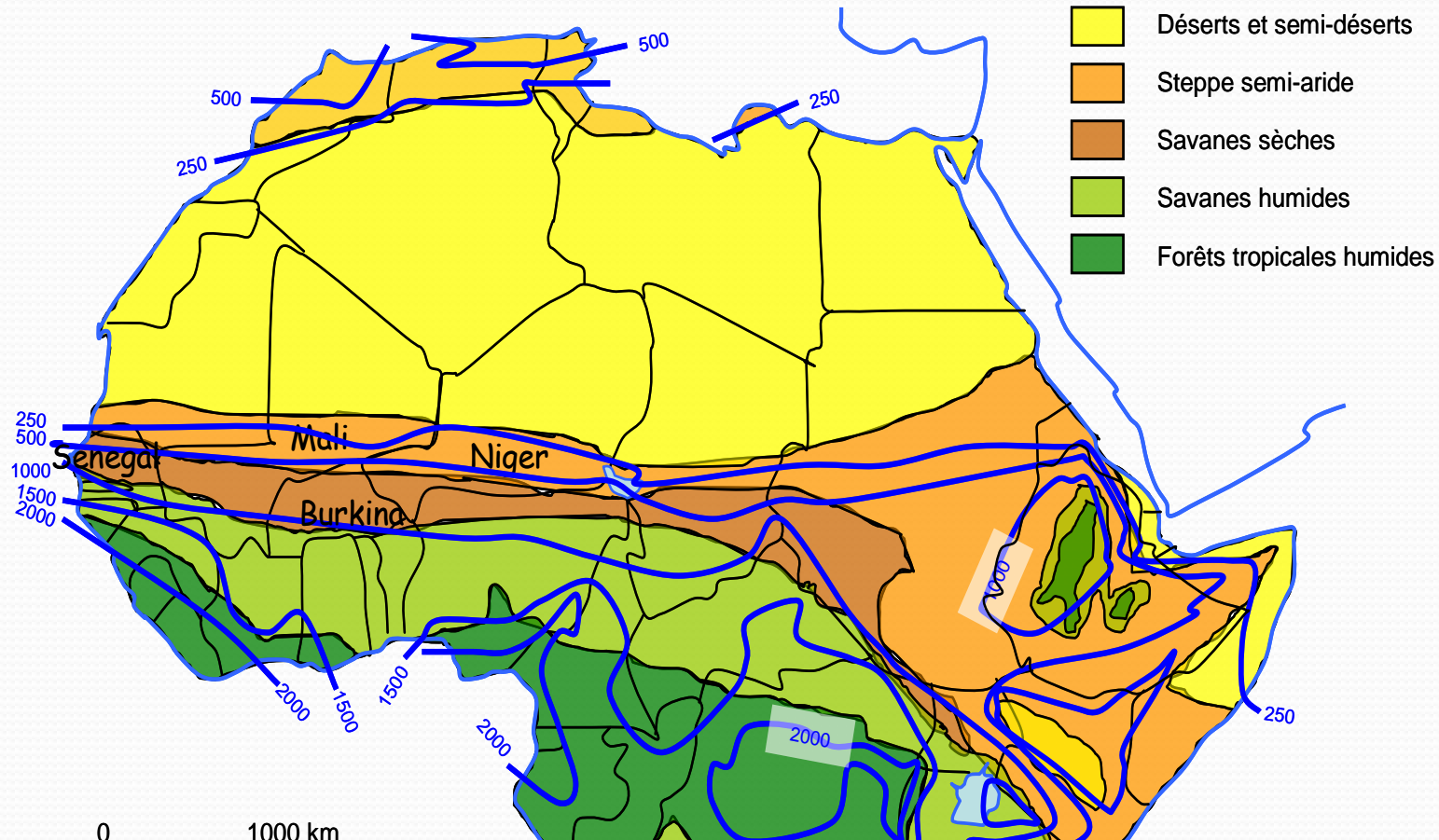


Centre d'étude régional  
pour l'amélioration  
de l'adaptation à la sécheresse



# Many agroclimatic situations in WA due to South-North rainfall gradient

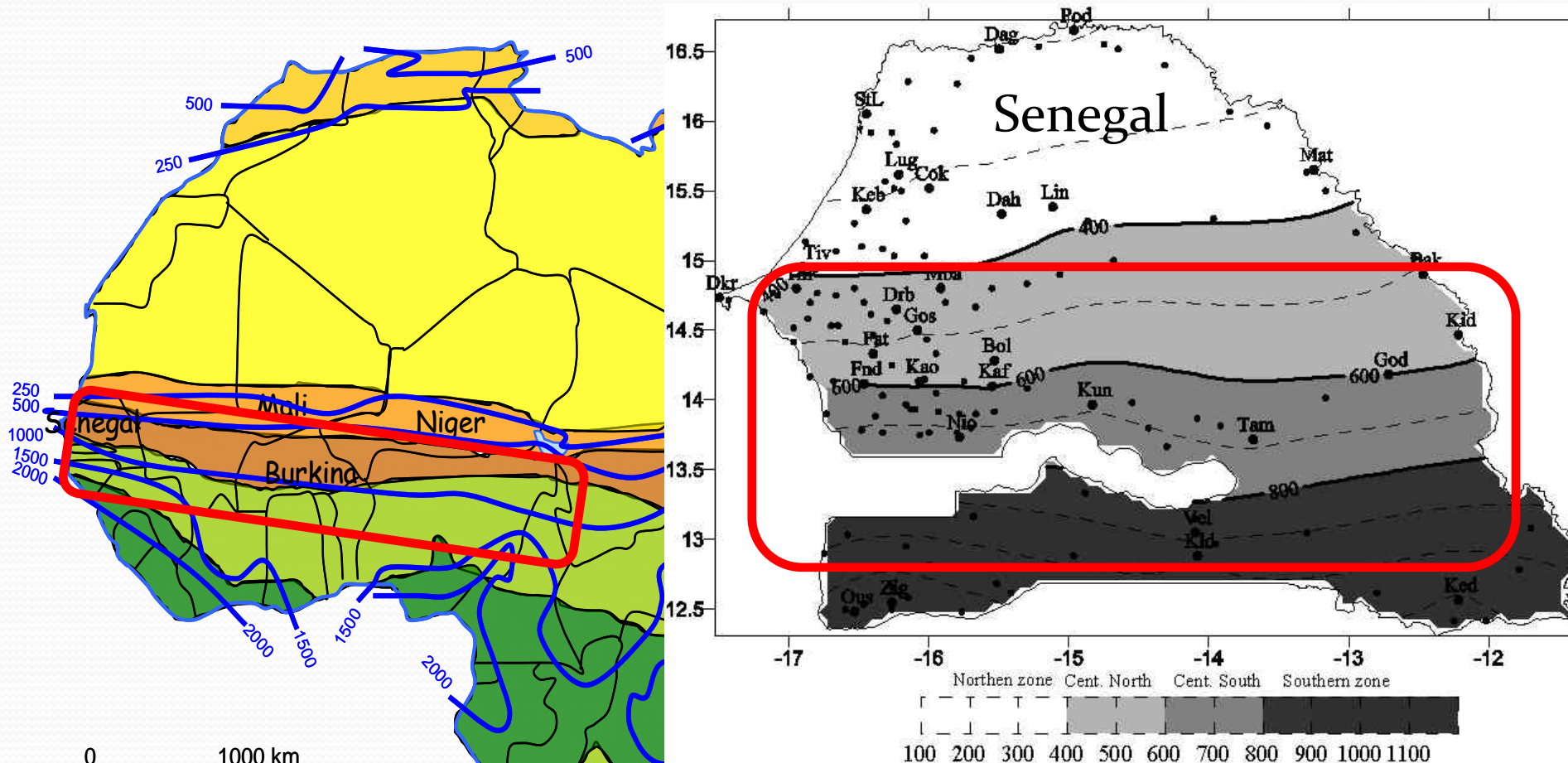
from 2000 mm to 200 mm



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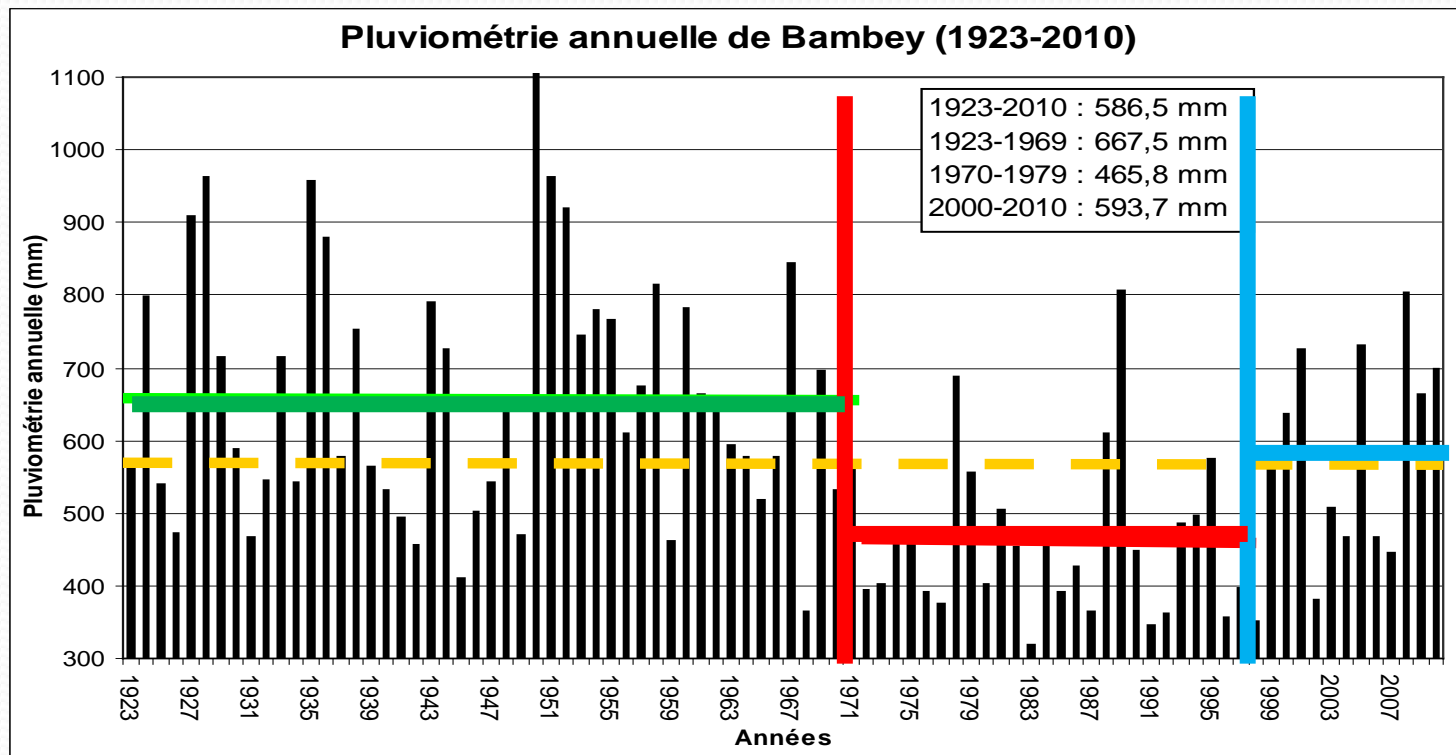
we will focus mainly on Sahelian and Soudano-Sahelian areas

400 – 1200 mm



# Important rainfall variability in SSA inter-annual (between years)

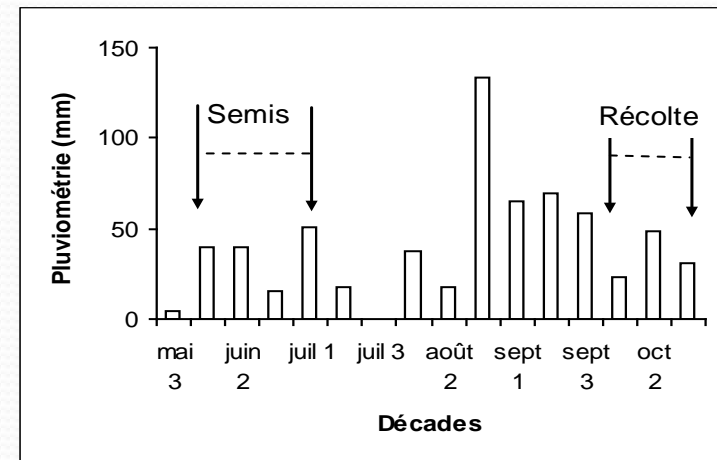
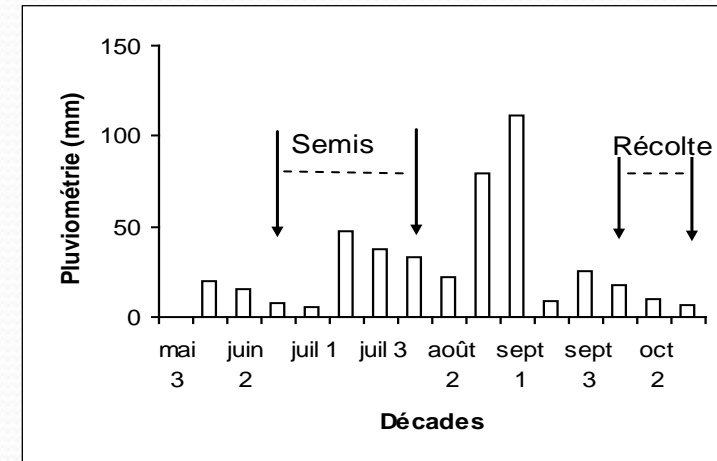
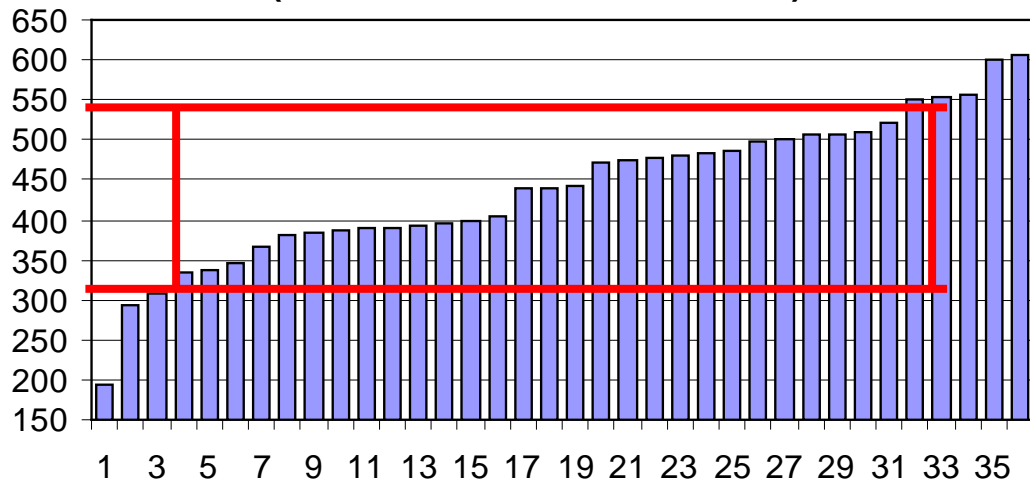
- Sharp decrease in 1970 up to 1990 : “1<sup>st</sup> sign of CChange”?
- Increasing since 15 years in WA (important in Senegal)



# Important rainfall variability in SSA intra-seasonal and spatially

- Very variable (uncertain) starts and ends of seasons, dry-spells, droughts
- Differences between (inside) nearby villages

Pluviométries 2007 Dépt. Diourbel (mm)  
(DMN-SDDR-CERAAS-CIRAD)



# Important rainfall variability in SSA consequences for crops and farmers

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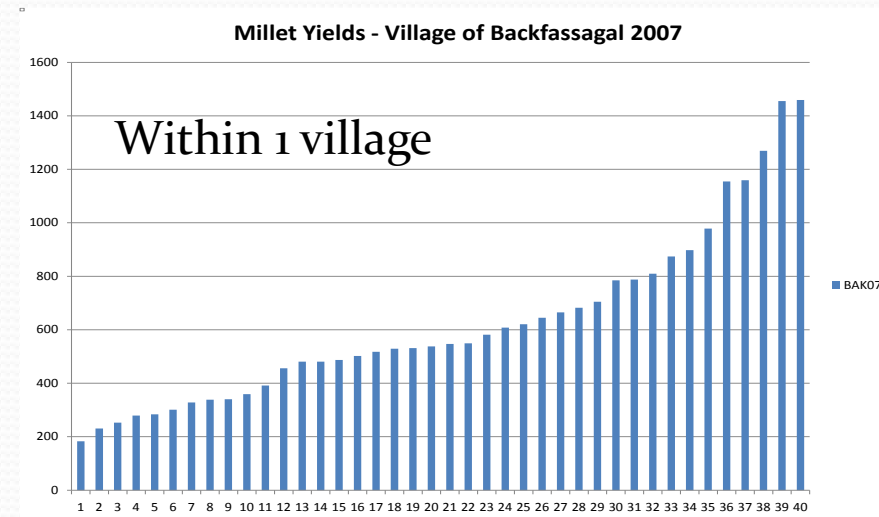
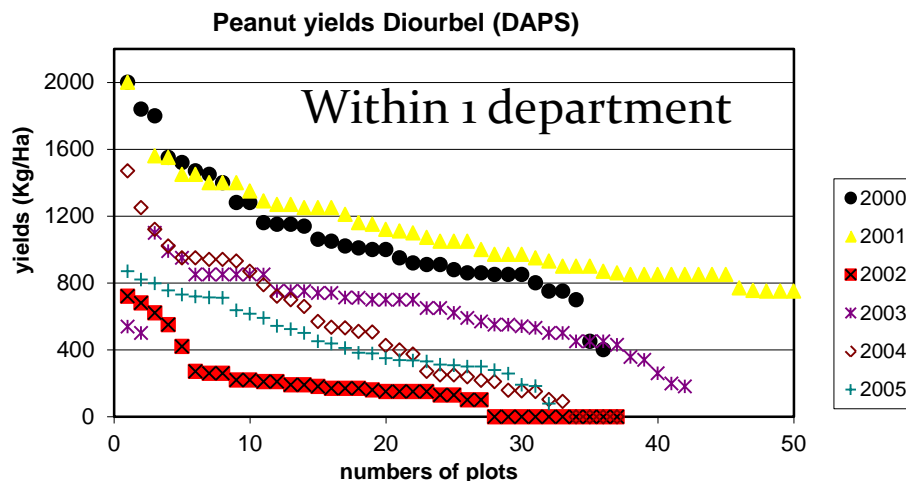
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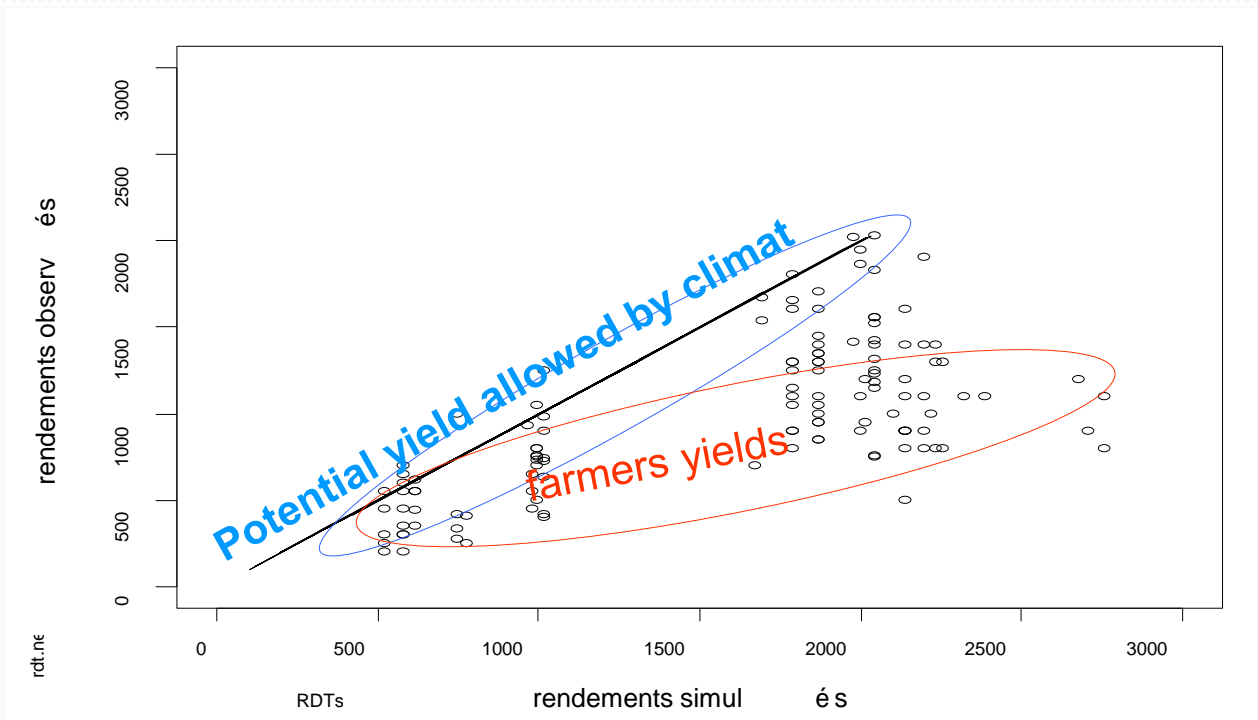
⇒ Traditional practices to cope with risks are “non intensive” ones : produce low but quite stable yields

Farmers yields are low and there is strong heterogeneity between yields



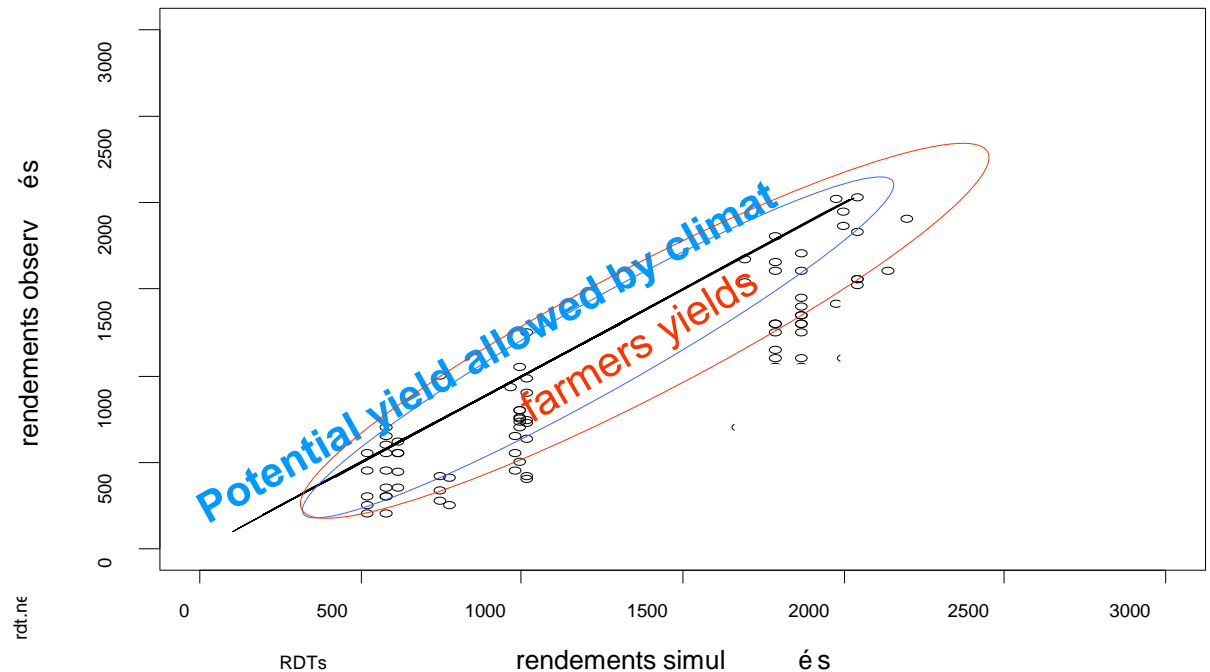
# Important rainfall variability in SSA consequences for crops and farmers

- Due to non intensification yields are lower than attainable ones allowed by climate
  - In most of the cases it is possible to produce more



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- Due to non intensification yields are lower than attainable ones allowed by climate
- Insurance can contribute, with favorable context (access to inputs, markets), to promote intensification and production increase



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- Potential important “basic risk” in rainfall based index insurance
  - i.e. the risk that the value of the index, which is assessed at a reference site (a raingauge for instance) doesn't represent correctly the reality to be insured (a farmer field)
    - due to spatial variability of production factors (rainfalls)
    - due some time to poor quality of the index

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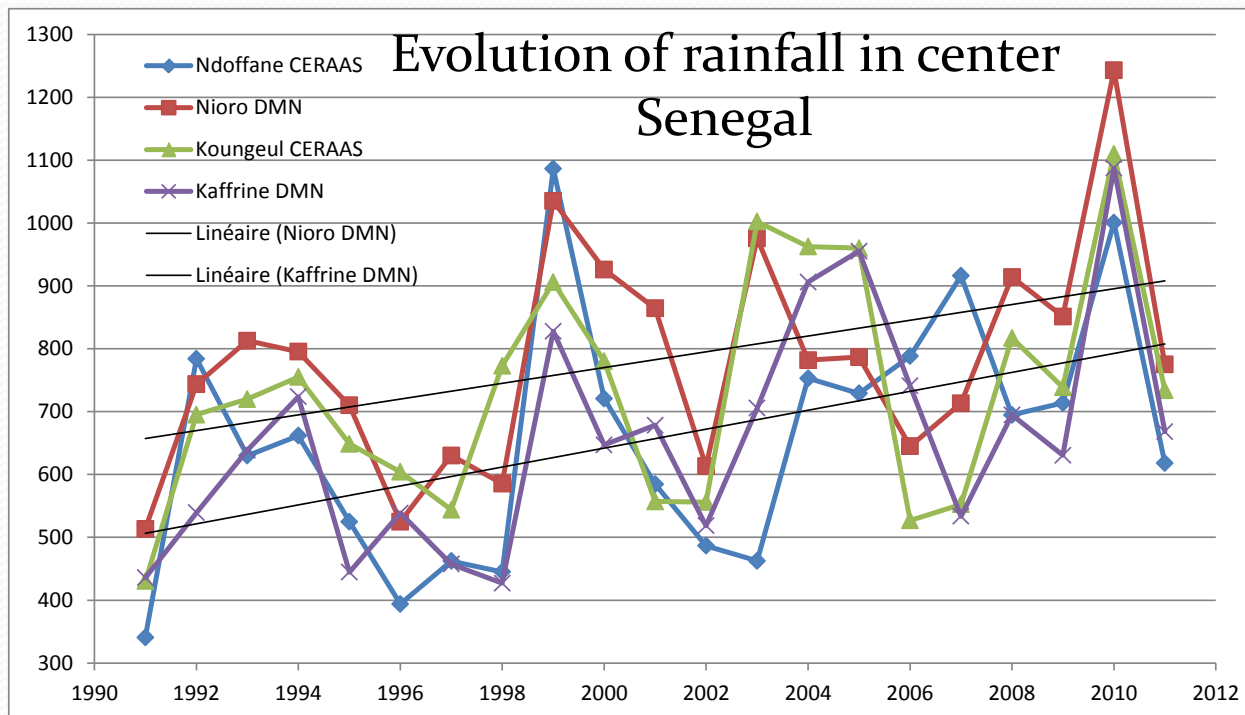
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  - Develop “meso-scale” strategies
    - integration of indicators over a region to ensure a whole portfolio
    - clients are aggregators : credit institutions, agro-industry, ..

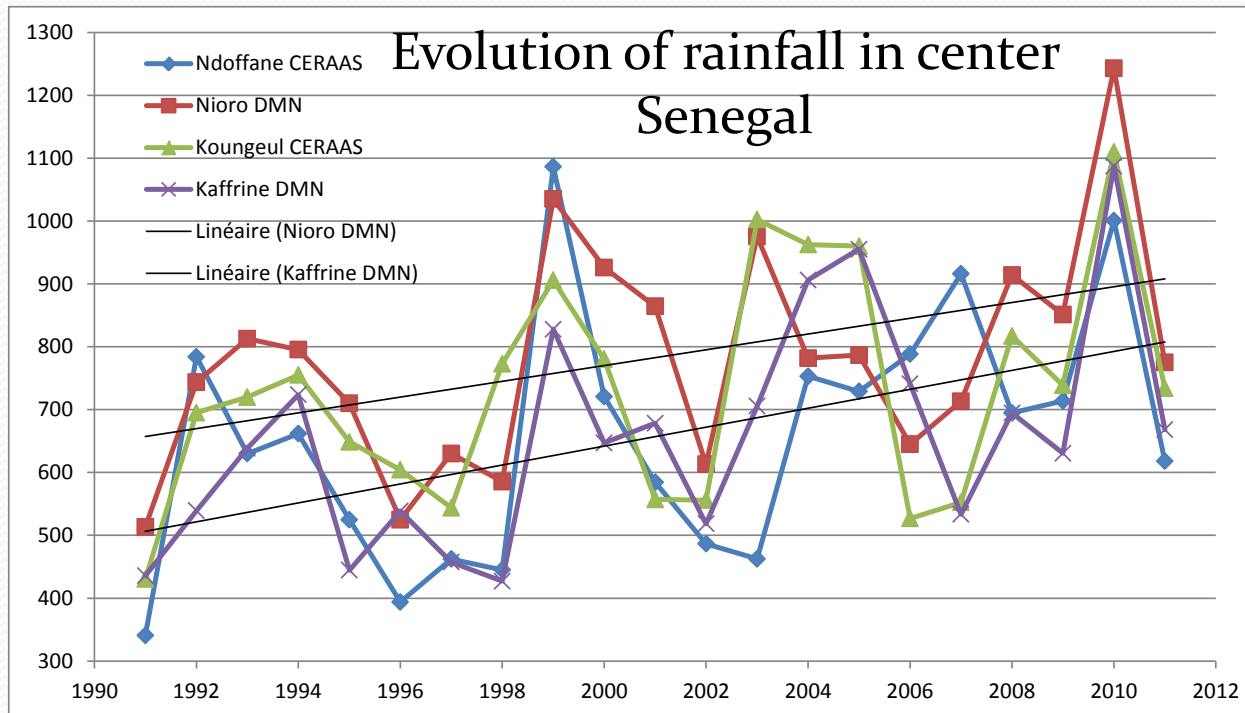
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- Cropping conditions globally improved (well perceived by farmers), despite some likely shifts that perturb practices



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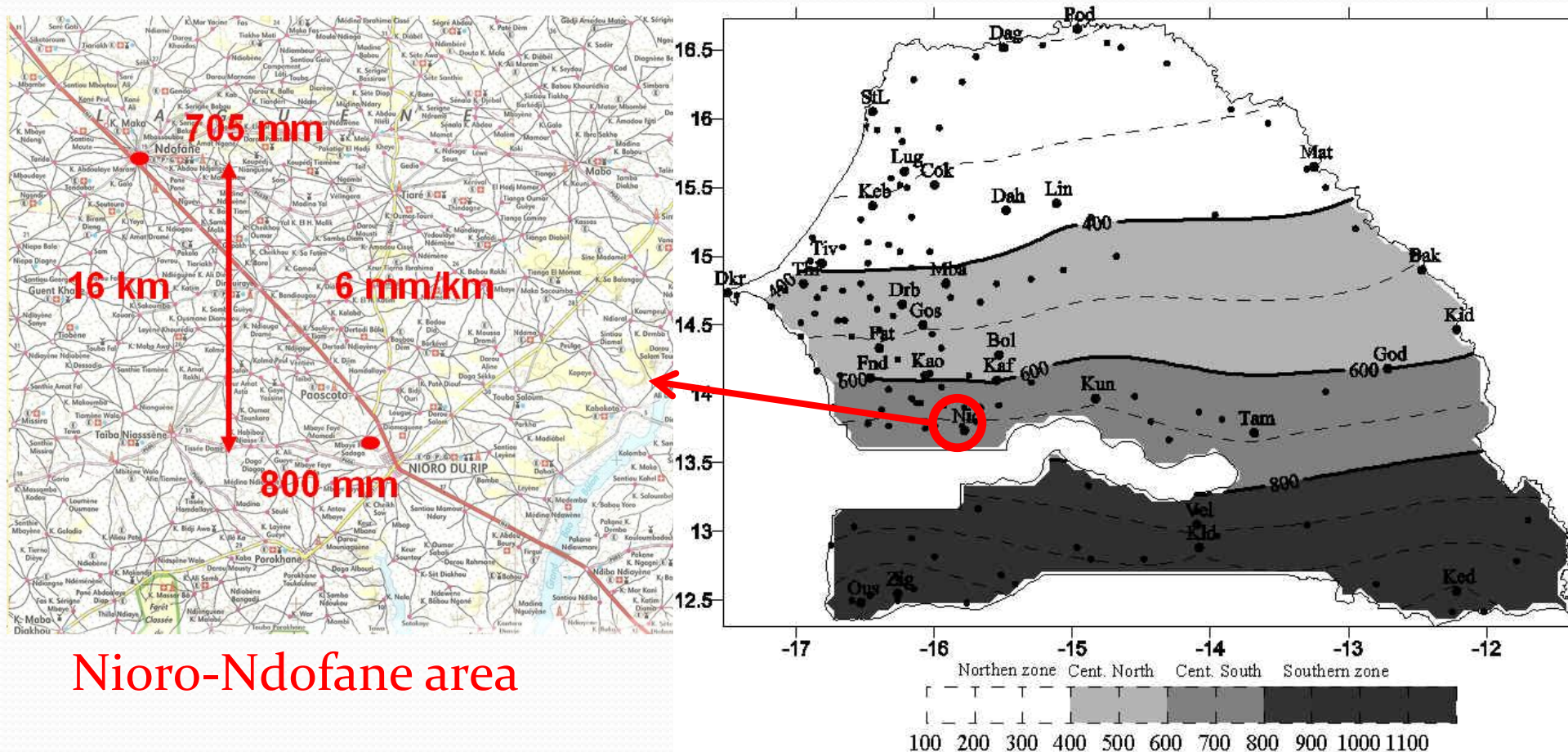
- Cropping conditions globally improved (well perceived by farmers), despite some likely shifts that perturb practices
- Which period to consider for index calibration and pricing?



period (years)	premium (FCFA)
30	20 000
20	17 000
15	15 000
10	12 000

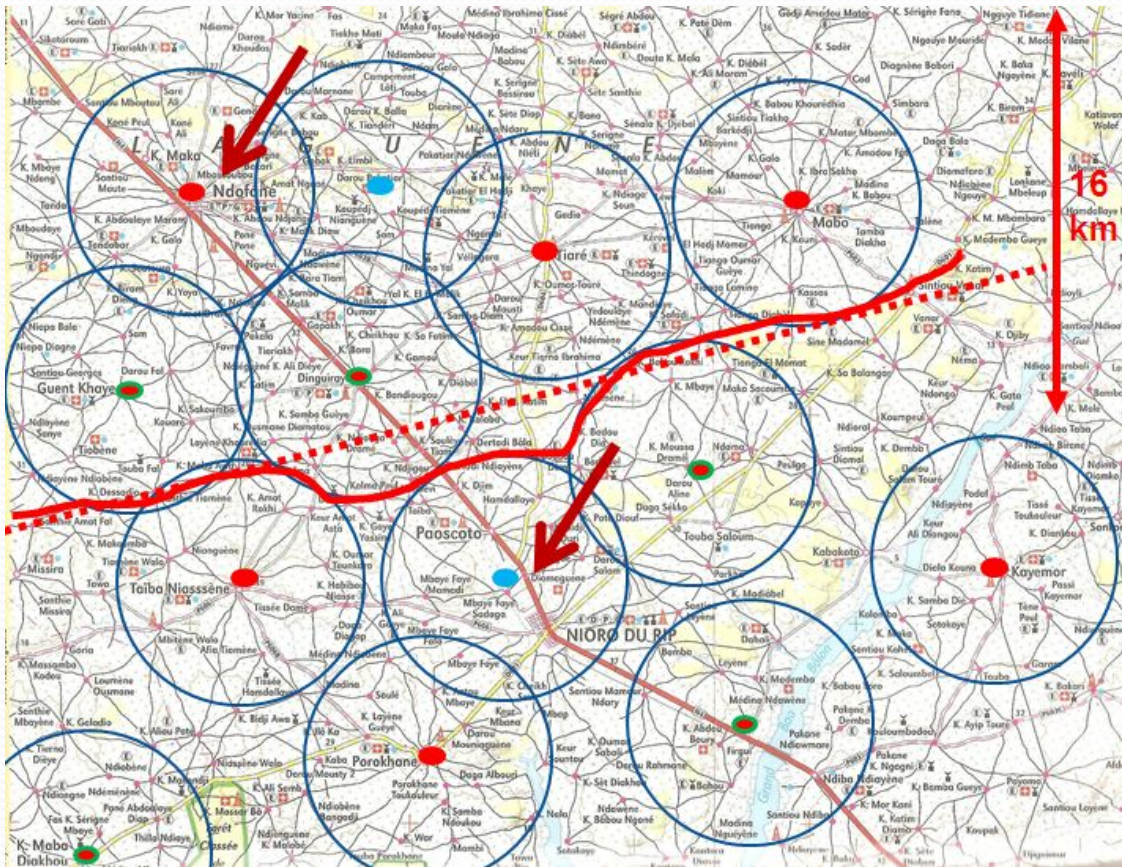
# Important South-North gradient consequences for insurance

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Niolo-Ndofane:  
2 zones considered  
managed by 2  
indices



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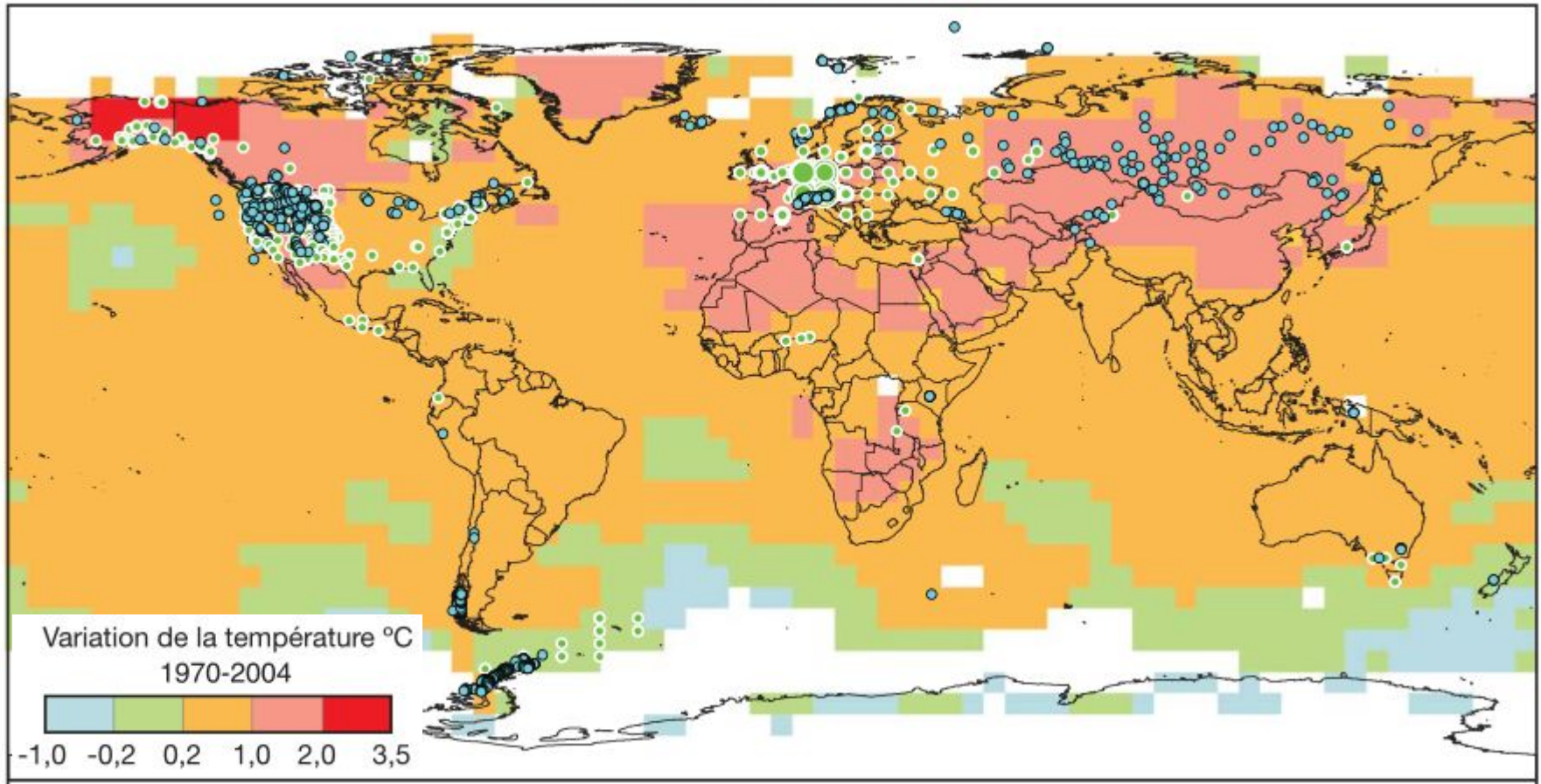
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  - Adjusted subsidies could be introduced ....

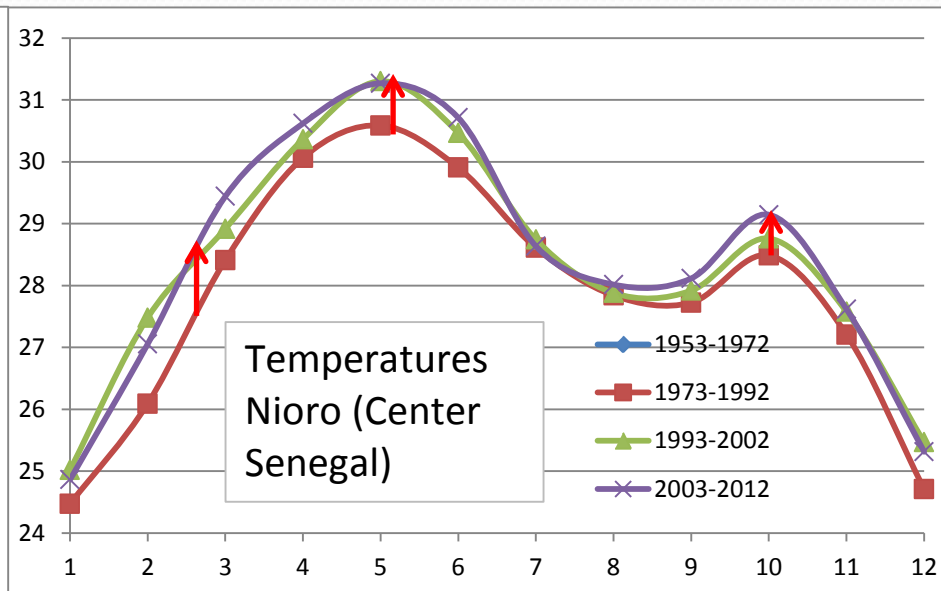
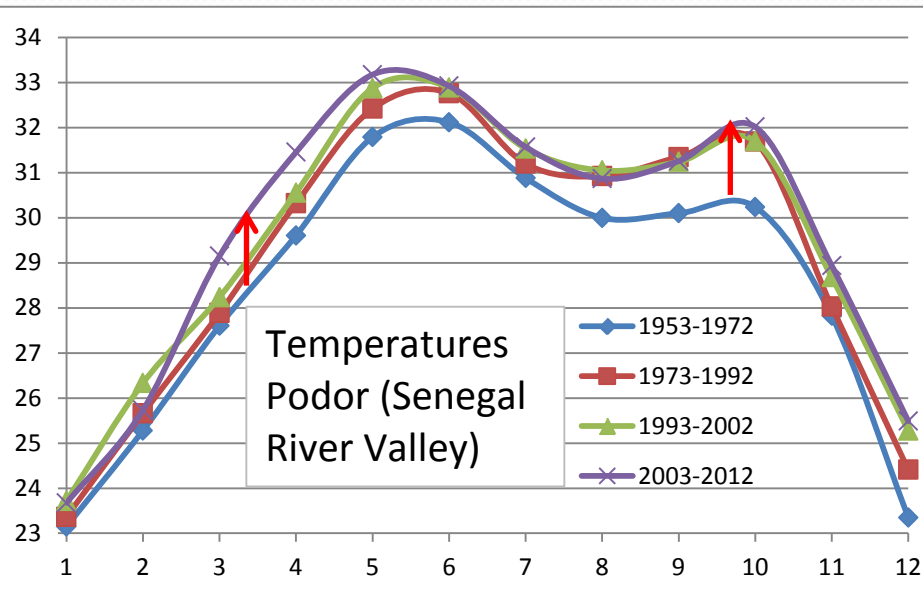
# Temperatures increased like everywhere but not too much

*Modifications des systèmes physiques et biologiques et variations de la température en surface pendant la période 1970-2004*



# Temperatures increased globally positive in WA up to now

- Increase of temperatures, which started almost 40 years ago
- Globally positive up to now
  - Less cold stress on irrigated rice
  - No heat stress mentioned (up to now)



# Many other crop risks (and “the devil is often in the details”)

- Locusts attacks : could be prevented, controlled .. and why not insured through international program
- Birds attacks on irrigated rice (14 millions Euros losses in 2006 in Senegal River Valley) .... **main concern of farmers**
  - Traditional insurance (not index) by CNAAS since 2012
  - Research required to understand (and prevent) massive attacks



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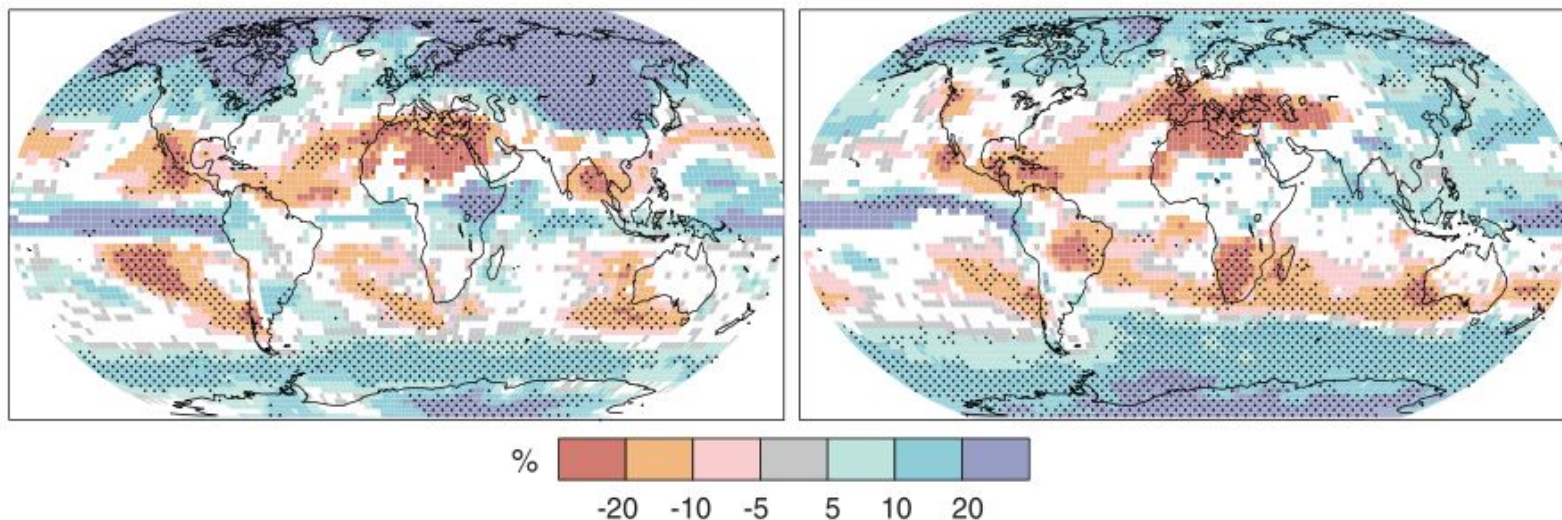
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- “Excessive rains” and “flooding”: so many different situations
  - Hydrological issue in many cases
  - Topography, soil, building, field management, irrigation scheme maintenance, etc.. are key factors
  - Destruction by heavy rain (wind, storm), “pollen washing” ...
  - Cloudiness (radiation and temperature decreases)

# What about the future ?

## uncertainties for rainfalls (IPCC/GIEC)

- Rainfalls trends are not clear for Sahel and Guinea Gulf : some models predict a drier climate in Sahel, other a wetter
- Variability will probably increase with more extreme events like droughts and excessive rains (flooding)

*Projections multimodèles des variations du régime des précipitations*



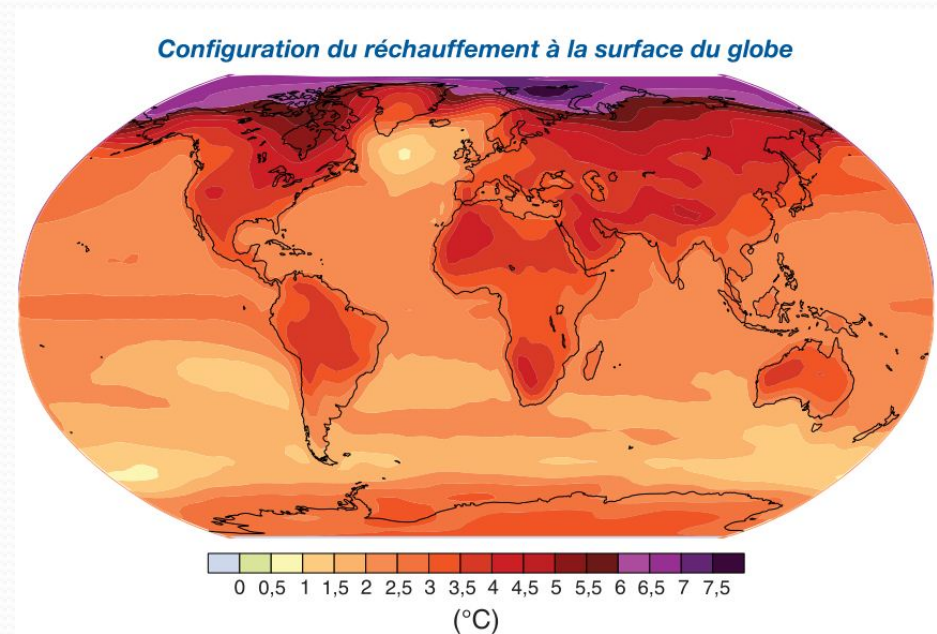
**Figure 3.3.** Variations relatives du régime des précipitations (%) pour la période 2090-2099, par rapport à la période 1980-1999. Les valeurs indiquées sont des moyennes tirées de plusieurs modèles, obtenues à partir du scénario A1B du SRES pour des périodes allant de décembre à février (à gauche) et de juin à août (à droite). Les zones en blanc correspondent aux régions où moins de 66 % des modèles concordent sur le sens de la variation et les zones en pointillé à celles où plus de 90 % des modèles concordent sur celui-ci. {GT I figure 10.9, RiD}

# What about the future ?

## more extreme events (IPCC/GIEC)

- Increase of temperatures
- More frequent extremes hot temperatures and heat waves
  - water requirements will increase
  - water stress risks will increase
  - heat stress risks also
  - diseases and enemies also

Not very optimistic ..



# Conclusions

## important risks (and will increase)

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- Insurance can contribute, together with favorable context (inputs, markets), to promote production increase, as “the oil in the motor” (it is not the motor, neither the gasoline)
- Insurance studies and programs must be seriously based on science and knowledge of realities and farmers
- Remote sensing methods will probably be the key solution as they allow large cover and will be more precise and accessible  
But they must be improved to be able to give precise information to manage “medium risks” for specific crops

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Will the South Countries be in position to provide subsidies?

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## important risks (and will increase)

- Medio-scale strategies based on integration of indicators must be explored
- Insurance financing might be the bottle-neck since good protections are expensive and risks will increase  
Will the South Countries be in position to provide subsidies?
- Other tools and strategies must be explored to promote production increase :  
the question is where is it more pertinent to put money?



Thank you for your attention

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