# Sectoral vulnerability

- **Agriculture**: mainly rainfed with predominantly cultivated cereals being millet and sorghum;
  - Precipitation accounts for ~42% change in millet yields,
  - GCMs & Crop Models under 3 precipitation & temperature scenarios indicate 20, 35 and >50% millet yield reductions by 2020, 2050 and 2080

- **Water resources**: River Niger runoff reductions were 40 to 60% higher than precipitation deficits (-20 to - 40%) between 1970 and 2000; most the vanished part of Lake Chad is in Niger.

*Sectoral vulnerability (ctnd)*

- **Health: children under pressure**

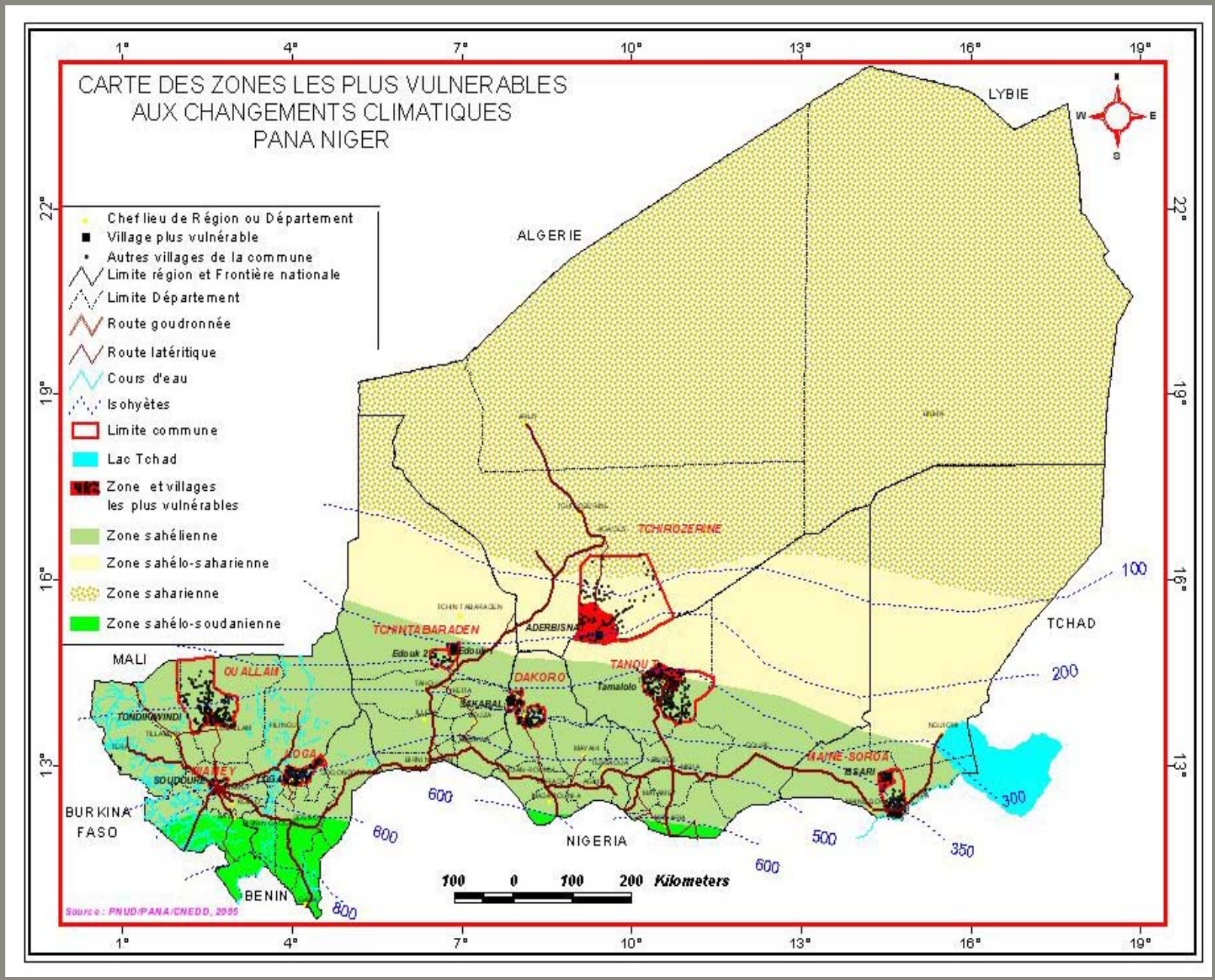
Adding to malnutrition, the main climate-sensitive diseases affecting mostly children in Niger are:

- **Malaria**: the expected increase in winter time minimum and summertime maximum temperature by 2020-2049 , combined with higher frequencies of extreme events will lead to higher transmission rates.
- **Meningitis and measles epidemics**: longer dry season length/longer onsets of rains combined with higher minimum temperatures and higher frequencies of Saharan dust storms will lead to higher attack and mortality rates.

# Adaptation

NAPA as the main adaptation framework

- Fourteen adaptation options have been defined for agriculture, water resources, breeding, health and transport sectors.
- These measures aim to build resilience to climate variability, and alleviate poverty in rural areas;
- Key vulnerable areas have been identified for priority actions.
- Implementing NAPA priority interventions to build resilience and adaptive capacity of the agriculture sector to climate change in Niger Project has just been approved (US$ 3.7 M).

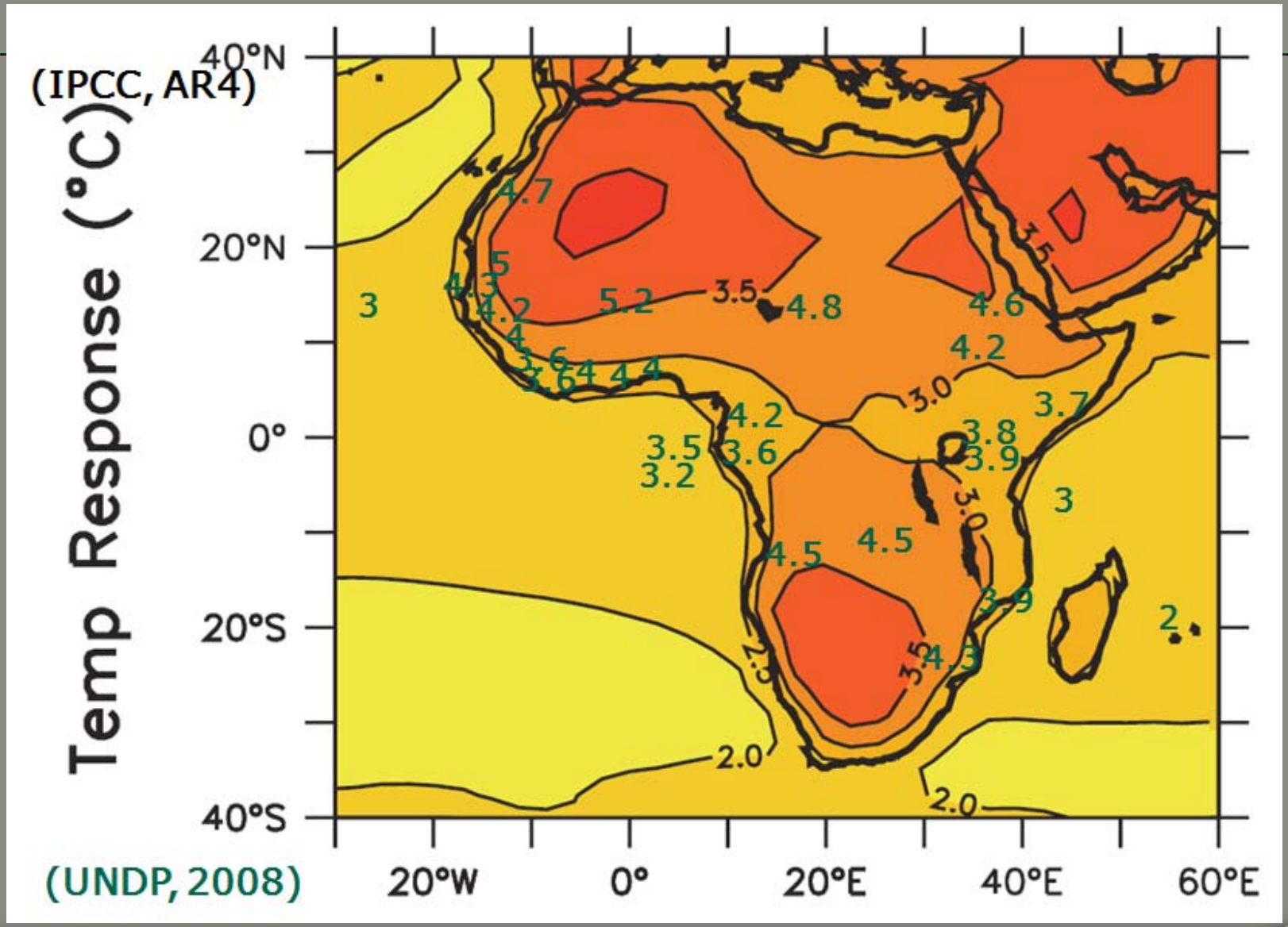

CARTE DES ZONES LES PLUS VULNERABLES
AUX CHANGEMENTS CLIMATIQUES
PANA NIGER
Chef lieu de Région ou Département
Village plus vulnérable
Autres villages de la commune
Limite région et Frontière nationale
Limite Département
Route goudronnée
Route latéritique
Cours d'eau
Isohyètes
Limite commune
Lac Tchad
Zone et villages les plus vulnérables
Zone sahélienne
Zone sahélo-saharienne
Zone saharienne
Zone sahélo-soudanienne
LYBIE
ALGERIE
TCHIROZERINE
TCHINTABARADEN
ADERBISNA
DAKORO
TANOUT
TCHAD
MALI
OU ALLAM
TONDIKIWINDI
TOGA
SOUDOURE
BURKINA FASO
BENIN
NIGERIA
MAINE-SOROA
BILMA
100
200
300
350
500
600
800
100 0 100 200 Kilometers
Source : PNUD/PANA/CNEDD, 2005
1°
4°
7°
10°
13°
16°
19°
22°

# Lessons learnt & Next steps

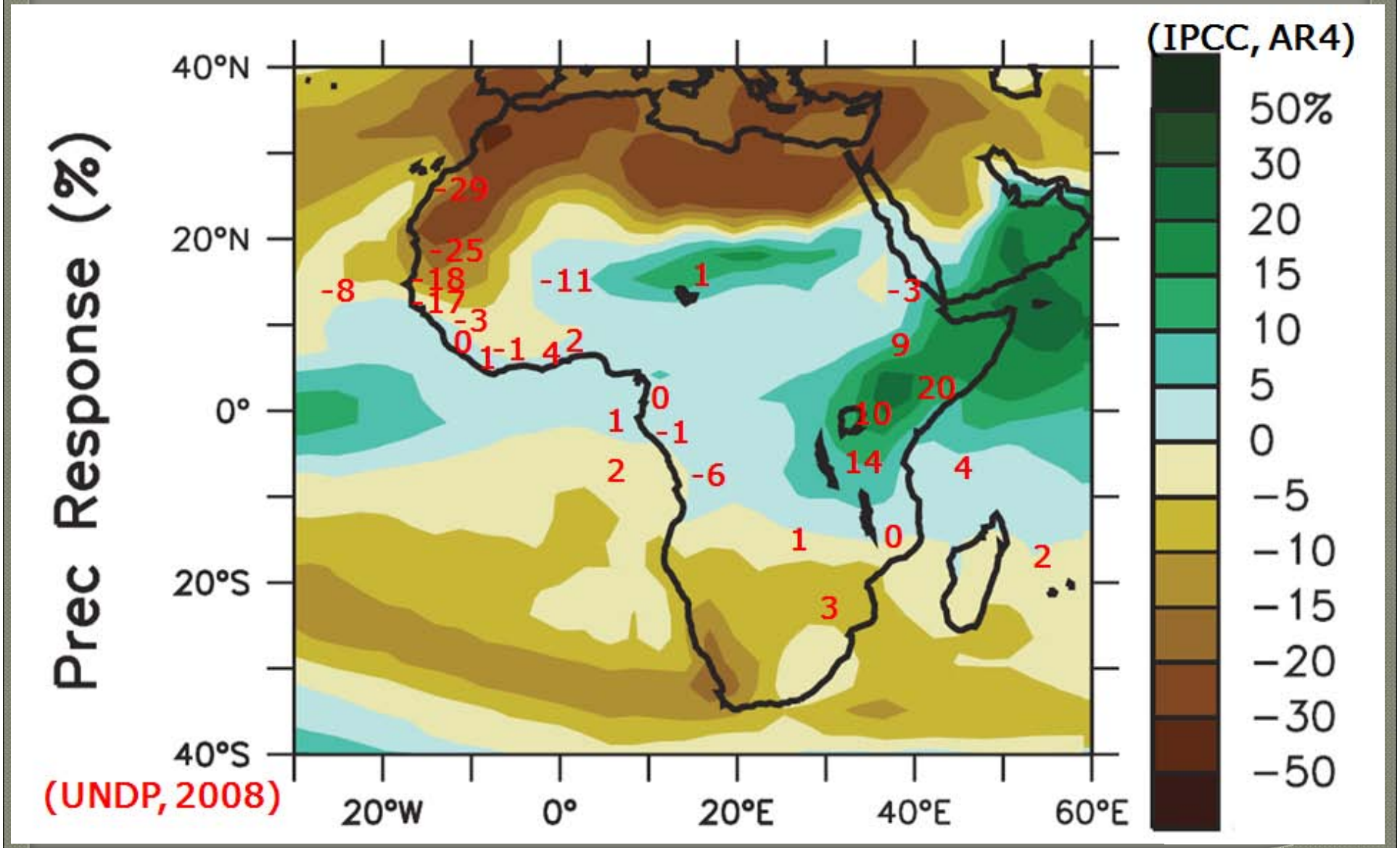
- Lessons learnt
  - High cost of collecting activity data, when providers are not reluctant, particularly in the energy sector;
  - Real need of capacity building to deal with downscaling of GCMs outputs to have meaningful climate scenarios
  - Time is a critical issue!

- Fifteen Follow-up projects concepts on research & systematic observations, technology transfer, mitigation, utilization of renewable energies, climate information & services, waste management, linked with the National Strategies of Poverty Alleviation , for Rural Development, for Health, Water Resources and Energy, and for a total amount of US$ 3.2 M.

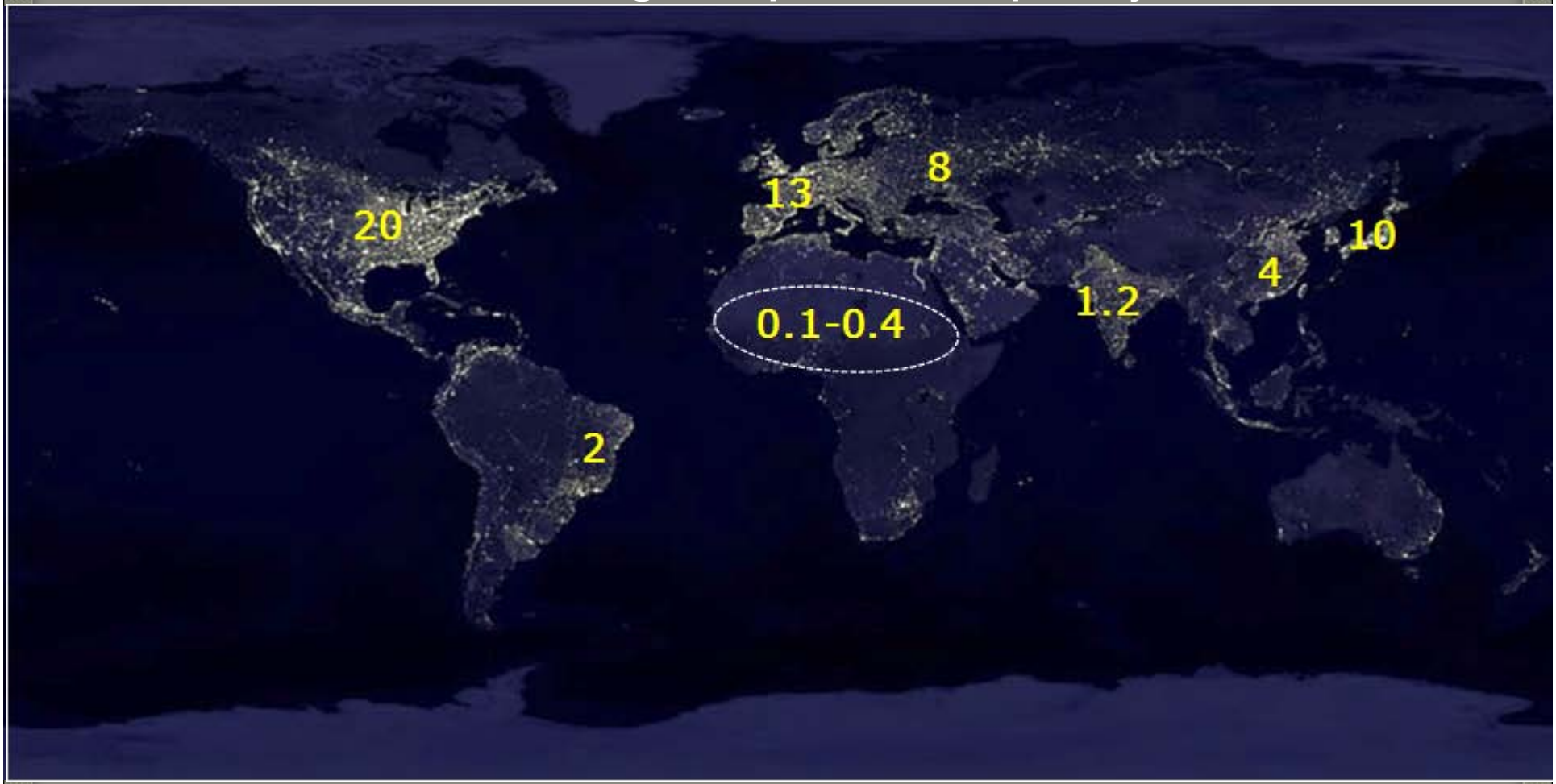
# Conclusion


(IPCC, AR4)
Temp Response (°C)
40°N
20°N
0°
20°S
40°S
20°W
0°
20°E
40°E
60°E
(UNDP, 2008)

# What could be the adequate level of stabilization for Africa?



# Access to energy is a key issue to poverty alleviation & enhancing adaptation capacity

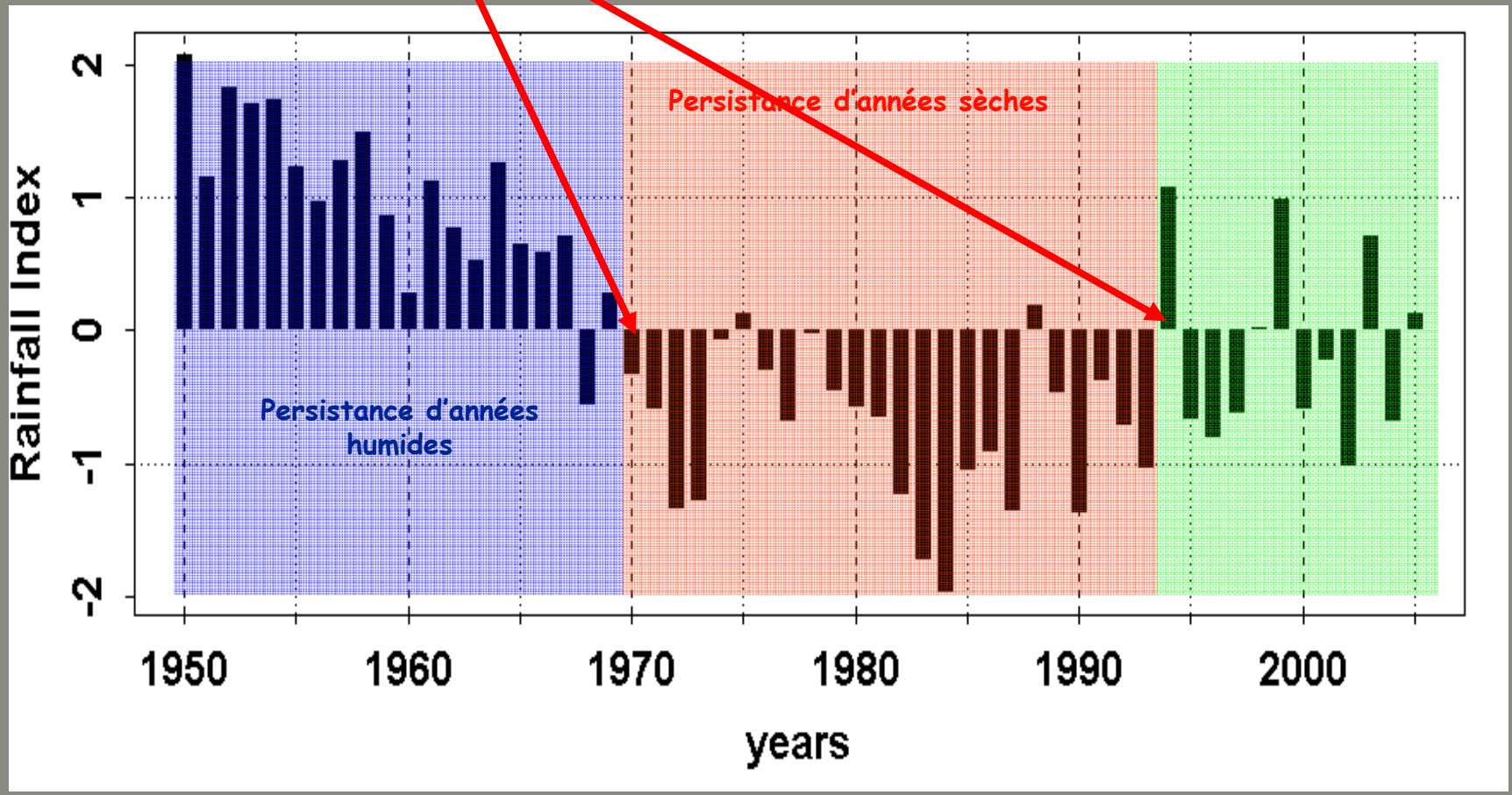



*Thank you*

| Country | Niger | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **4. Agriculture** | | | **286** | **15** | **0** | **10** | **0** | **0** |
| A. Enteric fermentation | | | 271 | | | | | |
| B. Manure management | | | 12 | 0 | | | 0 | |
| C. Rice cultivation | | | 2 | | | | 0 | |
| D. Agricultural soils | | | | 15 | | | 0 | |
| E. Prescribed burning of savannahs | | | 0 | 0 | 0 | 6 | 0 | |
| F. Field burning of agricultural residues | | | 0 | 0 | 0 | 4 | 0 | |
| G. Other (please specify) | | | 0 | 0 | 0 | 0 | 0 | |
| **5. Land-use change and forestry** [1] | **0** | **-16 917** | **6** | **0** | **2** | **54** | **0** | **0** |
| A. Changes in forest and other woody biomass stocks | 0 | -33 922 | | | | | | |
| B. Forest and grassland conversion | 4 765 | 0 | 6 | 0 | 2 | 54 | | |
| C. Abandonment of managed lands | | 0 | | | | | | |
| D. $CO_2$ emissions and removals from | 12 241 | 0 | | | | | | |
| E. Other (please specify) | 0 | 0 | 0 | 0 | 0 | 0 | | |
| **6. Waste** | | | **3** | **1** | **0** | **0** | **0** | **0** |
| A. Solid waste disposal on land | | | 0 | | 0 | | 0 | |
| B. Waste-water handling | | | 2 | 1 | 0 | 0 | 0 | |
| C. Waste incineration | | | | | 0 | 0 | 0 | 0 |
| D. Other (please specify) | | | 0 | 0 | 0 | 0 | 0 | 0 |
| **7. Other (please specify)** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Memo items** | | | | | | | | |
| **International bunkers** | **37** | | **0** | **0** | **0** | **0** | **0** | **0** |
| Aviation | 37 | | 0 | 0 | 0 | 0 | 0 | 0 |
| Marine | 0 | | 0 | 0 | 0 | 0 | 0 | 0 |
| **$CO_2$ emissions from biomass** | **5 590** | | | | | | | |

[1] If you have completed the LUCF section of Table 7As, these data will appear here automatically. If, however, you have used the IPCC Good Practice Guidance and Categories therein, apply the mapping back procedure for this sector and insert the corresponding numbers here manually.

# The Sahel was XX century biggest challenge in terms of rainfall as far as time persistance is concerned




*After A. Ali et al., 2008*

# The Sahel was XX century biggest challenge in terms of rainfall as far as spatial extent is concerned

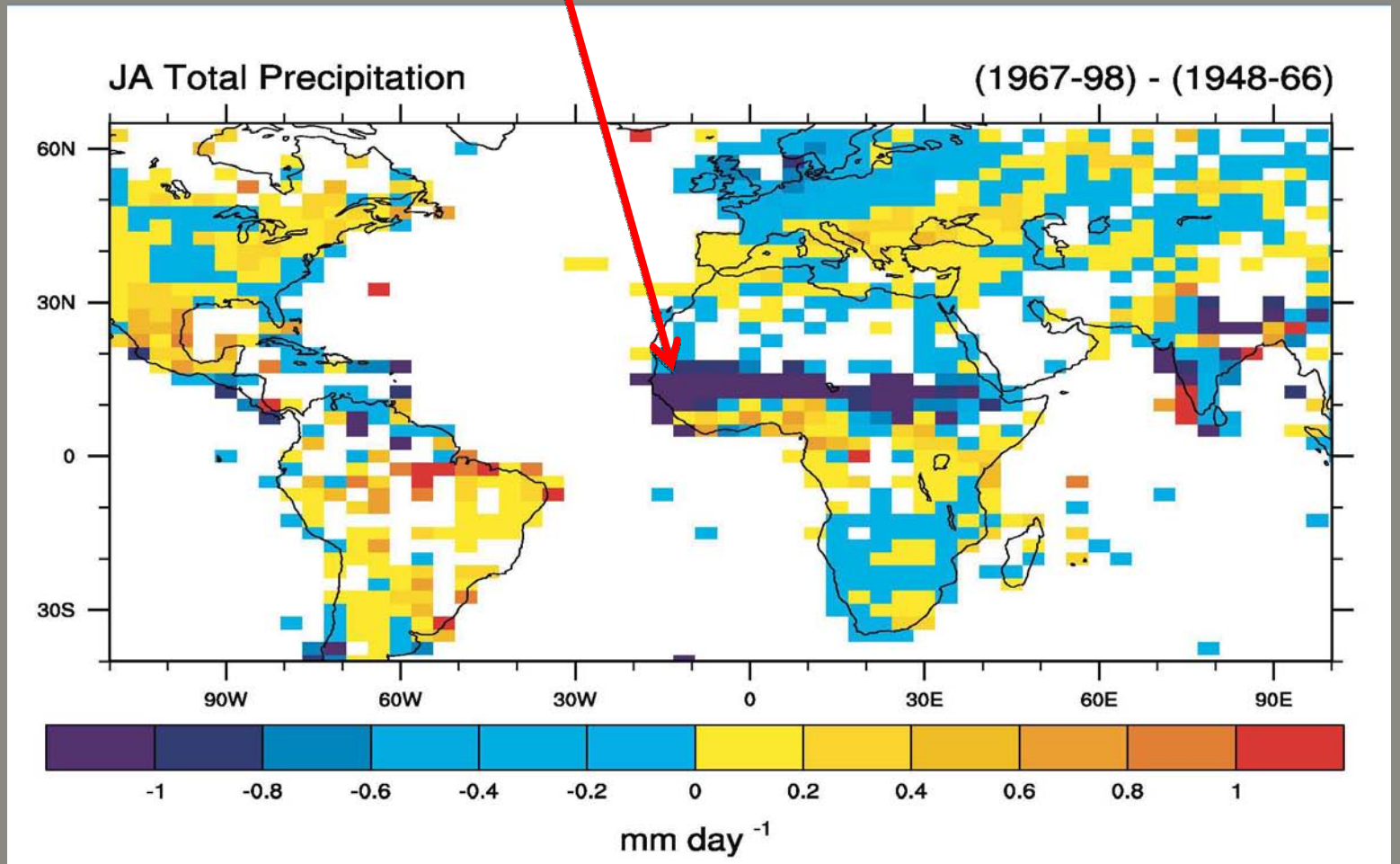



*Fig. 3: The change in high summer (July-August) total precipitation (mm day$^{-1}$), 1967-1998 minus 1948-1966, estimated from land surface records ('g55wld0098.dat' constructed and supplied by Dr. Mike Hulme at the Climatic Research Unit, Univ. of East Anglia, Norwich, UK).*

# The Sahelian Dust factor :

November through March: major mineral dust production area

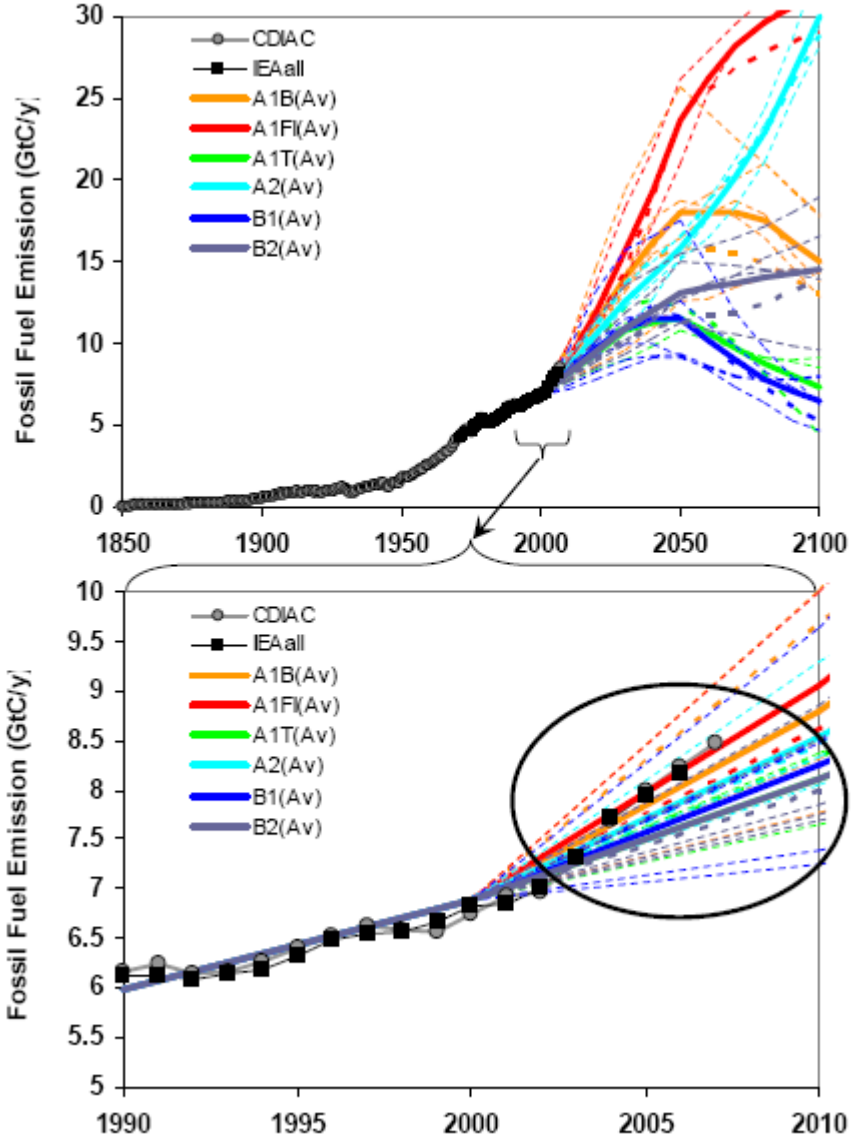
- Day 0: 1300, V= 4.5 km
- Day 2: 1300, 0.7km
  Concentration=1,700 μg $m^{-3}$

Approximately 1t/sq. km over millions sq.km (satellite estimates)

Effects: radiative (regional climate forcing) + Health

# Global $CO_2$ emissions from fossil fuels

- Global $CO_2$ emissions from fossil fuels have accelerated since 2000:
  - 3.4 % per year 2000-2007
  - 1.0 % per year 1990-1999
  - 2 % per year since 1850
- These growth rates are at the high end of those assumed in emissions scenarios
- Recent (2007) data continue the high-growth trend




Raupach et al. (2007) PNAS
updated to 2006 with IEA (2008) data