World Day to Combat Desertification

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An Agrometeorological Perspective: The Effectiveness of Traditional Farming Systems in Combating Desertification and Guaranteeing Food Security

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Why family (traditional) farms are so important for global food security and welfare of countries ?

Family farms produce about 80 percent of the world's food.

84% are smaller than two hectares.

Farms above 50 hectares occupy two-thirds of global farm land.

In low-income countries, farms smaller than five hectares occupy up to 70% of farm land.

In most developing countries farms are becoming smaller and smaller.

FAO, 2014

The top 100 questions of importance to the future of global agriculture

J. Pretty et al., Int. J. Agric. Sust. 8(4), 2010, 219–236

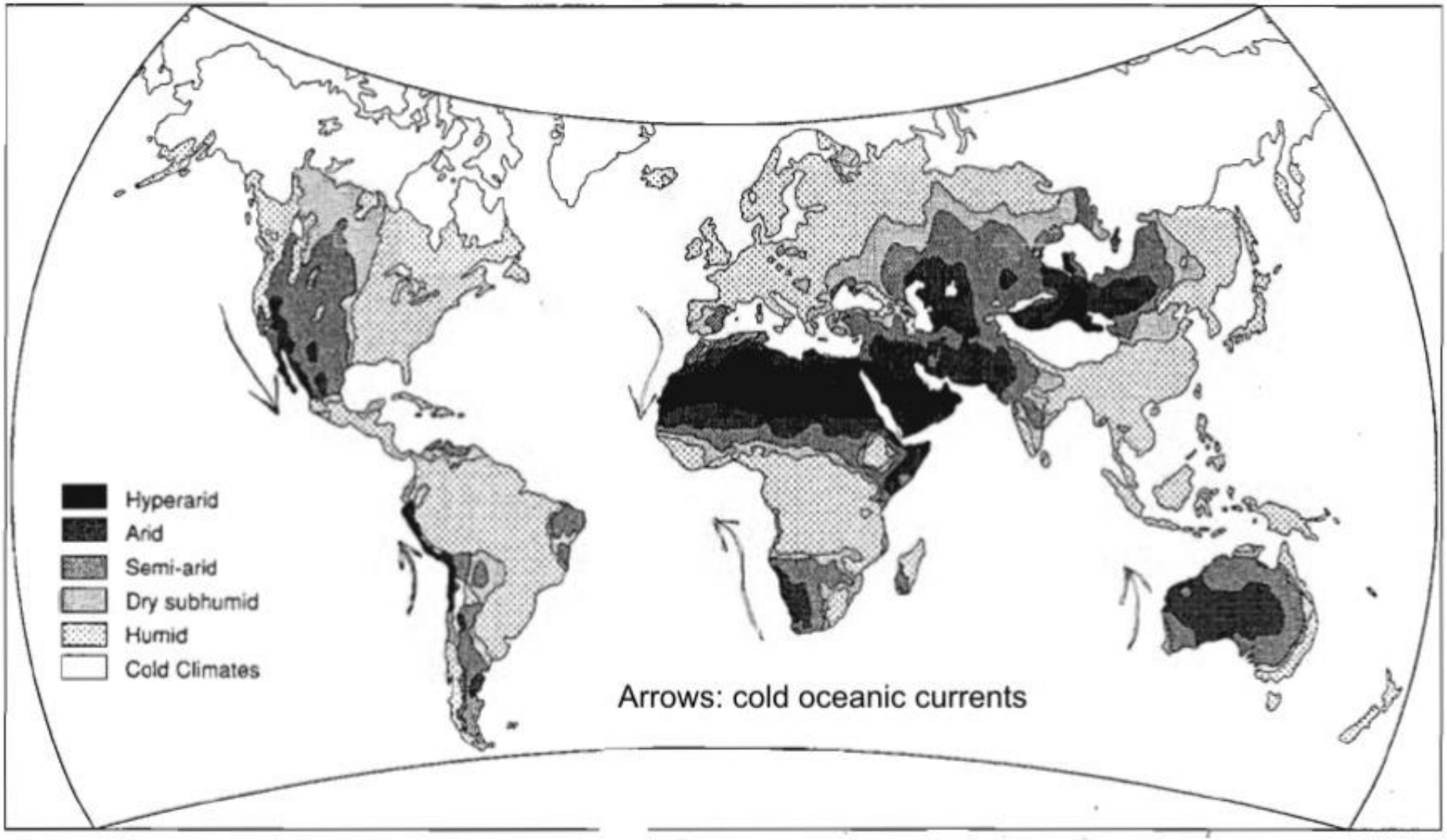
Agriculture unprecedented combination of drivers is **population growth**, dietary shifts, **energy and resource unsecurity**, **climate change** and variability.

The goal is no longer simply to maximize productivity, but to optimize across a far more complex landscape of production, rural development, environmental, social, economic outcomes.

Synergies and dialogue between policies, social, environmental, economic are fundamental to prioritize investments and research efforts.

Climate variability –

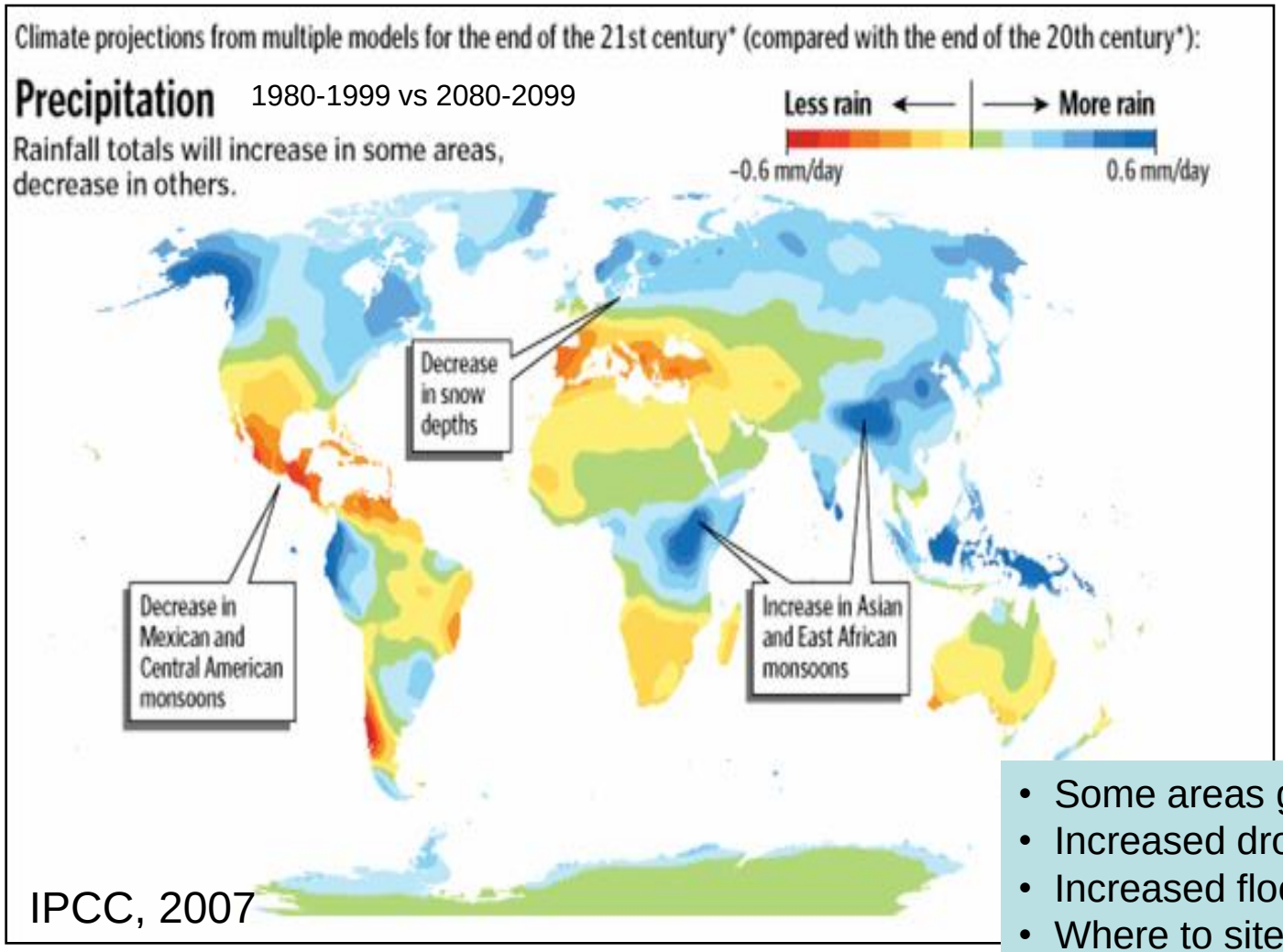
a main challenge for agriculture



Aridity zones of the world
Redrawn from a map in N.J. Middleton and D.S.G. Thomas, *World Atlas of Desertification*, United Nations Environment Programme, Edward Arnold, London, 1992, p. 4

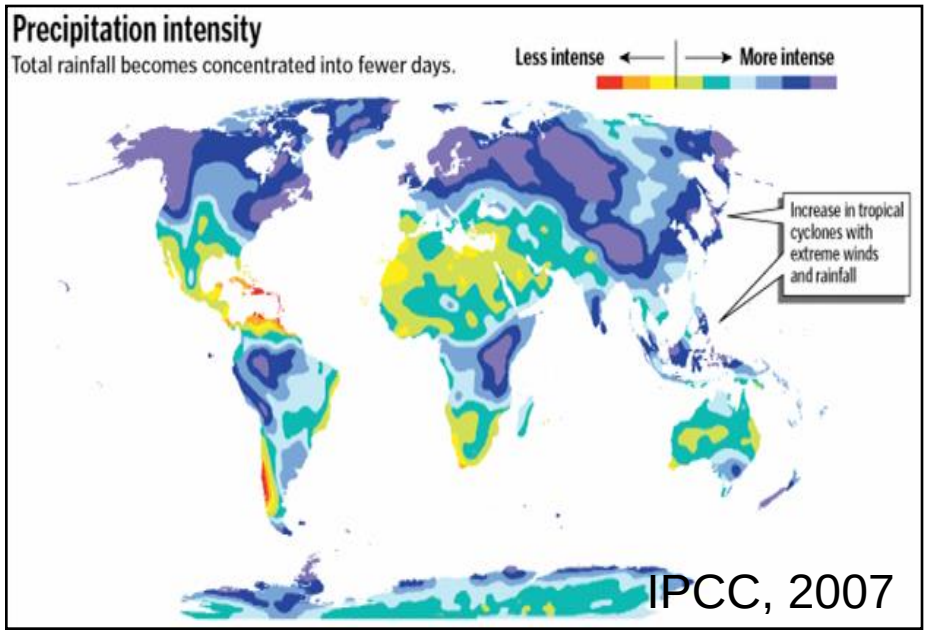
The climate (change) factors in the desertification process

Climate change effects on precipitation



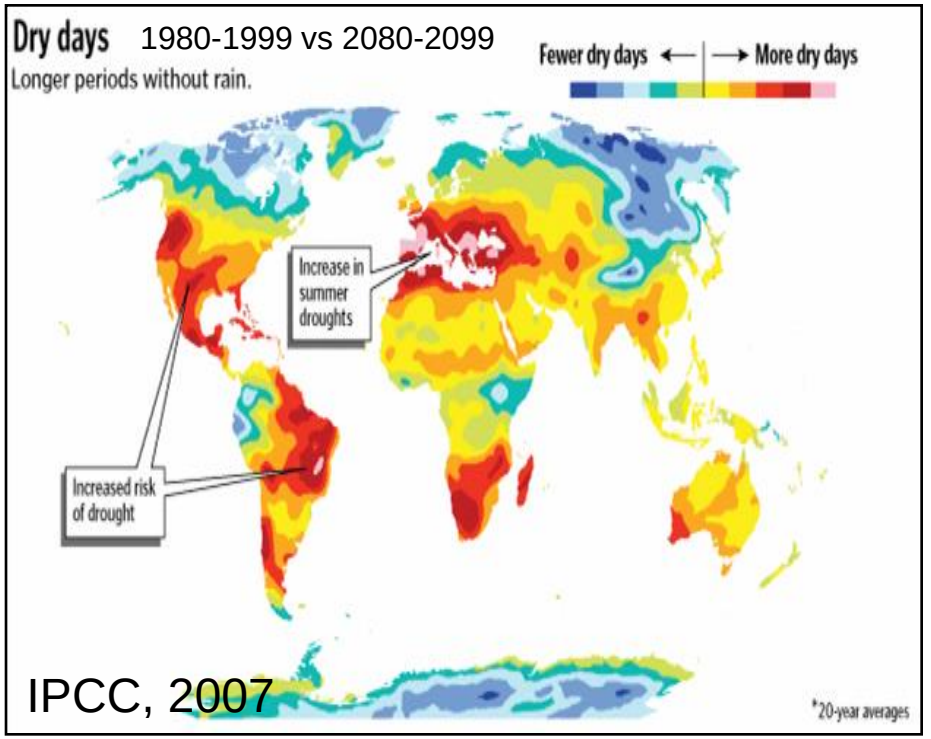
- Some areas get drier, some wetter
- Increased drought risk
- Increased flood risk
- Where to site irrigation projects
- Increased erosion risk

Changes in precipitation variability



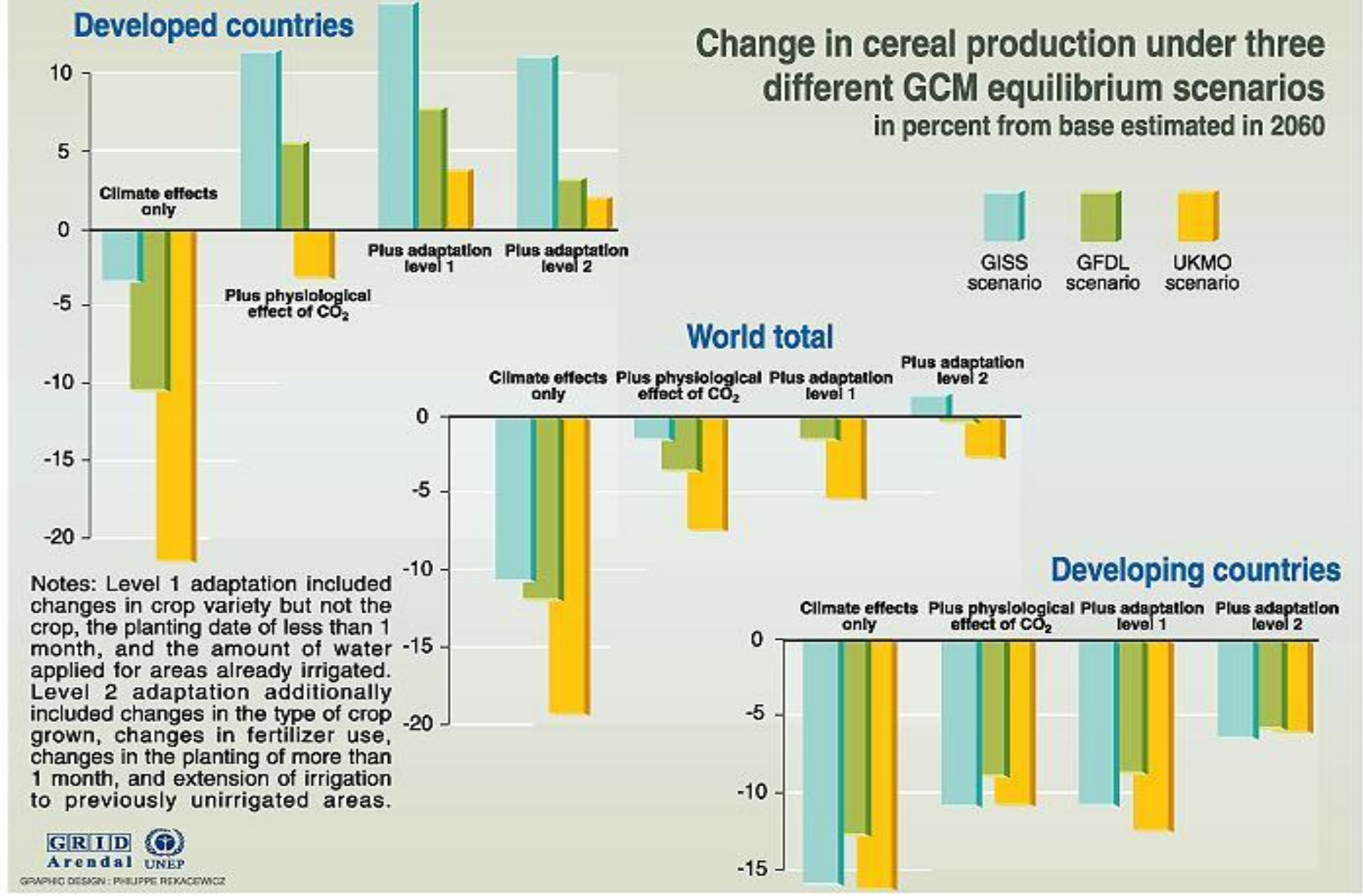
1980-1999 vs 2080-2099

- Increased risk of within season drought
- Reduced growing season (too wet, too dry)



Change in cereal production under three different GCM equilibrium scenarios

in percent from base estimated in 2060



Notes: Level 1 adaptation included changes in crop variety but not the crop, the planting date of less than 1 month, and the amount of water applied for areas already irrigated. Level 2 adaptation additionally included changes in the type of crop grown, changes in fertilizer use, changes in the planting of more than 1 month, and extension of irrigation to previously unirrigated areas.

GRID Arendal UNEP

GRAPHIC DESIGN : PHILIPPE REKACEWICZ

Source: Climate change 1995, Impacts, adaptations and miligation of climate change: scientific-technical analyses, contribution of working group 2 to the second assessment report of the intergovernmental panel on climate change, UNEP and WMO, Cambridge press university, 1996.

Mitigation options of African Climate Change

"When the land-use changes are switched off in the 21st century simulations, the warming is reduced by 59% and the rainfall reduction can be prevented almost entirely.

Thus, the local protection of vegetation and reforestation measures may be more effective for the mitigation of African climate change than the global reduction in GHG emissions“

Paeth, 2008


Land use feedback to regional climates !
In: Eitzinger et al., 2009

Improving microclimate : agro-forestry systems

Improving traditional farming systems and rural welfare

in developing countries should become a global priority (Stigter, 2010)

- Governmental support (**weather warning/forcast services, extension services, micro insurances, rural infrastructure, land rights**, **education**, ...)
- Transfer of knowledge: **farmers need to understand climate change to adapt**
- Successful examples by applying **participatory training approaches (bottom up)**
- New **low cost "high technology**" (e.g. pumps, sensors, ...)
- Use of local knowledge and experiences – but **adapt traditional (indigenous) techniques or methods to changing climate**
- Sustainable farming methods (i.e. **mulching, mixed farming, agroforestry**, **ecological farming** …)


Not the experts,
but the farmers will feed (save) the world
Thank you for attention !