Visions for Climate Change Mitigation in Agriculture

Conference on Carbon Credits for Sustainable Land Use Systems
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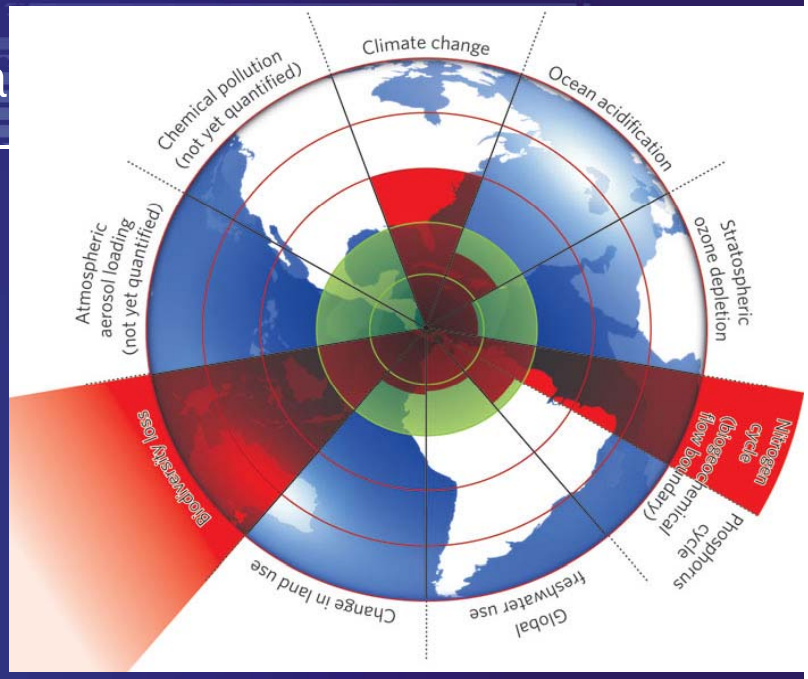
UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

Points Worth being Born in Mind

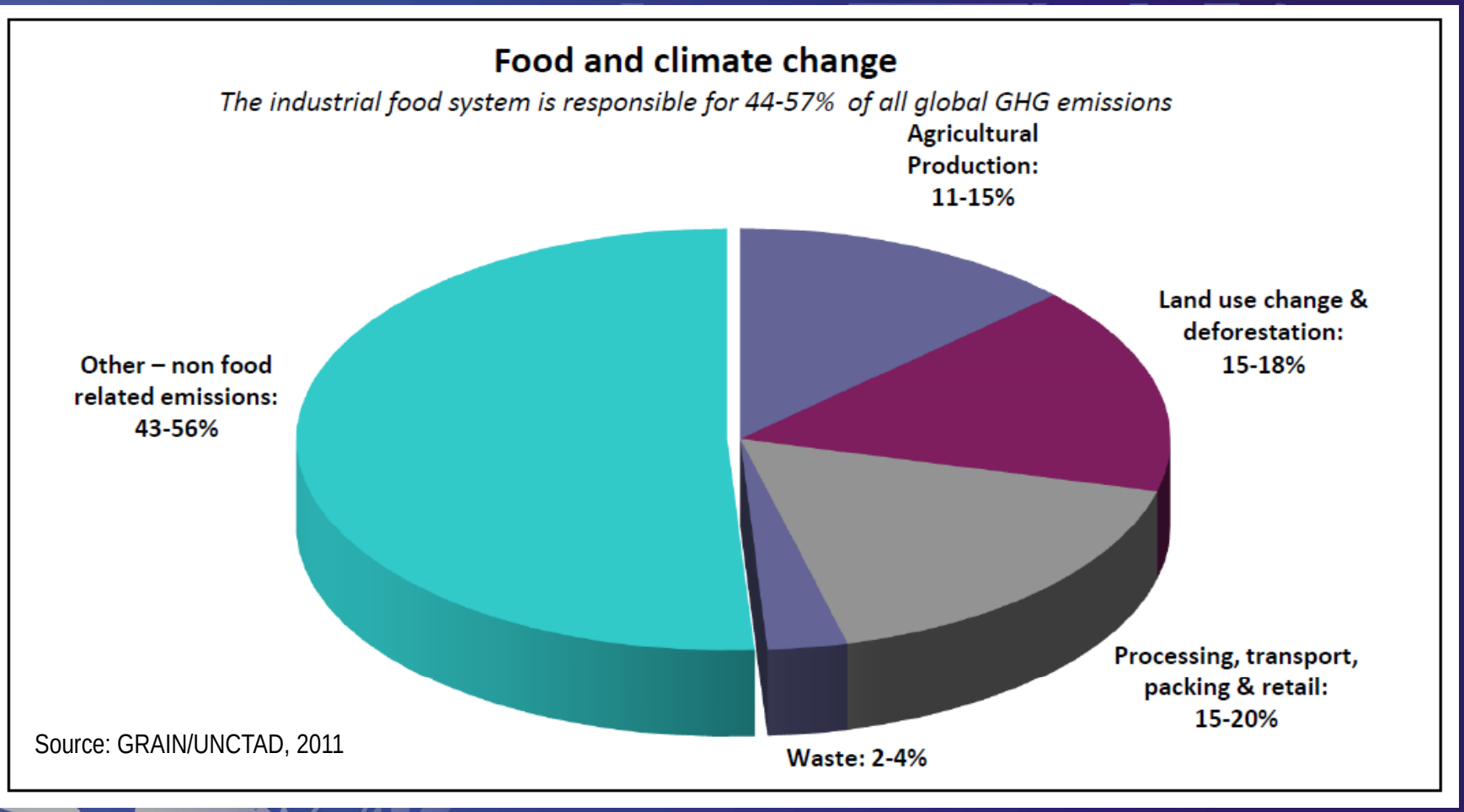
- Two global environmental boundaries have already been surpassed – caused by conventiona agriculture (the third boundary – climate change – is also very much agriculture-related).
- New dimension of resource-scarcity pressure:
  - (i) classical scarcities – fertile land, freshwater, energy, nitrogen, phosphorus;
  - (ii) new scarcities – new envirobmental limits that aggravate classical scarcities – climate change, ocean acidification, biodiversity loss; and
  - (iii) social issues that compound these scarcities – population & income growth in Africa, income growth in BRICs etc.



Source: Nature, September 2009

- How we define "efficiency, productivity and related technology" will determine the objectivity of our discourse on what we understand by "modern agriculture". Paradoxically, we currently consider production methods as "modern" that are among the most pollutant, most resource-squandering, most energy-intensive and most dependent on subsidies".

Direct and Indirect Emissions from Agriculture

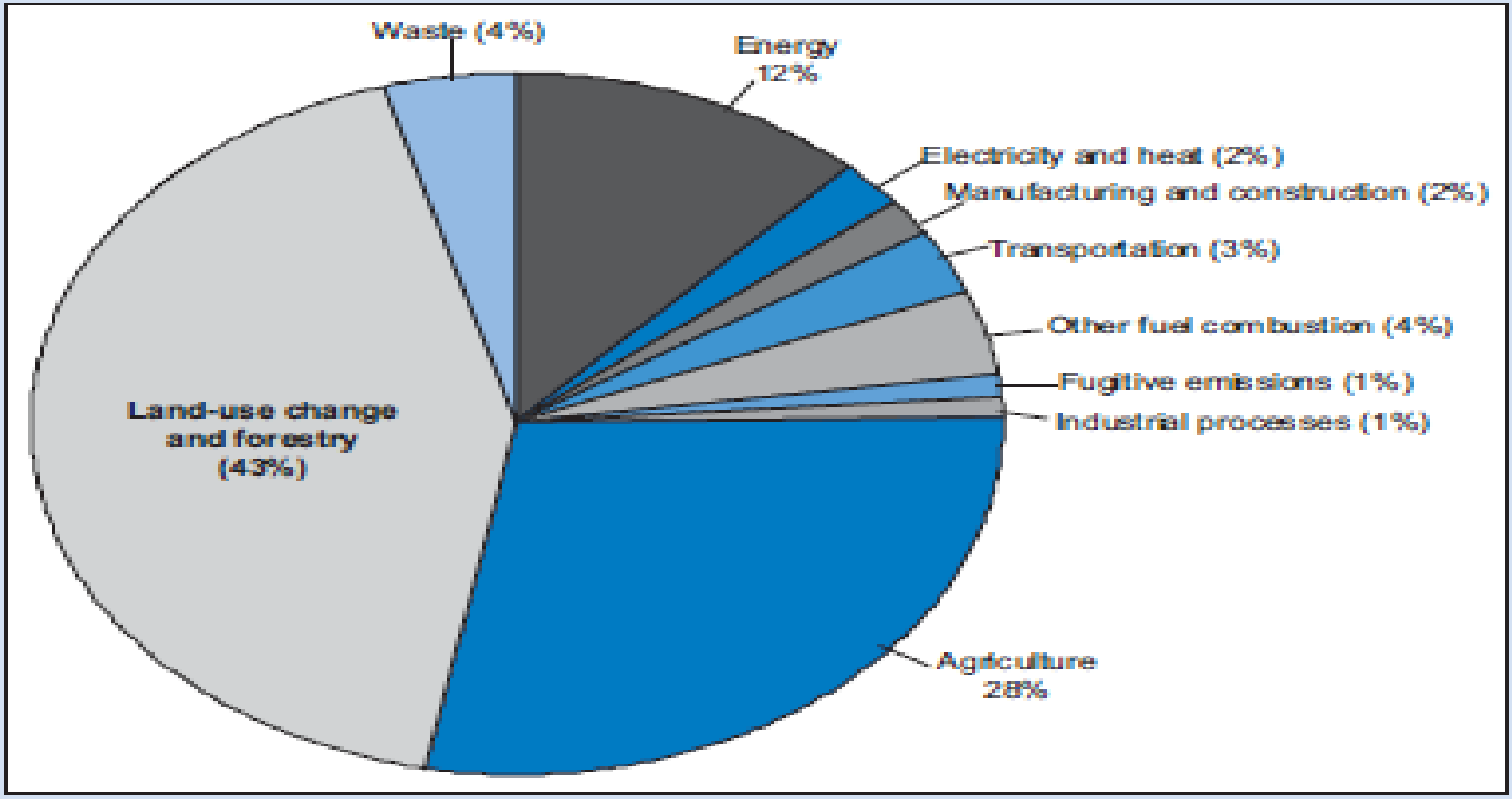


Source: Bellarby et al. (2008)

Importance of Agricultural GHG Emissions in LDCs

LDC GHG emissions by sector, 2005

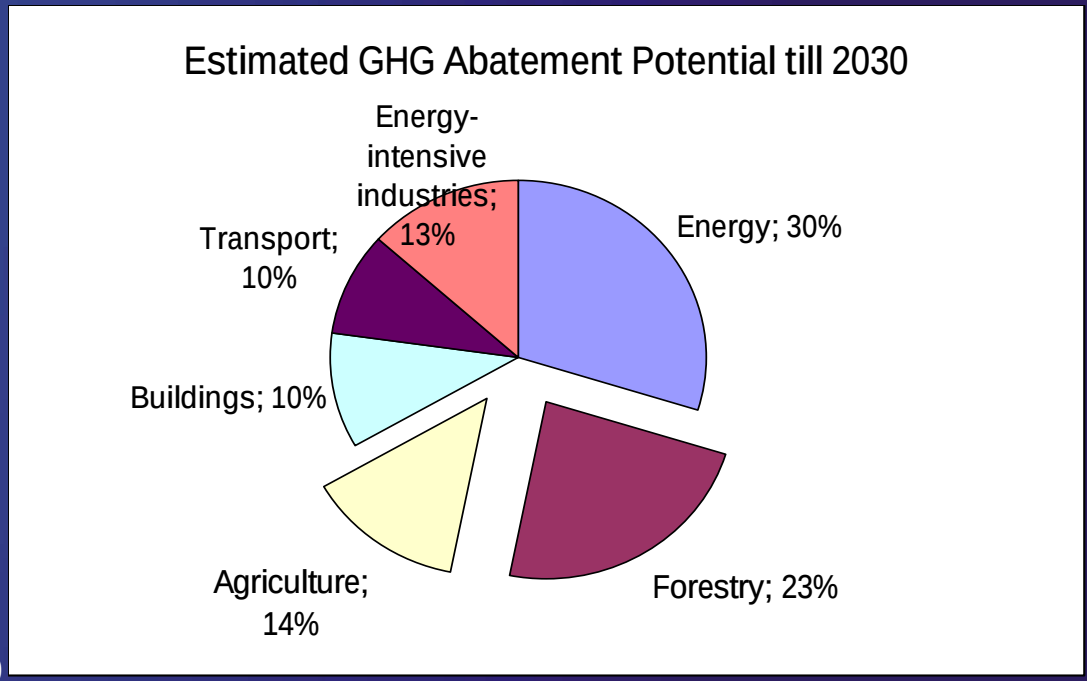
(Per cent of total emissions)



Source: World Resources Institute and UNCTAD, LDC Report 2010

Colossal Magnitude of CC Challenges for Agriculture

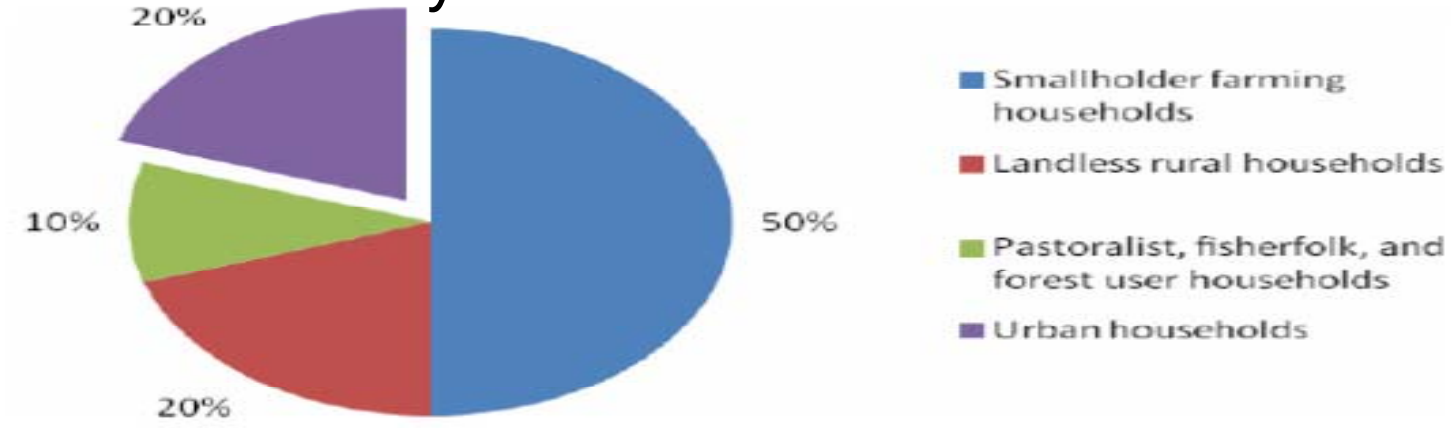
- Agriculture is very GHG-intensive: it accounts for about 13-15% of global GHG emissions, but only for about 4% of global GDP.
- Under a BaU-scenario, agricultural GHG emissions are likely to grow by 40-60% till 2030, when a decline of at least 30-40% is required.
- Agricultural productivity could decline by up to 50% in some regions till 2080.
- Agriculture has a very significant mitigation potential; and that at relatively low costs and with many economic and social co- benefits.



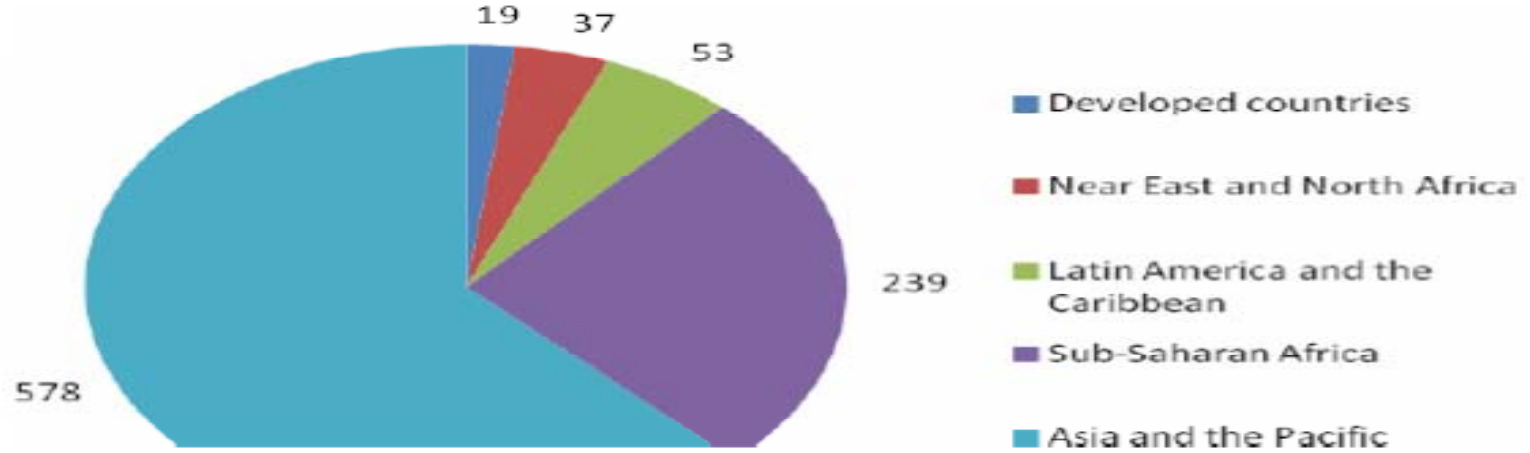
Source: McKinsey Global Institute, 2010

Where are the World's Undernourished?

Undernourishment by household in 2005



Undernourishment by region (2010, millions)



Source: Oxfam, Growing a better future, London, 2011

The Productivity Conundrum

- The perception that there is a supply side productivity problem is questionable. Hunger and malnutrition are mainly related to lack of purchasing power and/or inability of rural poor to be self-sufficient.
- What is needed is the intelligent use of nature, local knowledge and minimal external input use.
- Conventional agriculture increasingly encounters resource scarcities, lower productivity growth despite high external input use and serious contamination problems (nitrogen contamination, but one salient issue).
- Multifunctionality of Agriculture: (farmer is not only producers of agr products, but manager of an agro-ecological system):
  - Food
  - Water
  - Energy
  - Soils & Landscape
  - Biodiversity
  - Recreation
  - Education

Reproductive Ecological Capacity is of key importance

New Vision

- Food systems are at risk from gradual degradation of their own eco-system integrity & services. REQUIRED: Re-establishing systemic efficiency requirements and a stronger integration of patterns and socio-economic drivers of utilization of land, water, nutrients & hydrocarbon resources, based on better ecological knowledge (strengthening/re-creating regenerative capacity of agricultural systems: closed loops/little external input dependence, includes sufficient availability/generation of compost/green fertilizers).
- Need food systems that deliver a range of economic, environmental & social goals, while being resilient to risks and disruptions. Three major challenges:
  - Sustainable production challenge (9 bn people)
  - Equity challenge related to poverty eradication (multiplier effect of agriculture)
  - Resilience challenge (reduced vulnerability to climate change impact)
- Biodiverse, eco-functional and locally focused farming is resource efficient and conducive to localized control of production system – promotes revitalization of local food economy and strengthens food sovereignty.

New Vision (cont'd)

- Skewed power relations, market dominance, cost/price distortions, and unequal consumption patters are the key problems – required fundamental changes are easier at times of revolutionary, rather than evolutionary changes (Fukushima disaster, inundations in Pakistan and Thailand)
- Livestock production is key climate hotspot in agriculture (in Germany, 70% of GHG emissions and 61% of all cultivated land destined for animal protein production, plus the equivalent of the surface of Belgium for imported soy-bean feed).
- Overall strategy:
  - Making low-input systems more productive and efficient (high output)
  - Making high input systems less harmful and problematic
- Greenwashing (continuing with modified business as usual):
  - Climate-smart agriculture / doing more with less
  - Superficial change: techno innovation, green inputs, institutional change

Potential of OA to Reduce GHG Emissions

Tabelle 10.2: Theoretisch mögliche Treibhausgas-Reduktionspotenziale bezogen auf die landwirtschaftliche Gesamtproduktion in Deutschland: Jeweils „klimaschutzoptimales" Verfahren im Vergleich zur durchschnittlichen gegenwärtigen Praxis

Produkt bzw. Verfahren*	**Gesamt-produktions-menge in Deutschland 2006** in Tonnen	**THG-Emissionen 2006** in t CO_2-Äquivalente	**Reduktions-potenzial** in Prozent der produkt-bezogenen Emis-sionen	**Reduktions-potenzial** in t CO_2-Äquivalente	**Reduktions-potenzial** in Prozent der Gesamt-emissionen der deutschen Landwirtschaft
Getreide ohne Futtergetreide	23.380.000	9.200.000	-65%	**-5.800.000**	**-4,4%**
Kartoffeln	11.624.000	700.000	-9%	**-100.000**	**< -0,1%**
Zuckerrüben	25.285.000	1.100.000	-47%	**-500.000**	**-0,4%**
Raps	5.052.000	4.100.000	-56%	**-2.200.000**	**-1,6%**
Schweinefleisch	4.213.000	13.000.000	-43%	**-5.800.000**	**-4,3%**
Milch	27.995.000	23.800.000	-25%	**-6.000.000**	**-4,5%**
Rindfleisch	1.284.000	9.600.000	-13%	**-1.300.000**	**-1,0%**
Humusaufbau auf Ackerland			-500 kg/ha/Jahr	**-5.400.000**	**-4,1%**
Biogasanlagen			-10% der THG Tierproduktion	**-4.600.000**	**-3,5%**
Wiedervernässung von Moorflächen		36.900.000	-100%	**-36.900.000**	**-27,7%**
Gesamtpotenzial zur Reduktion von Treibhausgasen				**-68.600.000**	**- 51,6 %**

*Bis auf das Verfahren „Bullen-/Ochsenmast aus Milchviehkälbern" sind die Reduktionspotenziale definiert als Umstellung von durchschnittlicher konventioneller [konv] auf ökologische ‚best-practice'-Wirtschaftsweise [öko_plus-Verfahren]. Im Fall des Verfahrens „Bullen-/Ochsenmast aus Milchviehkälbern" besteht das THG-Reduktionspotenzial in der Umstellung ökologischer Ochsenmast aus Milchviehkälbern auf konventionelle Bullenmast, da dieses das klimafreundlichere Verfahren ist. Die Wiedervernässung landwirtschaftlich genutzter Moorflächen bezieht sich auf alle dort durchgeführten Bewirtschaftungsformen.

Quelle: IÖW, eigene Berechnungen auf Grundlage der Klimabilanzierung, sowie Daten der FAL (2000) für Kartoffeln, Zuckerrüben und Raps, des FiBL (2007) zum Humusaufbau, sowie Angaben aus dem Nationalen Inventarbericht (Umweltbundesamt 2005) zu dem Treibhausgasemissionen aus der Moornutzung. Zahlen der Spalten 2 und 4 gerundet auf 100.000.

Summing Up

- The world needs a paradigm shift in agricultural development: From a “Green Revolution“ to an “Eco-intensification“ approach.
- Meeting the food security challenges is primarily about empowerment of the poor and their food sovereignty.
- Sustainable agricultural practices meet the five-fold challenge of food security, promoting equitable economic and social development, overcoming resource constraints and preserving biodiversity.
- Governments need to remove a spate of direct and indirect disincentives to sustainable agriculture (will free resources).
- Public investment needs to be considerably strengthened in R&D and in extension to shift from input intensive to knowledge intensive agriculture.

Summing Up

- Recommendation of EC Standing Committee on Ag Research 3rd SCAR Foresight Exercise: “Approaches that promise building blocks towards low-input high output systems, integrate historical knowledge and agro-ecology principles that use nature’s capacity, should receive the highest priority for funding.” (February 2011)

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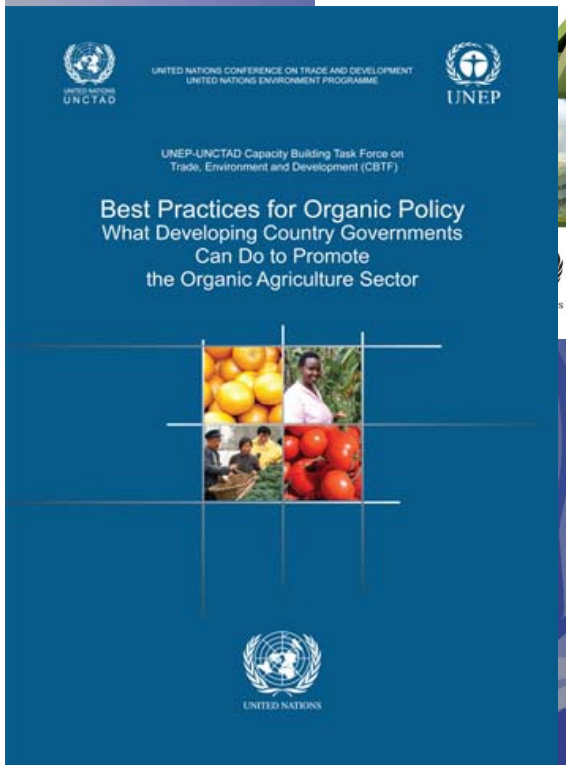
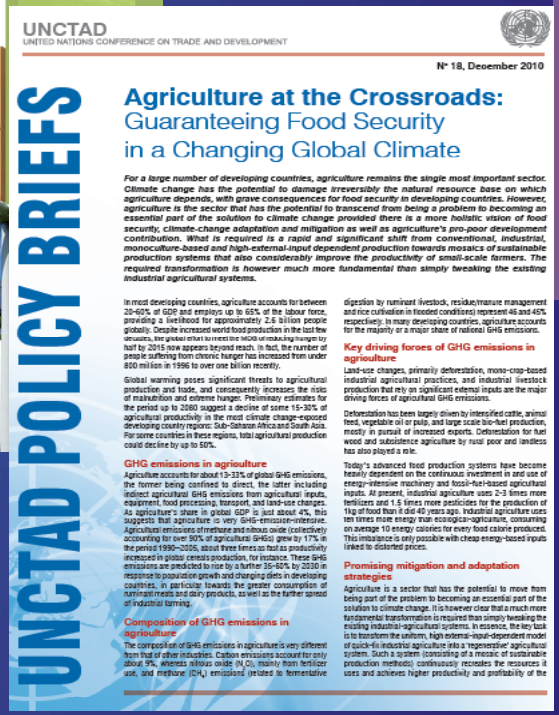
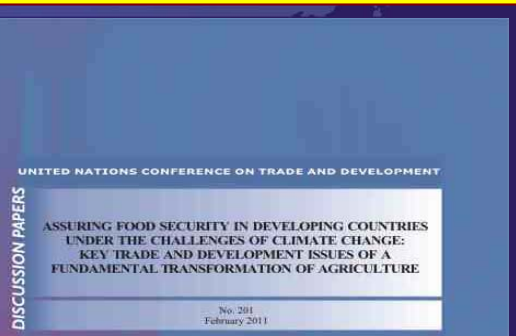
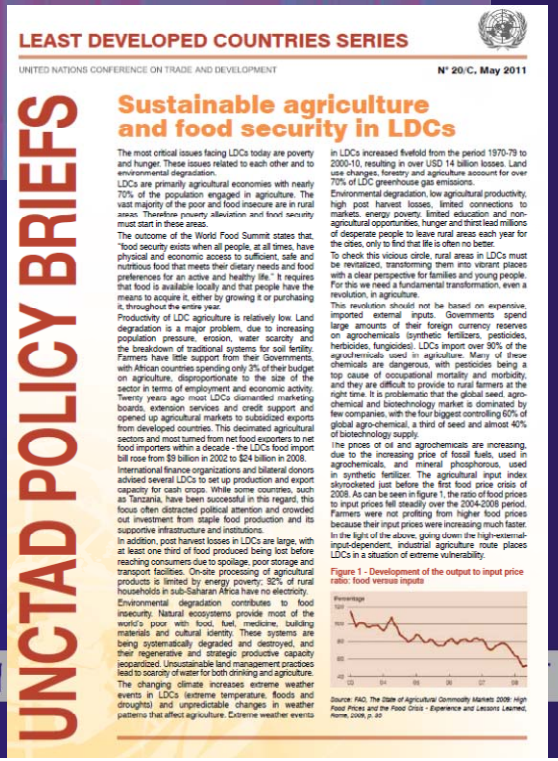
THANK YOU









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