



How do small scale farmers in drylands may survive in a climate changed world? Some ideas

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Overview

- What are we talking about?
 - definition
- Future Scenarios
 - Temperature rise
- Implications for Small Scale holders & Food Security
 - Emerging Interventions
 - Best practices
- Significance of Current Proposals
 - Annex of the Negotiating document



Definition of the Concepts

- Small scale (SS) agriculture (World development report 2008)
 - 3 billion people live in rural areas, depend directly on agriculture in developing countries
 - 1.5 billion smallholder and landless farmer
 - 29% of global GDP produced by agriculture in developing countries, using 65% of workforce
 - Value chain: agricultural inputs accounts for 30% of industrial GDP in developing-urbanized countries
 - Agriculture major user of water and responsible for about 1 / 3 of GHG emissions,
 - Potential to sequester carbon in soils is relevant.
- Desertification
 - Land degradation in drylands
 - Drylands – arid and semi-arid areas: 41% of the Earth's land mass
 - Land degradation – loss of productivity in soil, impacts on livelihoods
- Climate Change (CC)
 - Will exacerbate desertification



IPCC 2007: Mitigation potential in agriculture

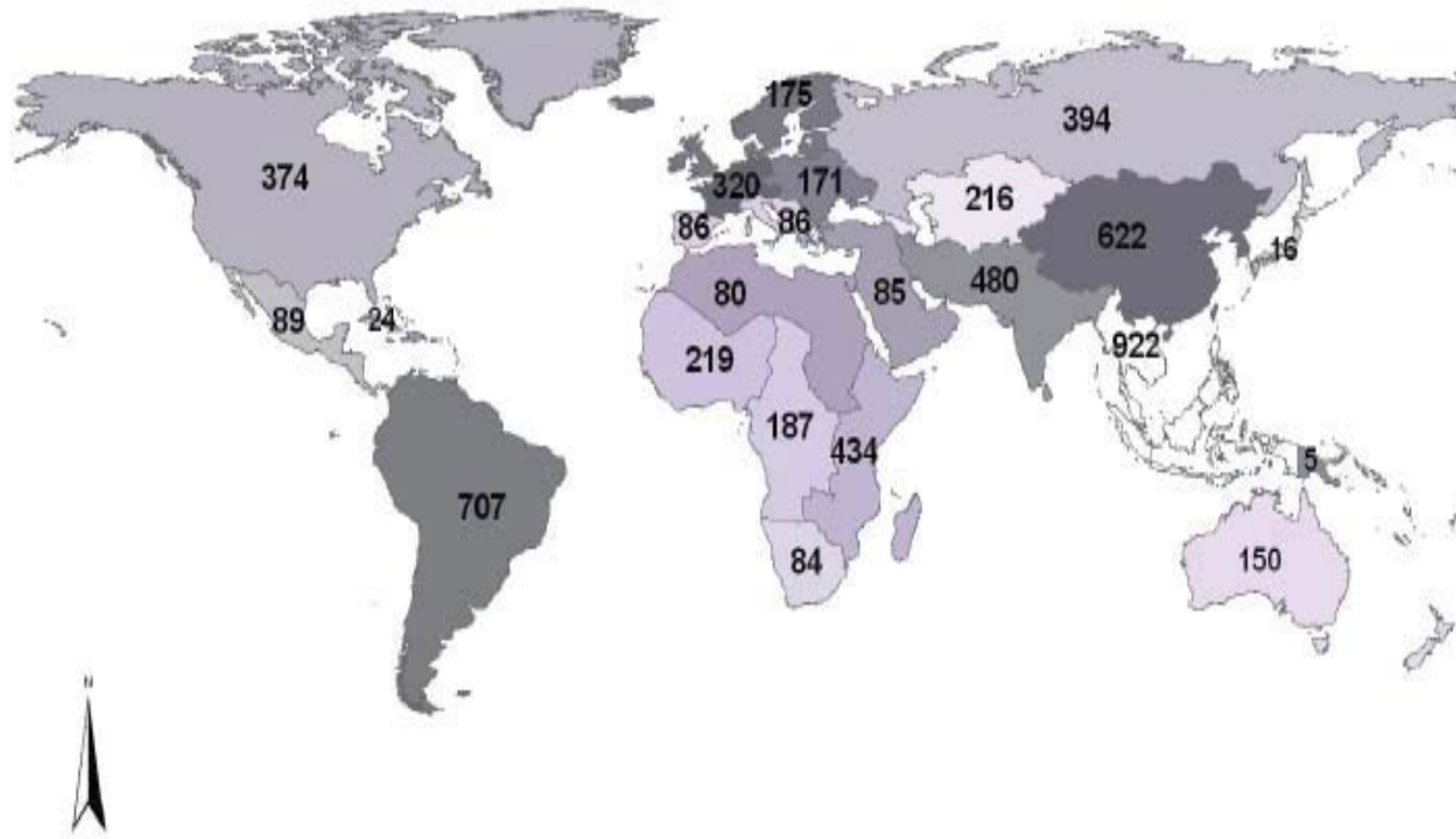


Figure 8.5: Total technical mitigation potentials (all practices, all GHGs: MtCO₂-eq/yr) for each region by 2030, showing mean estimates.

Note: based on the B2 scenario though the pattern is similar for all SRES scenarios.

Source: Drawn from data in Smith et al., 2007a.

UNEP-UNDP-UNCCD 2009 research

Table 1. Comparison of total and drylands carbon stocks in regions of the world

Map number	Region	Total carbon stock per region (Gt)	Carbon stock in drylands(Gt)	Share of regional carbon stock held in drylands (%)
1	North America	388	121	31
2	Greenland	5	0	0
3	Central America & Caribbean	16	1	7
4	South America	341	115	34
5	Europe	100	18	18
6	North Eurasia	404	96	24
7	Africa	356	211	59
8	Middle East	44	41	94
9	South Asia	54	26	49
10	East Asia	124	41	33
11	South East Asia	132	3	2
12	Australia/New Zealand	85	68	80
13	Pacific	3	0	0
Total		2053	743	36



Why Drylands Matter for Agriculture

- Origin of 30% of world's cultivated plants (MA)
 - Location of globally important endemic plants
 - Wheat, rye, oats, barley, olives, saffron
 - Cotton
 - 8 of 25 biodiversity hotspots in drylands
- Support 50% of the world's livestock (MA)
 - ½ of world's livestock diversity
- Drylands population = 2 billion people
 - Approx. 90% (1.8 billion) in developing countries
 - Majority small holder farmers (agriculture & livestock)





Small scale agriculture: characteristics

- Large population in marginal areas: more than 50% (WDR 2008)
- Rely on traditional (indigenous) plants, practices and culture
 - ie, non-improved seed and breeds
 - Traditional practices
- Rely on rainfall
- Lack of secure land tenure (lease hold)
- Lack information (market information for example)
- Lack safeguards, insurance for investments
 - Mixed farming = de facto insurance





Some CC Impacts on Tropics and Sub-tropics

- Decrease in precipitation
- Increase in evapo-transpiration
 - ground water loss
- Loss of endemic species



Food (In)Security –Under CC Scenarios



- Extreme risk
- High risk
- Medium risk
- Low risk
- No Information

Matthew MacDermott: -<http://www.treehugger.com/files/2010/09/how-will-food-security-be-affectedclimate-change-energy-water.php>



Some Scenarios

- Assume:
 - Need to allow for regional/local studies of climate impacts on agricultural dryland soils
 - CC impacts on agriculture – will vary from region to region
- Extrapolating historic agricultural pattern changes
 - The drier it gets more herding/livestock
 - Example (Africa)
 - Rainforest areas become shrub-land
 - Population density decreases with aridity increase (MA, 2005)
- Extrapolating from IPCC: anticipated biome changes



SS Agriculture under CC Scenario

- IPCC Projections of temperature rise
 - 0.5–1.5° C: 10–15% world species in danger of extinction
 - Next 2 decades 0.2°C temperature rise expected
- Outcome Scenario
 - Small-holder farmers' response
 - Regular crop failure: some crops temp. sensitive
 - Maize (29°C), soybean (30°C), cotton (32°C)
 - Reduced production
 - » Maize production falls by 33% in Tanzania
 - » Cotton production will decrease
 - » Traditional coffee growing zones to change
 - » Wheat, maize and barley production falls in Argentina, South America



SS Agriculture under CC Scenario

- Other adaptation decisions: migration (internal external) and economic losses:
 - Women and youth most vulnerable
 - Move from farming to herding/livestock rearing
 - Decrease investment in agriculture overall
- Livestock herders
 - Loss of herds, investment lost
 - Land abandonment (Northern Kenya)
 - Loss of social, cultural diversity (pastoralists)
- By contrast
 - Wine production may increase with 1.2–1.4°C rise in California, Italy and Spain and northwards



SS Agriculture under CC Scenario

IPCC projections of 1.5–2.5° C rise

- 20–30% of species in danger of extinction
- 20–80% of tropical Amazon forest and its biodiversity
- 40–50% of endemic vegetation in South Africa, Namibia
- NB: current negotiations target max. 2° C

- Outcome Scenario
 - Small-scale farmers' responses
 - Systematic and systemic crop failure
 - Shift to livestock rearing
 - Non-investment (potential collapse of sector)
 - Land abandonment
 - Migration (more humid areas, urban areas)
 - Livestock herders
 - Loss of herds, investment lost
 - Land abandonment (Northern Kenya)





SS Agriculture under CC Scenario

- IPCC projections of 2.5–3.5° C temp. rise
 - 15–40% extinction of endemic species in mega diverse places
 - Adaptation of ecosystems a must
 - 50% of natural reserves cannot adapt
 - Water scarcity

(Temperature rise of 2.5°C expected by 2050)

- Outcome scenario
 - Coffee production in Central America falls by 30%
 - Sugar production in Fiji falls significantly



Current Adaptation/Resilience Measures

- Insurance schemes for small-holder agriculture
 - insurance against against crop failure
 - Ethiopia & Kenya
 - recovery/rehabilitation/preventing land degradation
 - First Soil Carbon sequestration agreement signed
- Security of Land tenure
 - Land reforms (Kenya)
 - Leasehold forestry project in Nepal



Actions Taken

- Investments
 - Infrastructure Development
 - Kenya, Uganda & Tanzania
 - Micro-finance
 - Village funds in Syria & Kenya
 - Market Access
 - Investments to large firms for risky projects to stimulate small-holder production (Africa Enterprise Challenge Fund)
 - Support for science-driven agriculture
 - Alliance for a Green Revolution





Actions Possible way forward

- Drylands have the potential to play a role in climate mitigation and adaptation, delivering significant co-benefits
- On Mitigation: to demonstrate the feasibility (cost-benefit); developing strategies for improving drylands soil carbon stocks; public-private partnerships; creation of a knowledge base on dryland soils, foster further research; strengthen national / local institutions.



On adaptation

- Possible policies / strategies to reduce the vulnerability (strengthening alternative livelihoods) and increase resilience: SLM and drought risk management, rainwater harvesting, drought resistant crop varieties, agro-forestry and efficient energy use
- Adaptation action in drylands to focus response to biodiversity and ecosystem approach, environmental impact assessments, and principles of sustainable use.
- Mainstreaming SLM, drought risk management and biodiversity considerations into the design, implementation and monitoring of adaptation action at local, national and regional levels



On adaptation

- Adaptation to address in a concerted manner, poverty reduction, vulnerability to climate change (achievement of the MDGs).
- Research and information sharing on contributing factors and how to combat desertification (policies, measures, research)
- Partnership building for sustainable investments
- Institutional strengthening at local level: governance empowerment and capacity development: targeting women and youth



Thank you

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