



Food Security, Disaster Risk Management and Space-based Solutions in Africa: Identifying some of the Main Issues

Presented by

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At the

UN-SPIDER Regional Workshop

**“Building Upon Regional Space-based Solutions
for Disaster Management and Emergency Response for Africa”**

Addis Ababa, 06-09 July 2010

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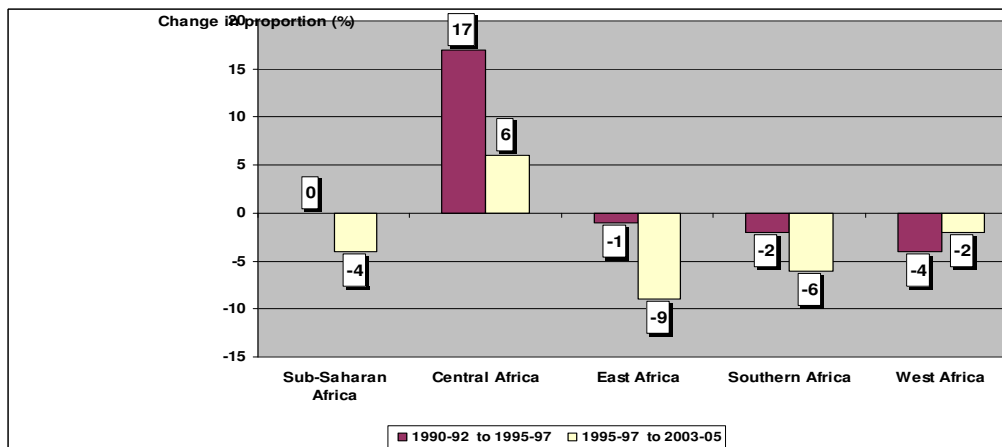
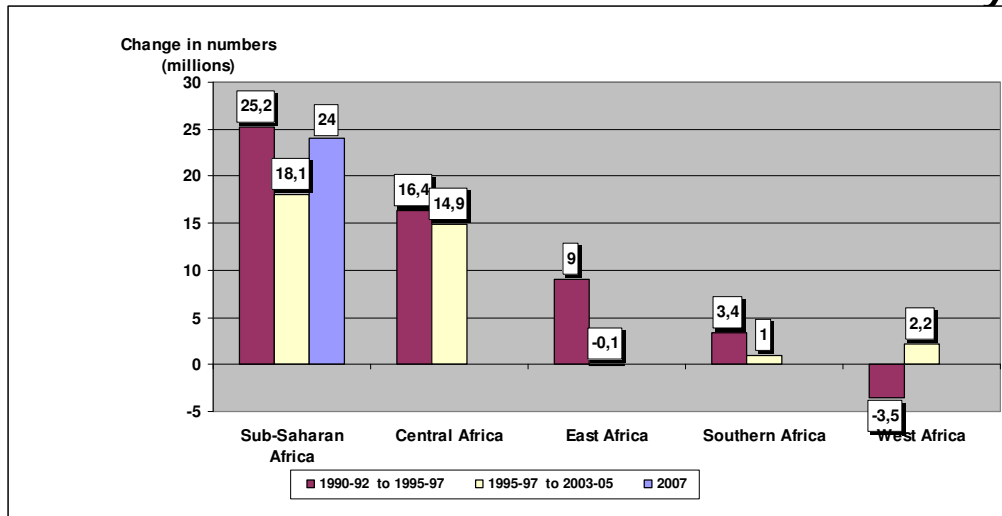


Outline

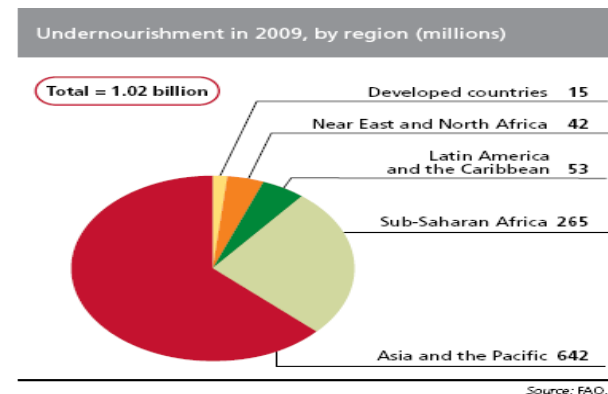
- As A Way of Introduction: The State of Food Insecurity and Hunger
- Conceptual and Measurement Issues
 - Interrelationships between Food Security and Disasters
 - Typology and Main Patterns of Food Emergencies Across Africa
- A Focus on the Production Stage and on Climate and Hydro-Meteorological Factors
 - Agricultural Production and Environmental Factors
 - Population Density and Soil Suitability
 - The AU Strategic Approach - Promoting Regional Value Chains of Strategic Commodities, and its Requirements in Spatial Data

As A Way of Introduction - The State of Food Insecurity and Hunger

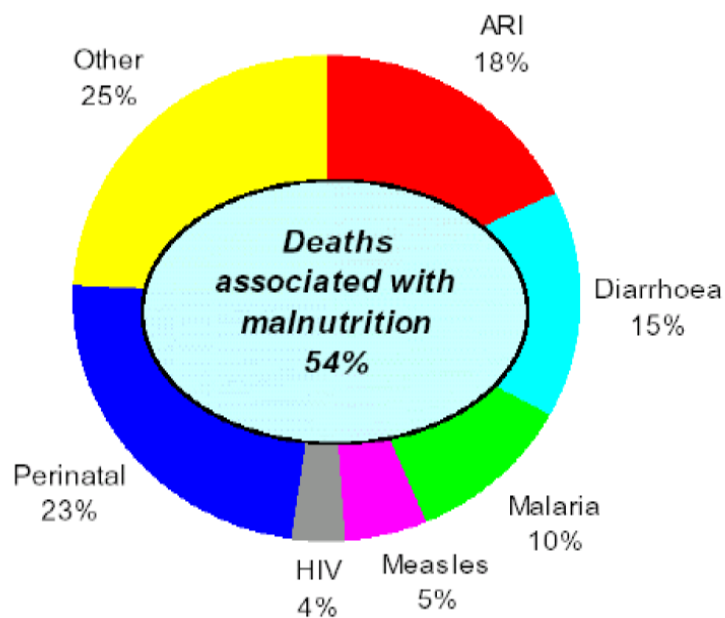
Food Insecurity and Hunger on the Rise ...



- High concentration of hunger –in terms of both number and prevalence of undernourished people – in East and Central Africa
- Democratic Republic of the Congo and Ethiopia host 38 per cent of the hungry people in SSA, and 80 per cent and 41 per cent of those of their respective sub-regions. Together with Nigeria and Tanzania, they account for almost half of the total of the sub-continent.
- Any substantial progress in these four countries would have an important impact on the containment of hunger, and therefore on poverty alleviation throughout the continent.

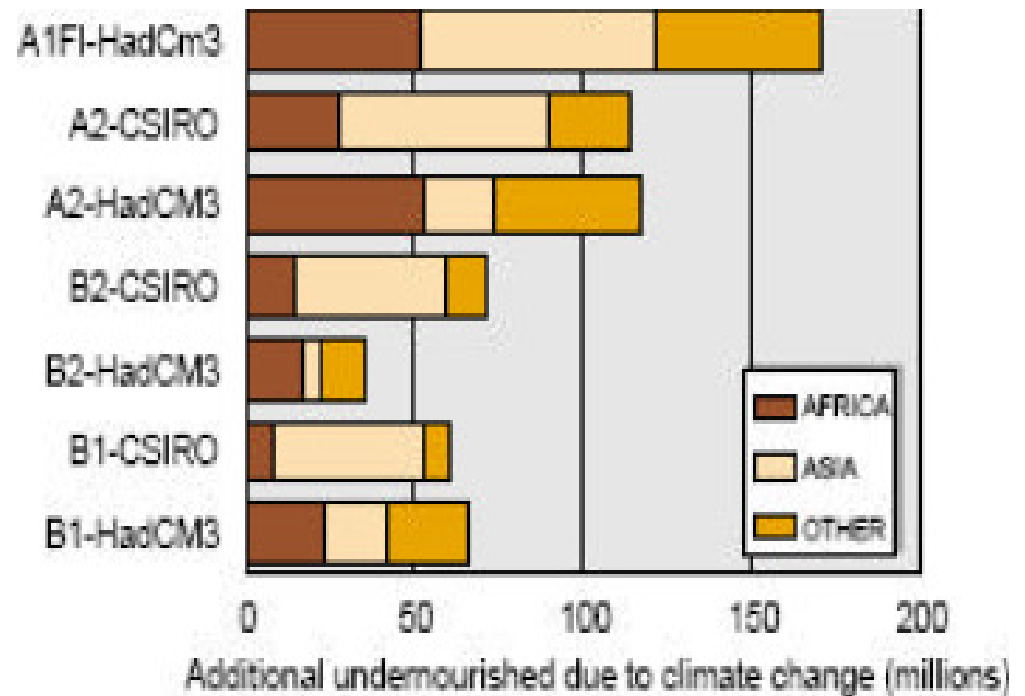


Malnutrition, Infant mortality, and CC



Source: WHO (2005) Note: Acute Respiratory Infection (ARI)

Proportional Mortality in Children in Developing Countries (Under 5 years Old)





Conceptual and Measurement Issues

FOOD SECURITY

*ABILITY OF A HOUSEHOLD TO GET ADEQUATE
FOOD, IN A STABLE AND SUSTAINABLE MANNER*

Adéquate: sufficient quantity and quality, culturally acceptable by the household.

Stable : every year and in every season.

Sustainable : sustainability of the activities ensuring the food security of the household.

Conceptual and Measurement Issues

Dimensions of Food Security

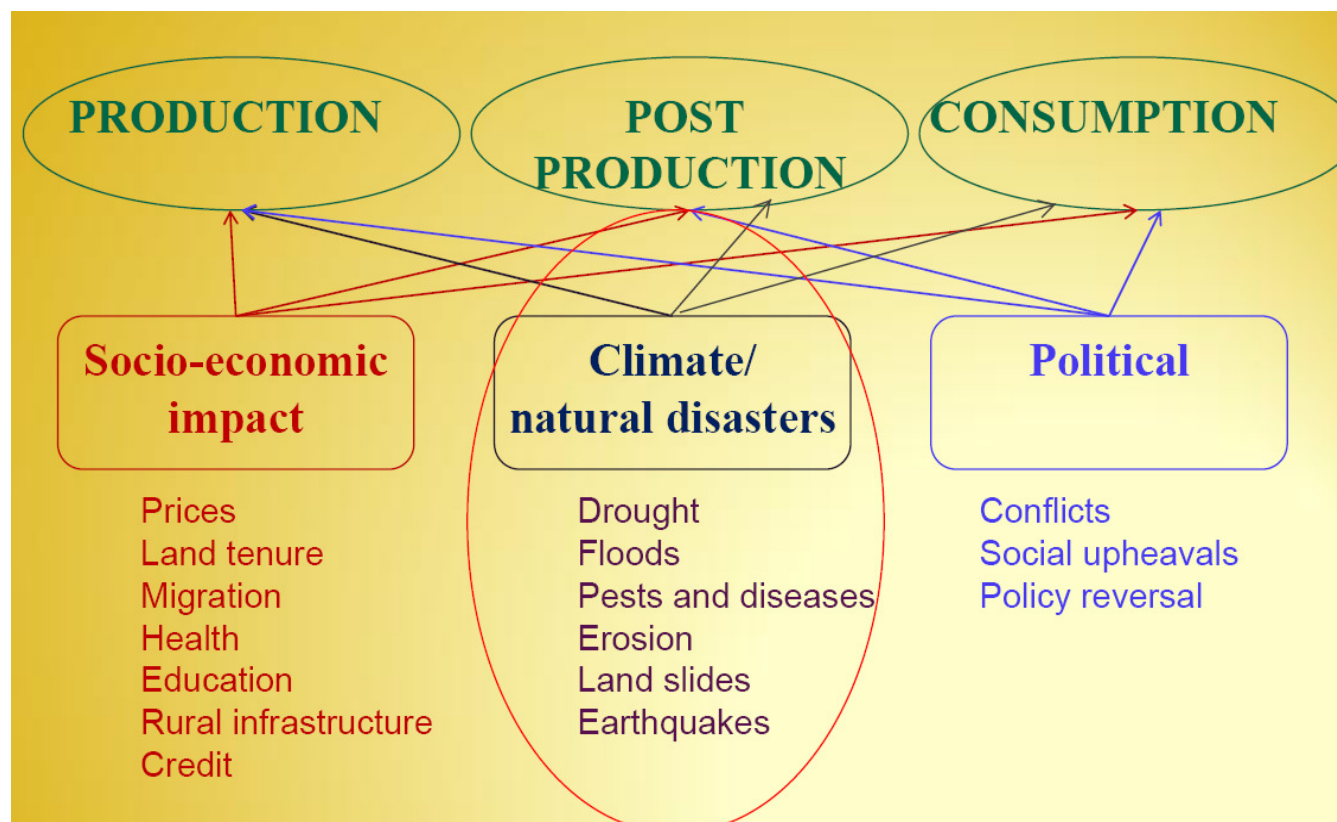
Availability

Accessibility

Utilization

FOOD CHAIN
STAGES

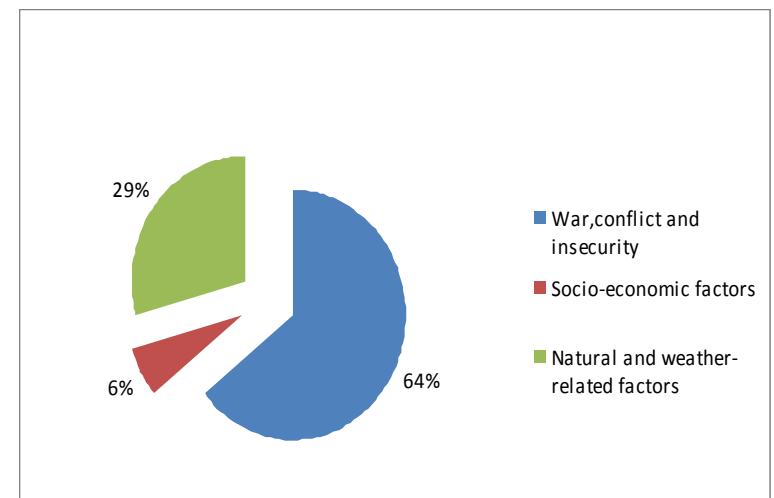
VULNERABILITY/
RISKS FACTORS



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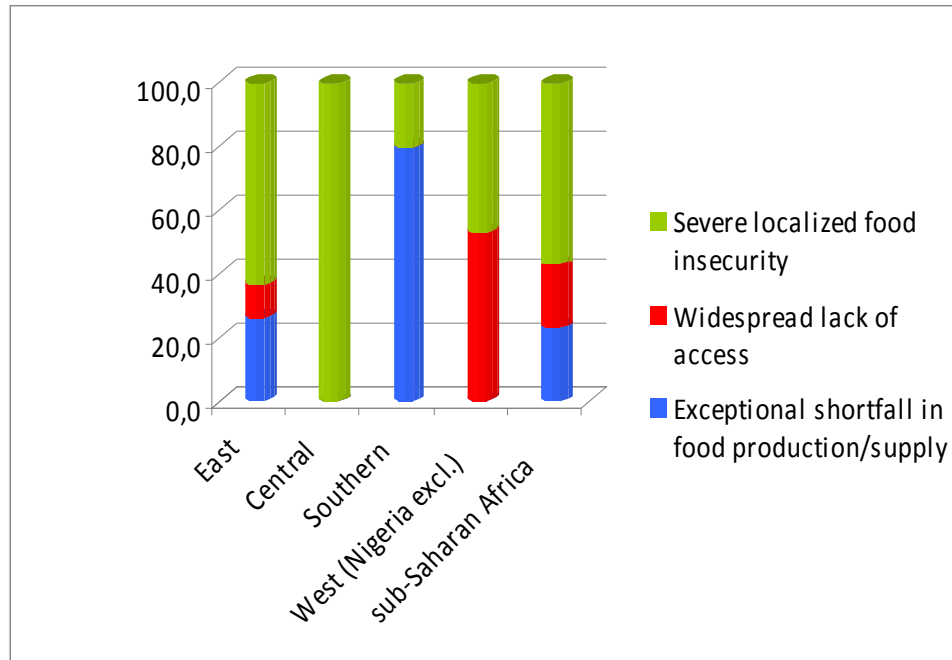
- **Disasters**: large scale shocks, affecting large numbers of people at the same time, risking large scale human hardship including famine.
- Aggregate disaster data suggests that **drought is still the most common natural disaster in the region**;
- Mounting evidence on the **likely impact of global CC** on Africa would suggest that the **recurrence and virulence of hydro-meteorological hazards, such as droughts and floods will increase**.

Natural and human-induced causes of disasters in SSA*

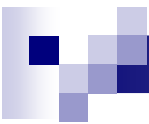


Typology and Main Patterns of Food Emergencies across Africa, 2005-09

Distribution (per cent) of food emergencies by nature and across the sub-regions



- Predominantly related to severe localized food insecurity, which are relatively more frequent (57 per cent) than crises resulting from:
 - a widespread lack of access (23 per cent) or an
 - exceptional shortfall in aggregate production/supply (20 per cent).



A FOCUS ON THE PRODUCTION STAGE & ON CLIMATE & HYDRO-METOROLOGICAL FACTORS

- **Agricultural Production** = F(Environment, i.e. soil quality, climate, water availability).
- **Combined effects of the Environment and of the factor endowment** → long lasting and area-specific patterns of LU, crop mix, techniques and skills, i.e. “*agricultural systems*”



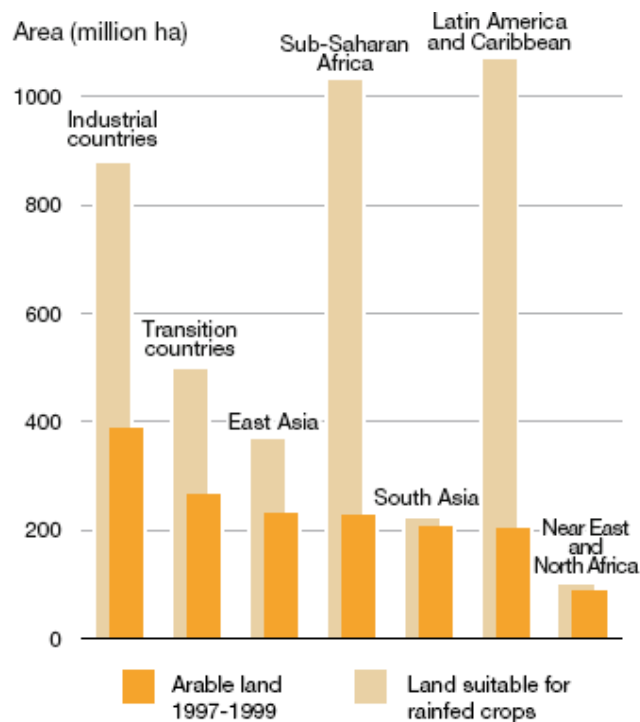
Some Output-Related Risks

- For any level of inputs and techniques, each product has its own maximum biological output under “perfect” weather conditions and pest or diseases prevalence
- Environment-specific varieties are more sensitive to deviations from ideal conditions
- Indigenous and innovative Soil and Water Management practices to correct intrinsic defects or to cope with weather variability
- The case of modern varieties of crops: the so-called HYV (high-yielding varieties)

Theoretical potential for cropland expansion ...

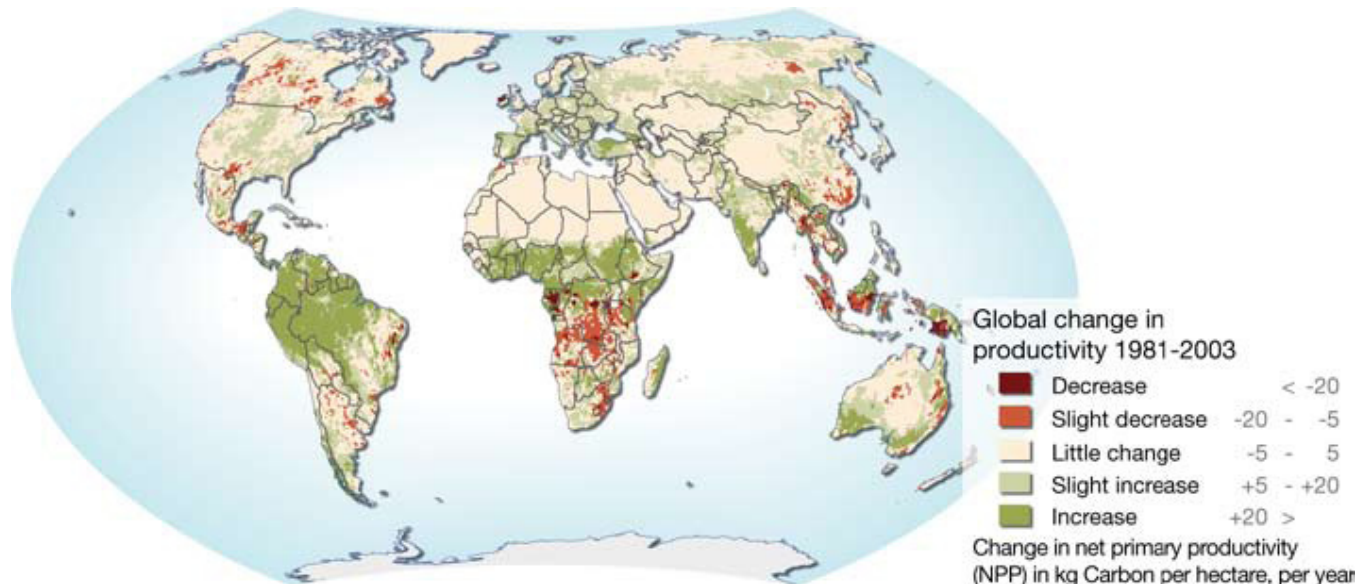
... Irrespective
of conservation, water and
other environmental
issues.

(Source: FAO, 2003).



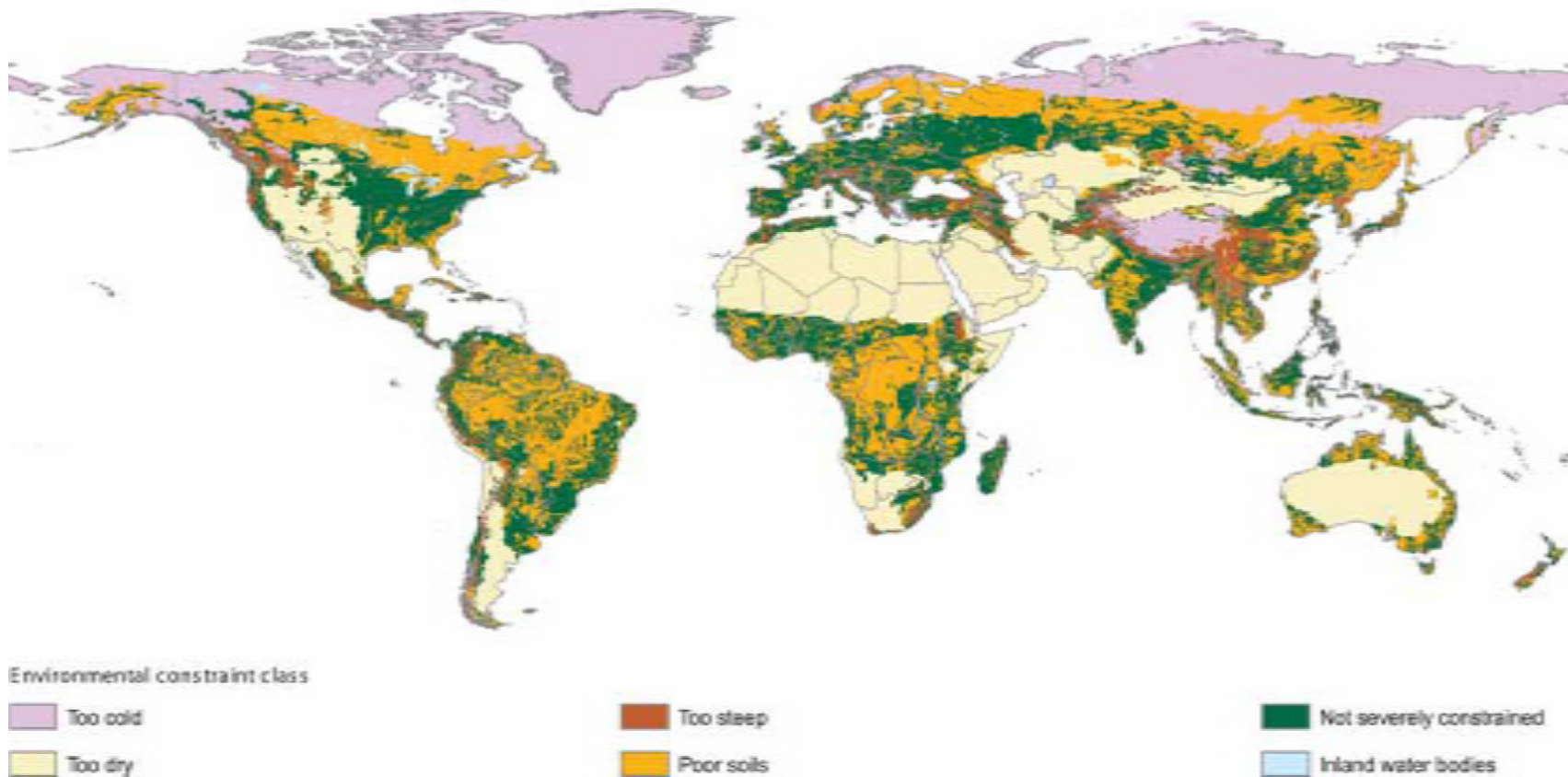
Impacts of Land degradation (drought & nutrient depletion & soil erosion) on Crop Yields, 1981-2003 ...

Also affects protein production by livestock



Source: UNEP. 2009, The environmental food crisis...

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Source: FAO, 2007, *Mapping biophysical factors that influence agricultural production and rural vulnerability*, Rome, 96p.

Addis Ababa, 06 July 2010

Extent of the world's rural land area with severe environmental constraints for rainfed crop production, Africa, Rest of the World

Major area and region	Rural area with severe constraints		Land area with severe constraints for rainfed cultivation of crops		
			too dry (LGP _{t=5} <60)	too steep (slope>30%)	poor soils**
	Km ² (1000)	share of rural area in the region (%)	share of rural area in the region (%)	share of rural area in the region (%)	share of rural area in the region (%)
Eastern Africa	3,146	51.1	19.0	5.3	37.3
Middle Africa	4,498	69.3	12.9	0.9	61.4
Northern Africa	7,117	89.9	77.6	2.5	50.0
Southern Africa	1,947	73.9	57.6	9.1	16.2
Western Africa	3,922	65.7	49.1	0.1	37.0
Developed	35,447	74.3	16.1	6.3	58.4
Developing	53,559	68.1	32.1	8.7	45.2
World	89,006	70.4	26.0	7.8	50.2

LGP: Used to refer to the number of days within LGP_{t=5} when moisture conditions are considered adequate – i.e. number of days with mean daily temperature above 5 °C,

** shallow, low fertility, poor drainage, stony or sandy, saline, sodic gypsic.

Source: FAO, 2007

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Rural population living in area with severe constraints for rainfed crop production, Africa, Rest of the World

Major area and region	Rural population living in area with severe constraints		Rural population living in area with severe constraints, by type of constraints		
			too dry (LGP _{t=5} <60)	too steep (slope>30%)	poor soils**
	persons (1000)	share of rural population in the region (%)	share of rural population in the region (%)	share of rural population in the region (%)	share of rural population in the region (%)
Eastern Africa	81,847	42.5	5.5	8.5	33.0
Middle Africa	37,407	58.6	1.5	0.9	56.9
Northern Africa	63,387	72.8	53.0	6.3	57.8
Southern Africa	10,535	44.4	14.3	17.9	15.3
Western Africa	43,960	32.0	4.6	0.1	28.7
Developed	83,200	28.6	2.1	3.2	25.2
Developing	1,339,930	46.0	7.0	5.4	39.4
World	1,423,130	44.4	6.6	5.2	38.2

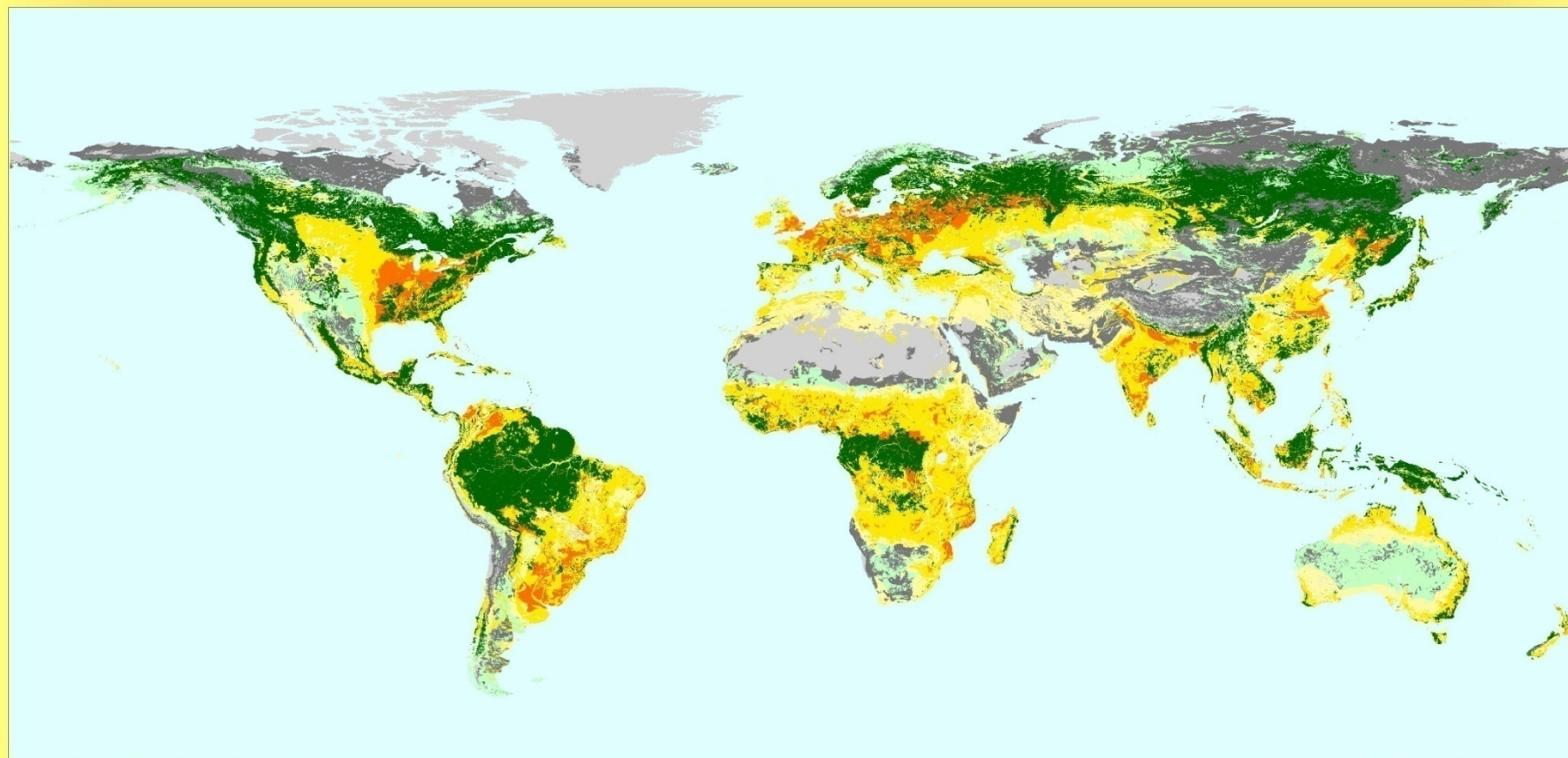
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** shallow, low fertility, poor drainage, stony or sandy, saline, sodic gypsic.

Source: FAO, 2007

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Combined Suitability of Land for Rainfed Crops and Pastures



- | | |
|---|---|
| No pasture and no rainfed crop production possible (PSI ¹ = 0 and CSI ² for all crops = 0) ³ | Rainfed crop production possible and pasture possible (CSI for most suitable crop: 21-80 and PSI > 0) |
| Very marginal pasture possible, no rainfed crop production possible (PSI: 1-10 and CSI for all crops = 0) | Potential prime rainfed crop land. (CSI for most suitable crop > 80 and PSI > 0) |
| Pasture possible, no rainfed crop production possible (PSI > 10 and CSI for all crops = 0) | Closed Forest |
| Very marginal rainfed crop production possible and pasture possible (CSI for most suitable crop: 1-20 and PSI > 0) | Water Bodies |

NOTE:
¹: PSI = Pasture Suitability Index
²: CSI = Crop Suitability Index
³: Limited rainfed crop production is possible in a few pixels

Acknowledgement:
 This document was prepared as part of the FAO Poverty Mapping Project (GCRT/INT/76/IND) funded by the Government of Norway.

Population Density and Agricultural Land Suitability

Currently available land area and rural population, by region and combined agricultural suitability class at intermediate level of inputs

Major area and region	Data	Unit	A. Not suited for rainfed agriculture	B. Marginal agricultural land	C. Good agricultural land	D. Prime agricultural land	Total
AFRICA							
Eastern Africa	area	km ² (1 000)	12	2,082	3,139	362	5,595
		share of total %	0.21	37.21	56.11	6.47	100
	population	persons (1 000)	64	44,305	121,199	15,894	181,462
		share of total %	0.04	24.42	66.78	8.76	100
Middle Africa	density	persons/km ²	5	21	39	44	32
	area	km ² (1 000)	351	757	2,672	280	4,060
		share of total %	8.64	18.65	65.81	6.90	100
	population	persons (1 000)	63	5,266	34,649	4,957	44,935
Northern Africa		share of total %	0.14	11.72	77.11	11.03	100
	density	persons/km ²	less than 1	7	13	18	11
	area	km ² (1 000)	3,404	2,925	1,273	102	7,704
		share of total %	44.19	37.98	16.52	1.31	100
Southern Africa	population	persons (1 000)	1,818	18,731	27,468	1,611	49,628
		share of total %	3.66	37.74	55.35	3.25	100
	density	persons/km ²	1	6	22	16	6
	area	km ² (1 000)	10	1,877	466	7	2,360
Western Africa		share of total %	0.42	79.53	19.75	0.30	100
	population	persons (1 000)	4	11,800	10,393	154	22,351
		share of total %	0.02	52.79	46.50	0.69	100
	density	persons/km ²	less than 1	6	22	22	9
Western Africa	area	km ² (1 000)	1,473	1,717	2,325	170	5,685
		share of total %	25.91	30.20	40.90	2.99	100
	population	persons (1 000)	415	16,096	102,343	10,982	129,836
		share of total %	0.32	12.40	78.82	8.46	100
	density	persons/km ²	less than 1	9	44	65	23



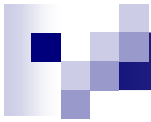
The AU Strategic Approach - Promoting Regional Value Chains of Strategic Commodities, and its Requirements in Spatial Data

- The United Nations Economic Commission for Africa (UNECA), within the CAADP framework, has launched an initiative for the development of strategic commodities regional value chains in Africa.
- The goal is to enable effective Public-private partnerships to play a significant role in the development of a vibrant agribusiness sector capable of capturing untapped opportunities such as economies of scale, intra-regional complementarities and trade, and economies of transactions in cross-border investment.



Rationale & Justifications...

- Summit on Food Security in Africa - December 4-7, 2006 - Abuja, Nigeria
- **WE** the Heads of State and Government of the African Union assembled in Abuja, Nigeria, on the 7th day of December 2006
- Declare our firm Commitment to:
 - Increase Intra-African trade by promoting and protecting **rice, maize, legumes, cotton, oil palm, beef, dairy, poultry and fisheries** products as strategic commodities at the continental level, and **cassava, sorghum and millet** at sub-regional level
 - Construct and maintain critical infrastructure to facilitate the movement of strategic agricultural products across national boundaries at minimal cost
 - Develop continental and regional **market information systems** and support the development of the same at national level by 2008;
 - Promote public sector investment in agriculture related infrastructure, particularly regarding **water, irrigation, electricity and roads** through public-private partnership



Databases Themes (Population)....

Themes	Indicators	Outputs			Available Data			Analyses
		Maps	Graphic	Table	Sources	Année	Echelle	
Demography	Population				AfriStat		L.III	Migrations
	Density				Ciesin			Concentration
Urban Typology	Main and secondary towns							Urbanization

Databases Themes (Productions)....

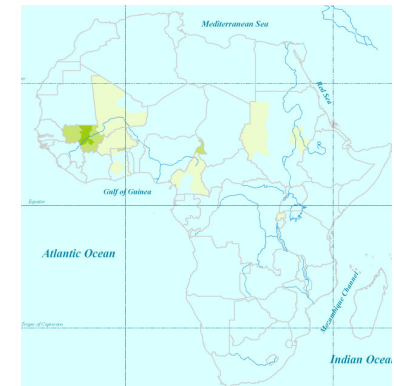
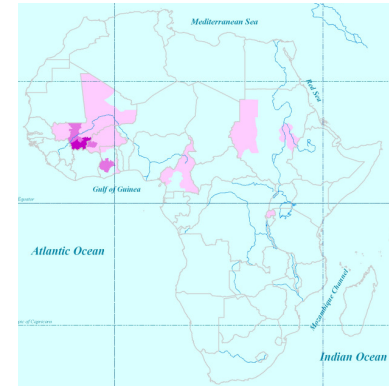
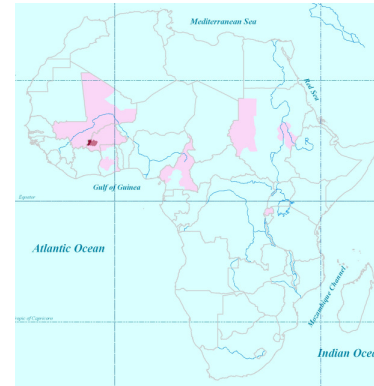
Themes	Indicators	Outputs			Available Data			Analyses
		Maps	Graphic	Table	Sources	Année	Echelle	
Food Crops	Production Zones				FAO			
	Production				ACS	2006	L.III	
Commercial Crops	Production Zones				FAO			
	Production				ACS	2006	L.III	
Breeding	Pastoral Systems				FAO			
	Livestock				ACS	2006	L.III	
Hydro-agric. potentialities	Irrigated areas							

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What We Do Have (1).... Data assessment

■ Agriculture Production Zones

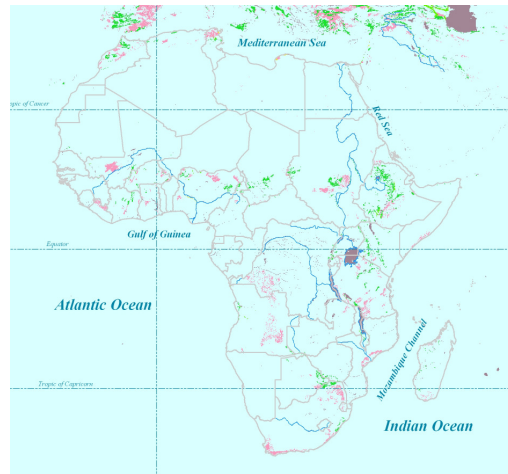
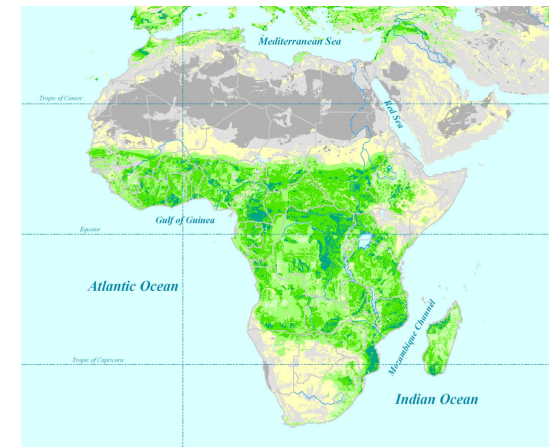
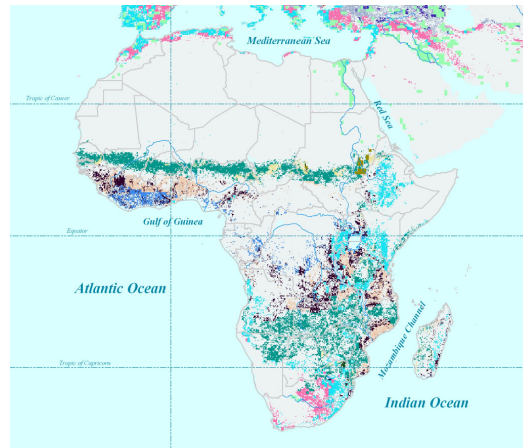
- ☐ Cassava
- ☐ Cotton
- ☐ Maize
- ☐ Millet
- ☐ Rice
- ☐ Sorghum
- ☐ Oil Palm



What We Do Have (2)....

■ Ecological Characteristics

- AgroEcosystems
- Land Suitability
- Area Free of Soil Constraints
- Climate (Isohyets)





What We Do Have (3)....

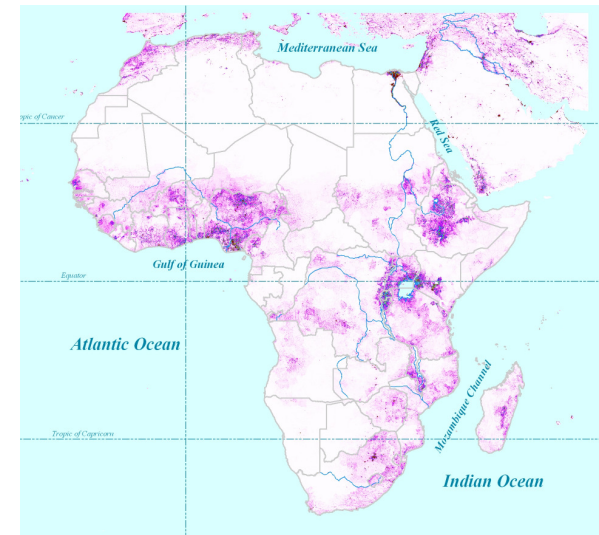
■ Infrastructures

- ☐ Markets
- ☐ Roads
- ☐ Ports

What We Do Have (4)....

■ Human

- Settlements
- Population Density












What We need (1)....

■ Main Production Zones

- ☐ To conduct an inventory of available data and information resources, their formats, timeliness, current use, etc
- ☐ Data Main Sources : FAO, WFP and IFAD, ECA
- ☐ National agencies

Data Availability - Sources

@ Données			
■ Globale	● USDA	 http://faostat.fao.org/site/526/default.asp	● ECA StatsBase  THE ECA STATISTICAL DATABASE Economic Commission for Africa http://172.22.18.235/StatBaseOnline/browse
	● FAO_STAT		
■ Continentale	● AFRI_STAT	 http://www.fao.org/geonetwork/en/main/home	● AFRISTAT  AFRISTAT Observatoire économique et statistique d'Afrique subsaharienne http://www.afristat.org/?pg=10
	● AGRO_Maps		
■ Regionale	● GeoNetwork	● USDA Foreign Agriculture Statistics  http://www.fas.usda.gov/grain/grain.asp	● AGRHYMET  ● www.agrhymet.ne
	● AFRISTAT		
■ Nationale	● AGRHYMET	● IFPRI  http://www.ifpri.org/	● ●
	● South Africa		
	● Burkina		