LADA

Land degradation assessment in drylands

Hubert George

Land and Plant Nutrition Management Service, AGLL
Land and Water Development Division
FAO

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Outline

- Overview of LADA
- What is land degradation ?
- The importance of land degradation in dryland areas
- Previous global assessments of land degradation
- Development of LADA methodologies
- Current status of LADA
- Conclusions

Overview of LADA

Project: global assessment of land degradation

- Exploratory workshop (December2000)
- Method Development (2002-2004)
- Global Assessment (2004 - 2008)

Partly GEF Funded through UNEP
700k (B) - 4 Million US$(C)

- in direct support of the UNCCD
- executed by FAO with numerous partners

LADA partnership

<u>At national and regional levels</u>:
National CCD focal institutions, land and water depts.,
Regional bodies of UNCCD, ..
<u>At International level</u>:

GEF

UNEP

UNCCD

ISRIC

Global Mechanism of the UNCCD

Food for all

FOOD AND AGRICULTURE ORGANIZATION of THE UNITED NATIONS

JRC

AUSTRALIAN LANDCARE COUNCIL

World Resources Institute

What is land degradation ?

Degraded land

Land which due to natural processes or human activity is no longer able to sustain properly an economic function and/or the original ecological function (ISO, 1996)

Vegetation degradation

Implies reduction in biomass, decrease in species diversity, or decline in quality in terms of the nutritional value for livestock and wildlife (Eswaran et al, 2000)

What is land degradation ?

"Soil" degradation

Decline in soil qualities commonly caused through improper use by humans (ISSS, 1996). This includes physical, chemical and/or biological deterioration.

- loss of organic matter; decline in soil fertility,
- decline in structural conditions; erosion
- adverse changes in salinity, acidity or alkalinity
- the effects of toxic chemicals, pollutants or excessive flooding

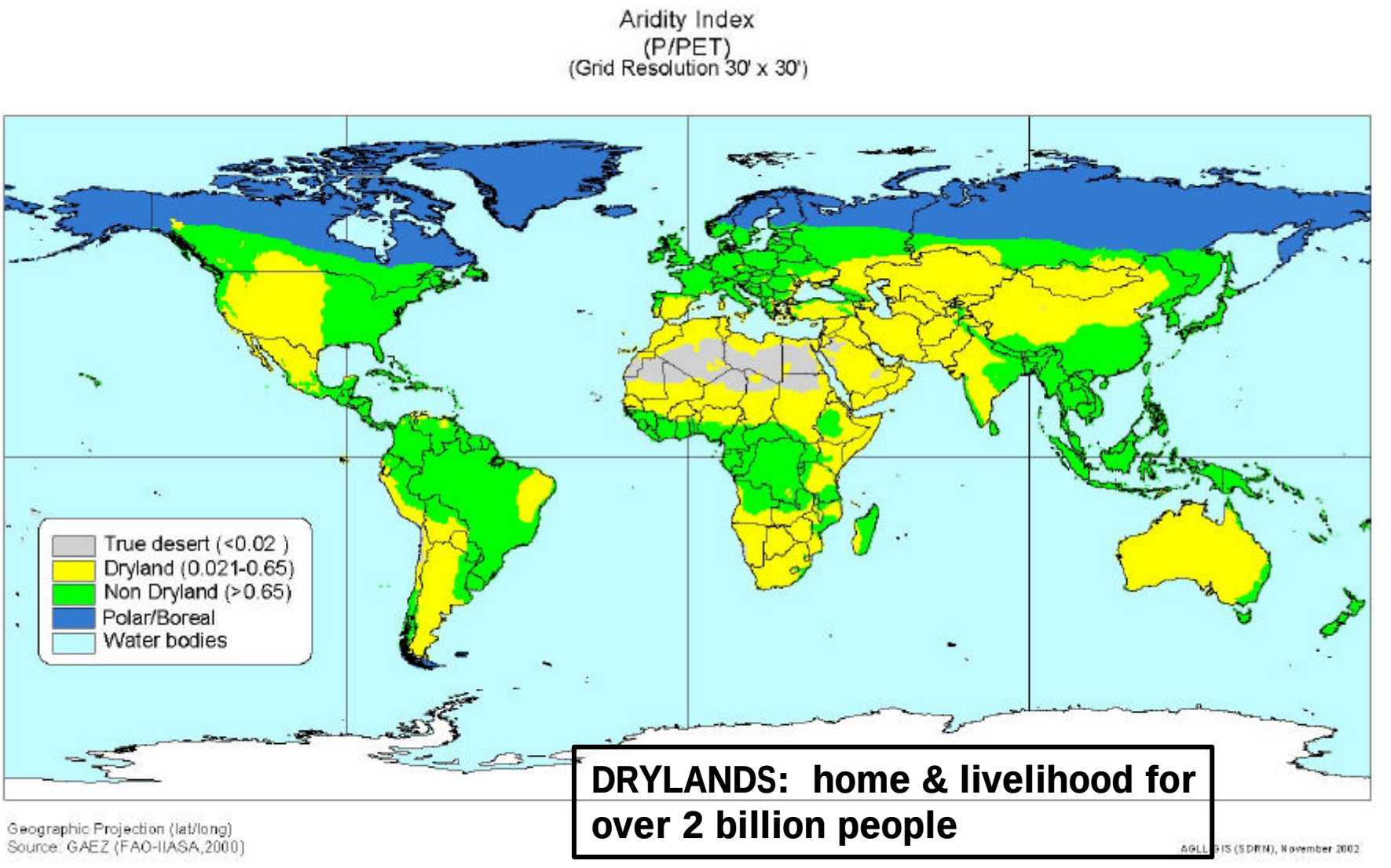
What is land degradation ?

…. encompasses the whole environment but includes individual factors :

- **Soils**
- **Water resources (surface, ground)**
- **Forests (woodlands)**
- **Grasslands (rangelands)**
- **Croplands (rainfed, irrigated)**
- **Biodiversity (animal, vegetative cover, soil).**

What is land degradation ?

Land degradation in drylands



DRYLANDS: home & livelihood for over 2 billion people

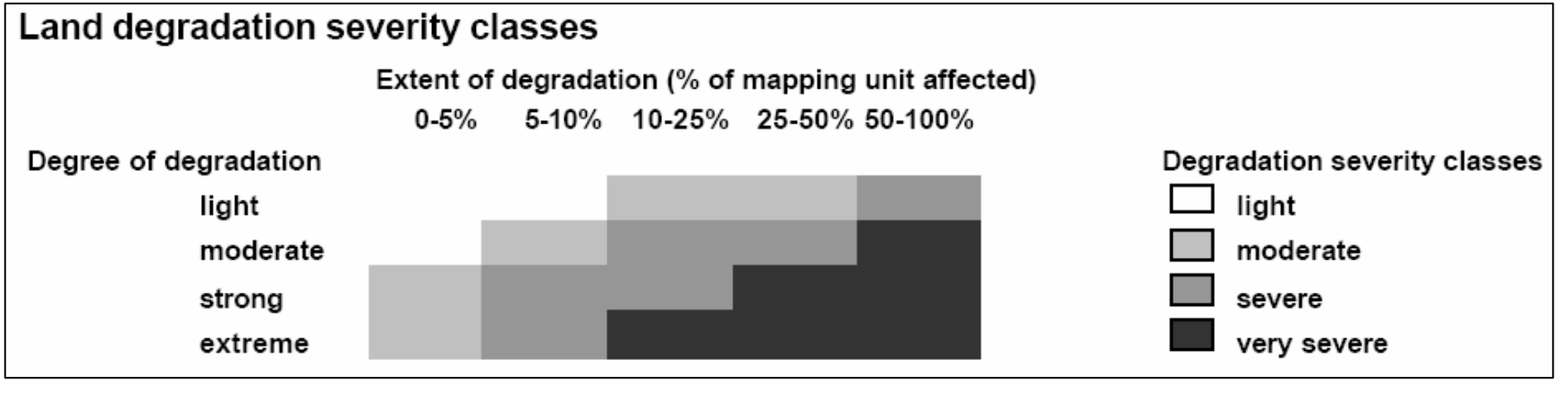
Previous global assessments

- GLASOD - only usable source of global data despite known limitations
  - ISRIC (commissioned by UNEP IN 1988; in preparation for UNCED 1992; extent of human-induced soil degradation; published in 1990)
- Expert judgement of degradation status (type, extent, degree, rate and cause) for individual polygons on a national/sub-national level
- Regional data: ASSOD (1997); SOVEUR (2000)
  - more detailed than GLASOD

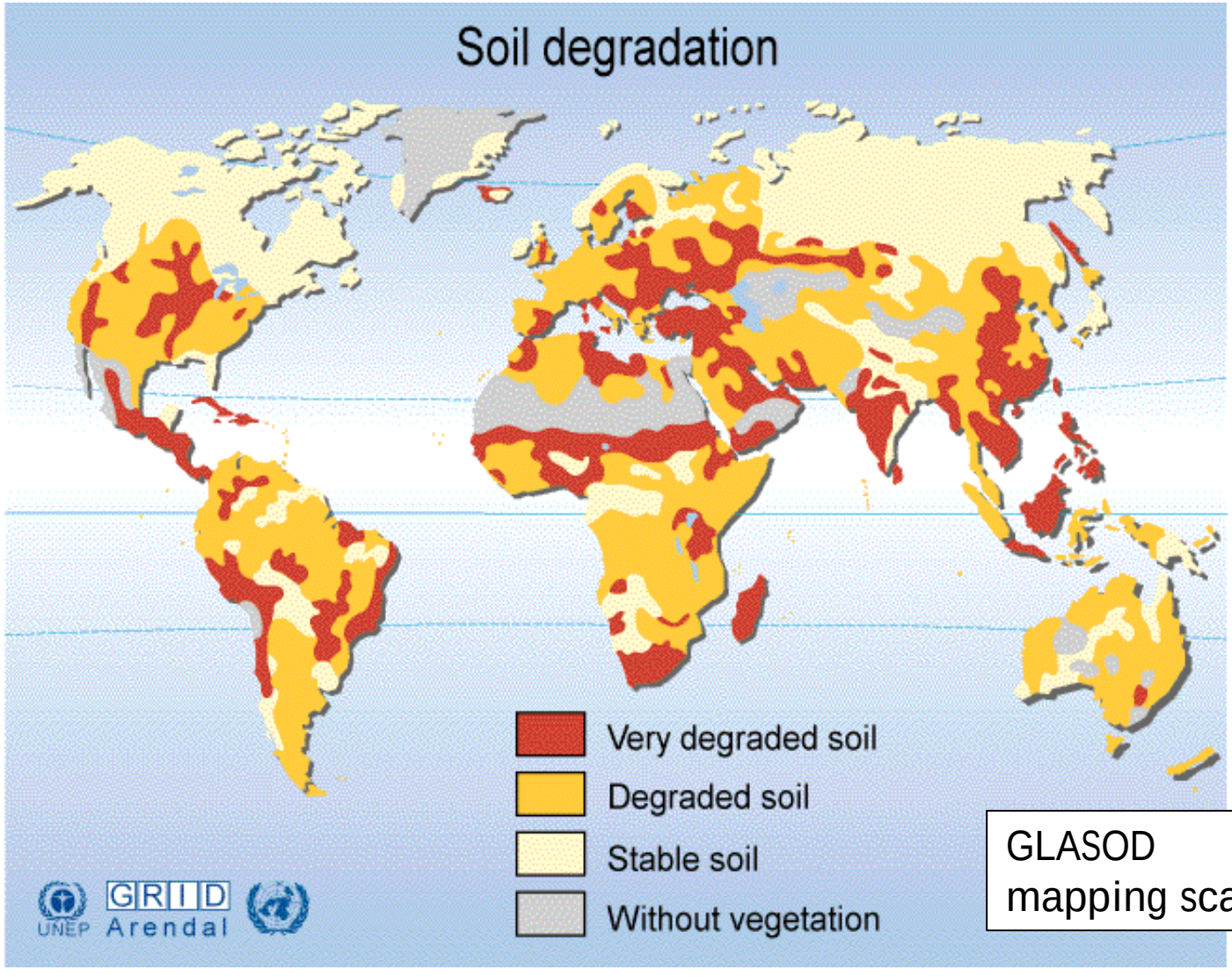
Previous global assessments

Estimate for each physically-homogeneous mapping unit

- Type of degradation: (water/ wind erosion; chemical/ physical deterioration)
- Degree of degradation: (light, moderate, strong, extreme)
- Relative extent of degradation (% of mapping unit affected)
- Causes: (deforestation, overgrazing, agricultural activities, over-exploitation of vegetation, industrial activities)

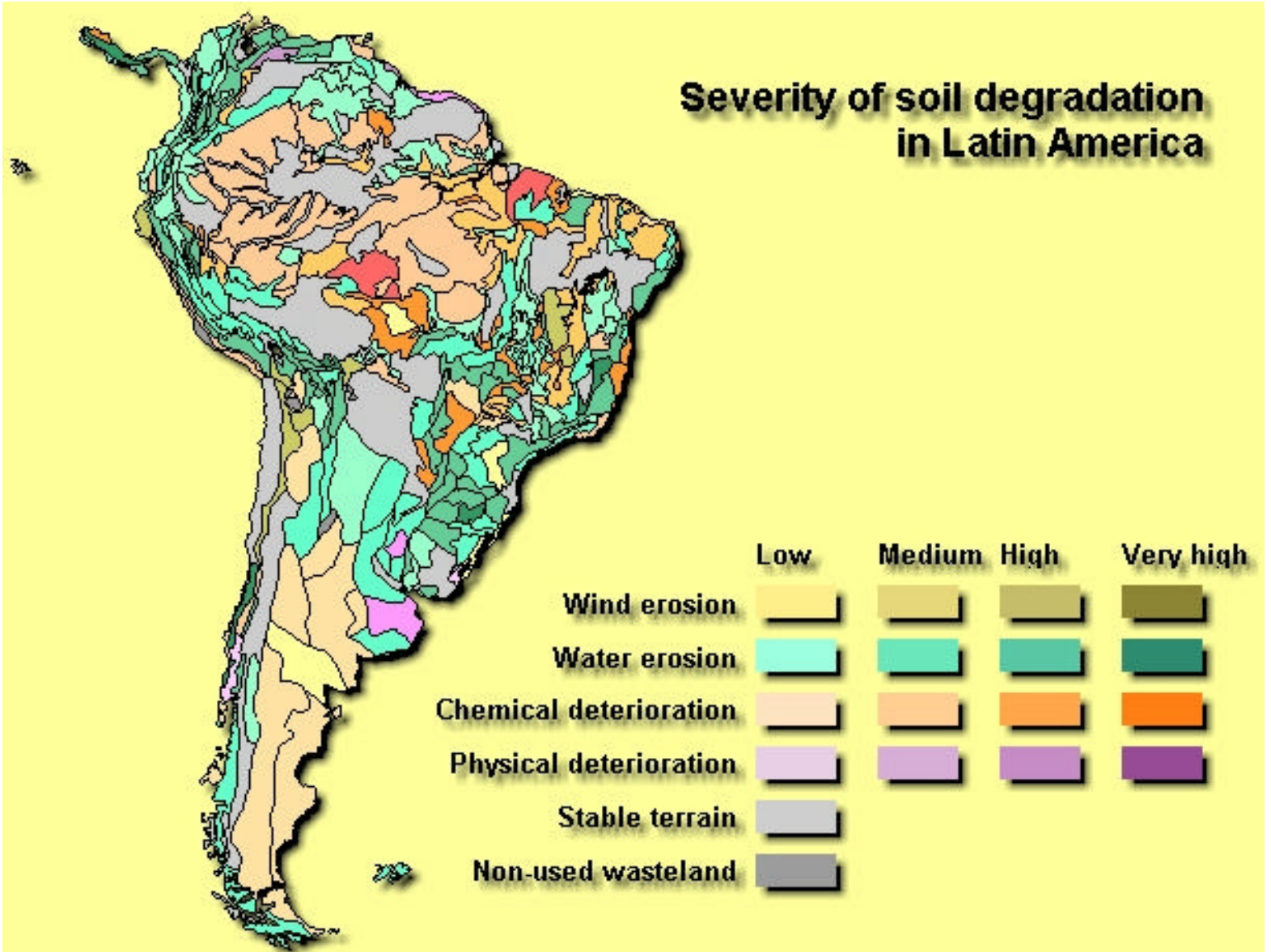


Previous global assessments



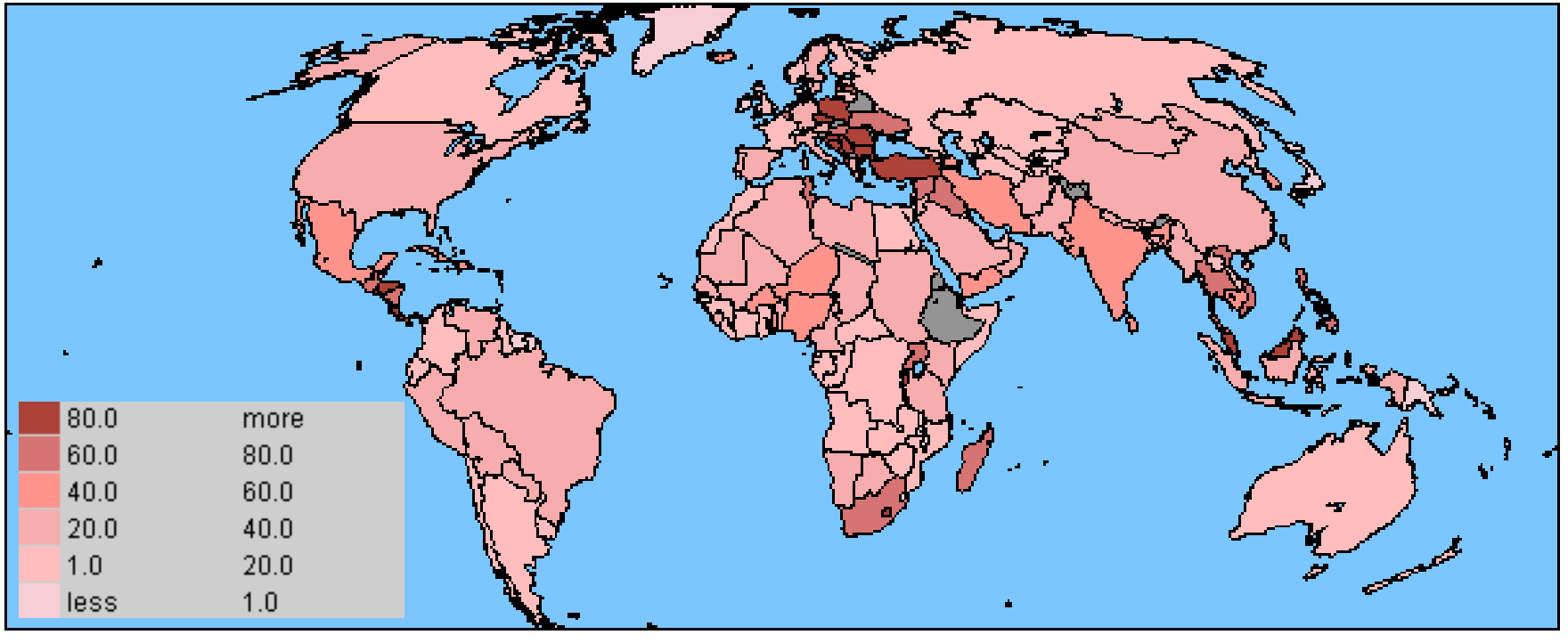
GLASOD
mapping scale 1:10m

Previous global assessments



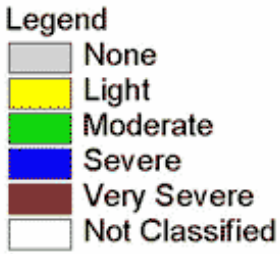
Previous global assessments

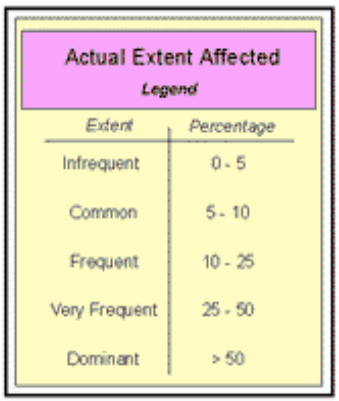
Total human-induced degraded area (%)

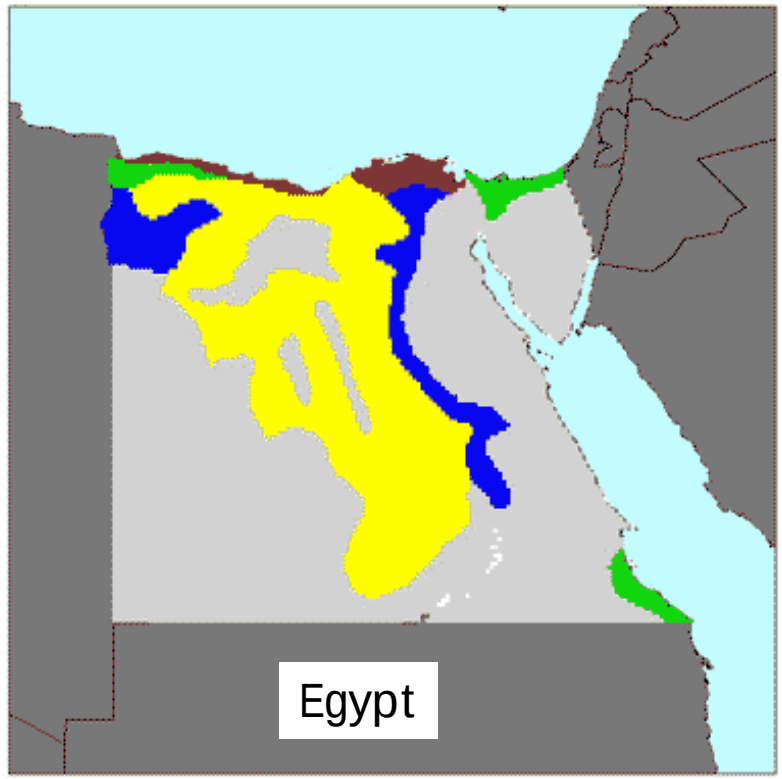


Area of land with severe and very severe human-induced land degradation.

Previous global assessments







Severity	Mapped	Mapped (km2)	Population	Population %	Population density	Wasteland (km2)	Infrequent (km2)	Common (km2)	Frequent (km2)	Very frequent (km2)	Dominant (km2)	Degraded (km2)	Degraded %
None	61.8	617,113	3,262,300	4.9	5.29	617,113	-	--	-	-	-	0	0.00
Light	27.1	270,171	4,068,660	6.1	15.06	-	6,754	--	-	-	-	6,754	0.68
Moderate	2.5	25,364	421,468	0.6	16.62	-	-	690	3,012	-	-	3,702	0.37
Severe	6.5	64,739	45,467,704	68.2	702.33	-	-	--	11,653	-	-	11,653	1.17
Very Severe	1.8	17,860	13,026,000	19.6	729.32	-	-	--	-	-	13,395	13,395	1.34
Not Classified	0.3	3,008	391,348	0.6	130.11	3,008	-	--	-	-	-	0	0.00
TOTALS	100.0	998,255	66,637,480	100.0	66.75	620,121	6,754	690	14,665	0	13,395	35,504	3.56

Previous global assessments

GLASOD LIMITATIONS

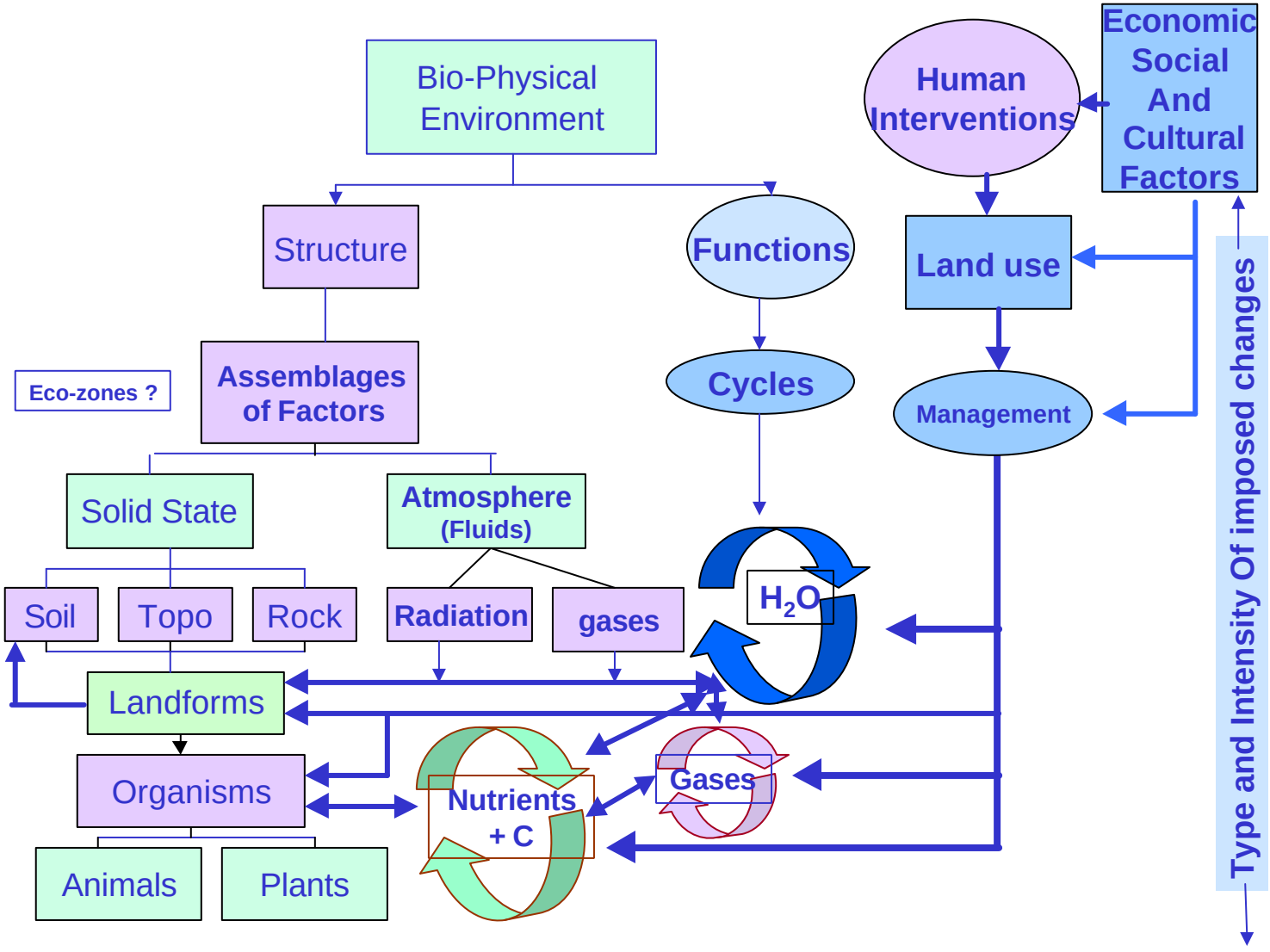
- Small scale: not appropriate for national breakdowns
- Expert judgement: qualitative & subjective
- Visual exaggeration: each polygon which is not 100% stable shows a degradation colour, even if only 1 to 5% of the polygon is actually affected
- Extent classes (5) rather than percentages
- Complex legend: combined extent and degree (severity) for four major degradation types (water and wind erosion, physical and chemical deterioration)
- Only "dominant" main type of degradation is shown in colour; Degradation sub-types only shown by codes
- Only "bad news"

Source: GLASOD http://lime.isric.nl/index.cfm?contentid=158

LADA: Major objectives

- Develop technical approaches to land degradation assessment at different spatial & temporal scales
- Establish links between land degradation status & causes/ pressures (biophysical & socio-economic)
- Provide standardized, objective data/ information on land degradation
- Assess impacts of land degradation on human society & the environment

LADA: land degradation linkages



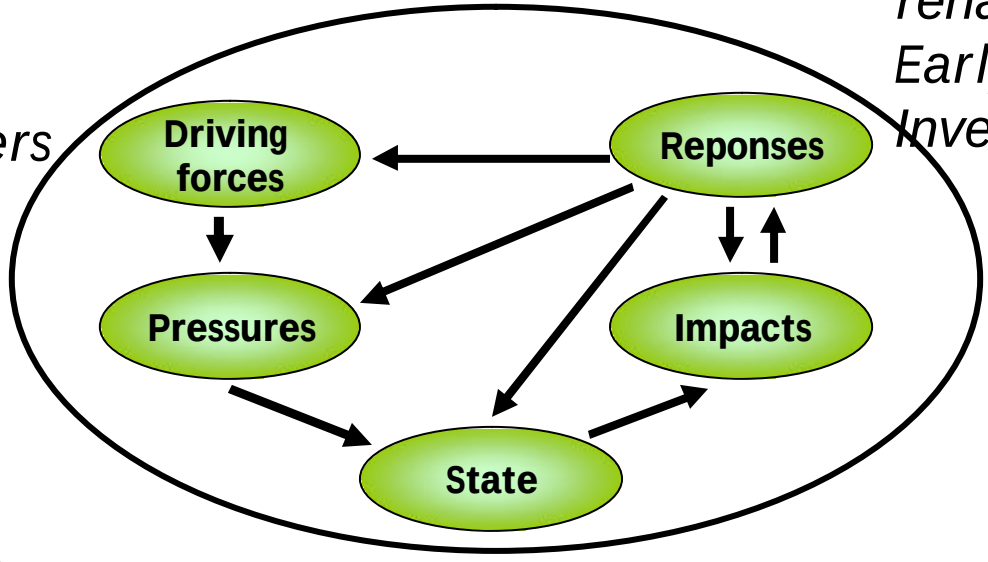
LADA: potential assessment tools

METHODOLOGY	Pros	cons
Expert opinion	Rapid, low cost	subjective
Remote sensing	Mod. rapid, Mod, low cost, objective	Focus on land cover
Field monitoring	Direct observation of land condition, objective	Slow, high cost
Productivity (e.g. yield)	Direct observation of LD impact	Variations also influenced by other factors
Participatory (e.g. farmers' opinions)	Grass-roots view on impact, driving factors	Slow, subjective

LADA analytical framework - PSIR

Macro-economic policies
Growth in population, income
Land use
Land tenure
Poverty
Natural disasters

Macro-economic policie
Land tenure policies
Conservation/ rehabilitation
Early warning systems
Investments



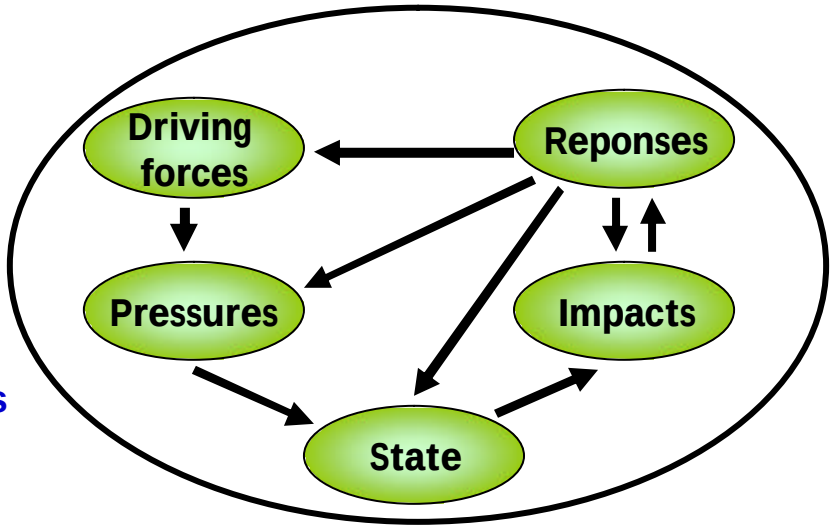
Ecosystem Approac
-spatial scales
-temporal scales

Rising demands
Agriculture sector: products / inputs
- over grazing
- nutrient mining
Waste disposal

Poverty & migration
Reduction in products & services
-Carbon sequestration
-Water quality; biodiversity
Habitat destruction

LADA approach & methodologies

DRIVING FORCES
- Macroeconomic policy
- Lack of markets
- Population growth
- Poverty
- Ignorance
- Land tenure laws
- Climate change
- No institutional co-operation on land issues



RESPONSES
- Macroeconomic policy
- Land tenure policy
- Monitoring
- Early Warning Systems
- International Conventions
- Investment in Land and Water inputs
- Education
- Infrastructure
- Farmer Field Schools
- Conservation
- Rehabilitation

PRESSURES
-demand for food and fibres
- Urban pressure for land & infrastructure
- Livestock pressure
- Drought; Fires
- unsuitable land use & mgmt.
- Lack of inputs nutrient, water
- Unfavourable soil and terrain conditions

- Land Productivity Decline
- Soil Nutrient Decline
- Soil pollution
- Soil deformation, erosion
- Soil compaction
- Salinization and Sodification
- Decline of vegetative cover
- Decline of biodiversity
- Drop of groundwater level
- Loss of water quality
- Carbon storage decline
-Soil moisture storage decline

IMPACTS
-Less food produced
- Poverty & Migration
- Habitat destruction
- Loss of vegetation
- Silting of dams
- Salinization

Potential indicators: Pressure

1. Percentage of agricultural land under exploitation
2. % of agricultural land used for crops (annual/ permanent)
3. Number of hectares of agricultural land per farmer; arable land per capita
4. Ratio of cultivated to cultivable land
5. Ratio of cultivated land to fallow land
6. Increase in cropping intensity (harvested areas/total cropland)
7. Increase in percentage irrigated area to cropland area
8. Percentage of cultivation on open access land, common property and private property
9. Land use (e.g. cultivated areas) in areas of high erosion potential

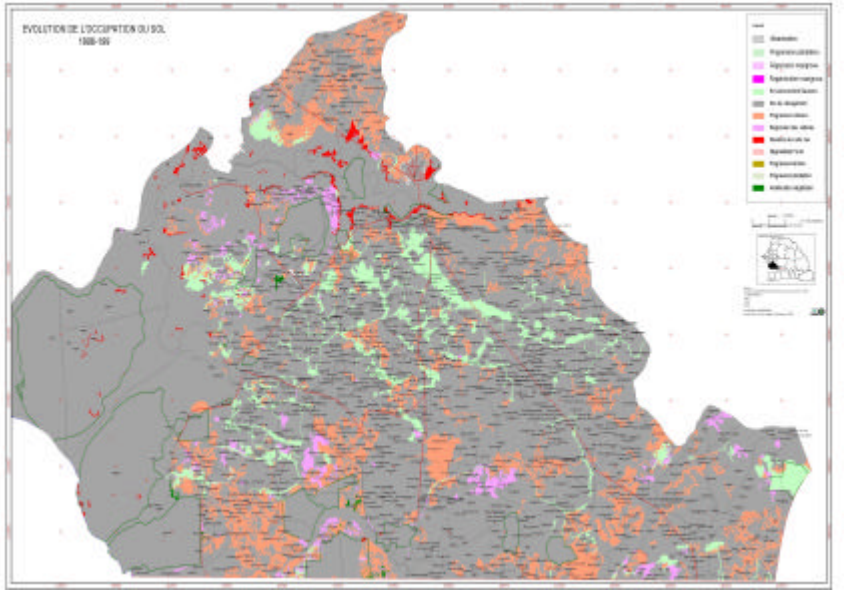
LADA: national assessment

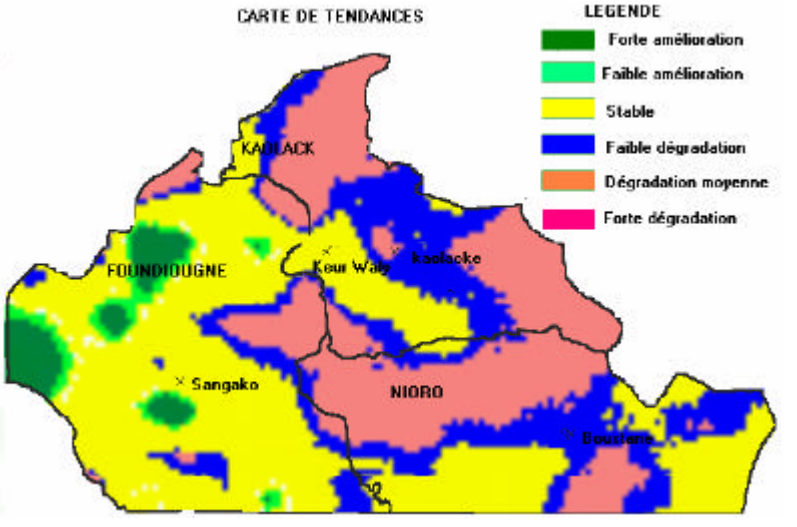
Suggested steps

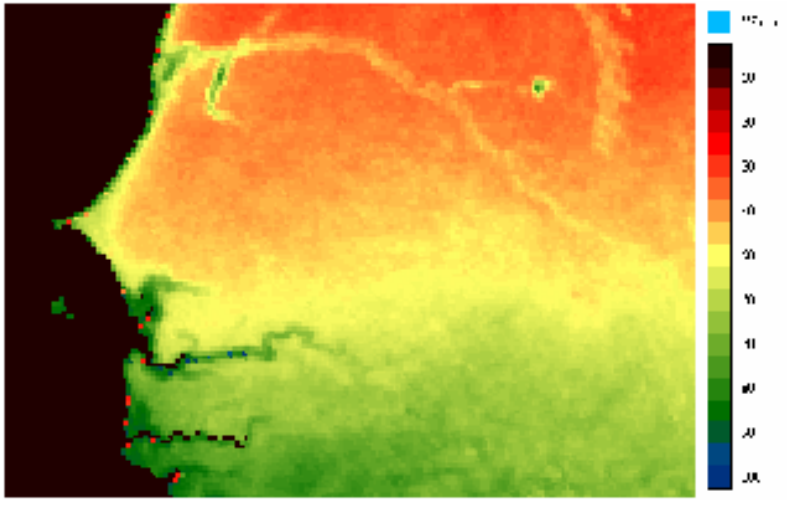
1. Participative identification of land degradation problems and users needs
2. Establishment of a LADA (National) Task Force;
3. Stocktaking exercise/ Preliminary Analysis;
4. Develop Stratification and Sampling strategy ;
5. Local Assessment, Baseline for monitoring and RS Analysis ;
6. Information integration, dissemination and use : (d*evelopment of Land Policy Decision Support Tools)*
7. Development of a LADA monitoring tool;

LADA: pilot study - Senegal

LC/LU changes - Kaolack 1988-1999







- LC/LU trends (Landsat)
- NDVI trends (AVHRR)
- SMI (Meteosat)

LADA: Current status & next steps

- Pilot studies undertaken/ being finalized
  - Argentina, China, Senegal
- Capacity building TCP projects
  - Ethiopia, Mali, Namibia, Lesotho, Caribbean, ..
- TAC & Steering Committee – April 2004
  - stakeholders (countries; experts, CCD, GM, UNEP, UNDP, GEF, institutions, donors,..)
  - Review of LADA Phase-B (2 years)
  - Finalization of PDF-A document (4 years)
  - Financial, institutional & implementation aspects
  - Technical issues - network on indicators

LADA: networks

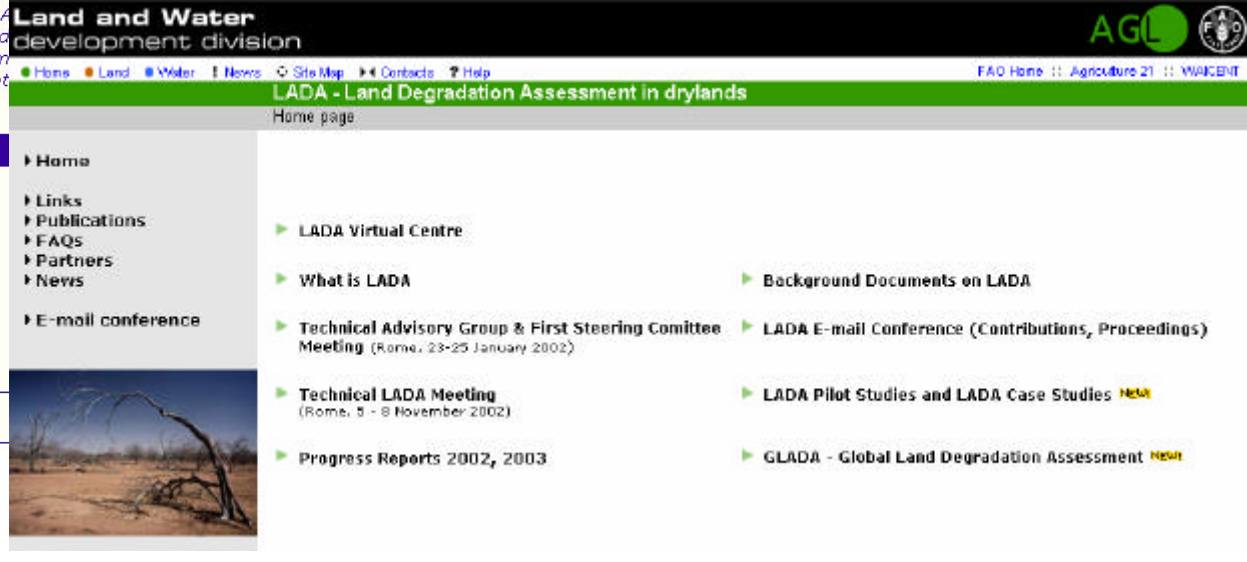
http://lada.virtualcentre.org/pagedisplay/display.asp

LADA is an international UN initiative, supported by the Global Environment Facility (GEF), UNEP, the Secretariat and the Global Mechanism of the UNCCD and FAO, and is being executed by FAO. The LADA project aims to assess causes, status and impact of land degradation in drylands in order to improve decision making for sustainable development in drylands at local, national subregional and global levels. LADA
concerned by the land
involved in the implem
Convention to Combat

LADA Home
LADA Description and Implementation
Partnerships and Links
Methodological guidelines and reviews
Data and Information
Meetings, events and contacts
Fora and collaboration

Whats New

Contact: Feedback Corrections



http://www.fao.org/ag/agl/agll/lada/default.stm

Conclusions

- LADA will provide improved methodologies for land degradation assessment at various scales (wider scope & objective basis for remedial actions) & statistical data
- Opportunities for countries to participate in LADA

For more information .....

LADA Secretariat, AGLL

Food and Agriculture Organization of the United Nations ,

Viale delle Terme di Caracalla,

00100 Rome, Italy

Fax: +39 06570 56275

Phone: +39 06570 53843

E-mail: http://www.fao.org/landandwater/lada