



United Nations Convention to Combat desertification

Latin America and Caribbean Unit

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**“General approach to the costs of
desertification”**

Rome

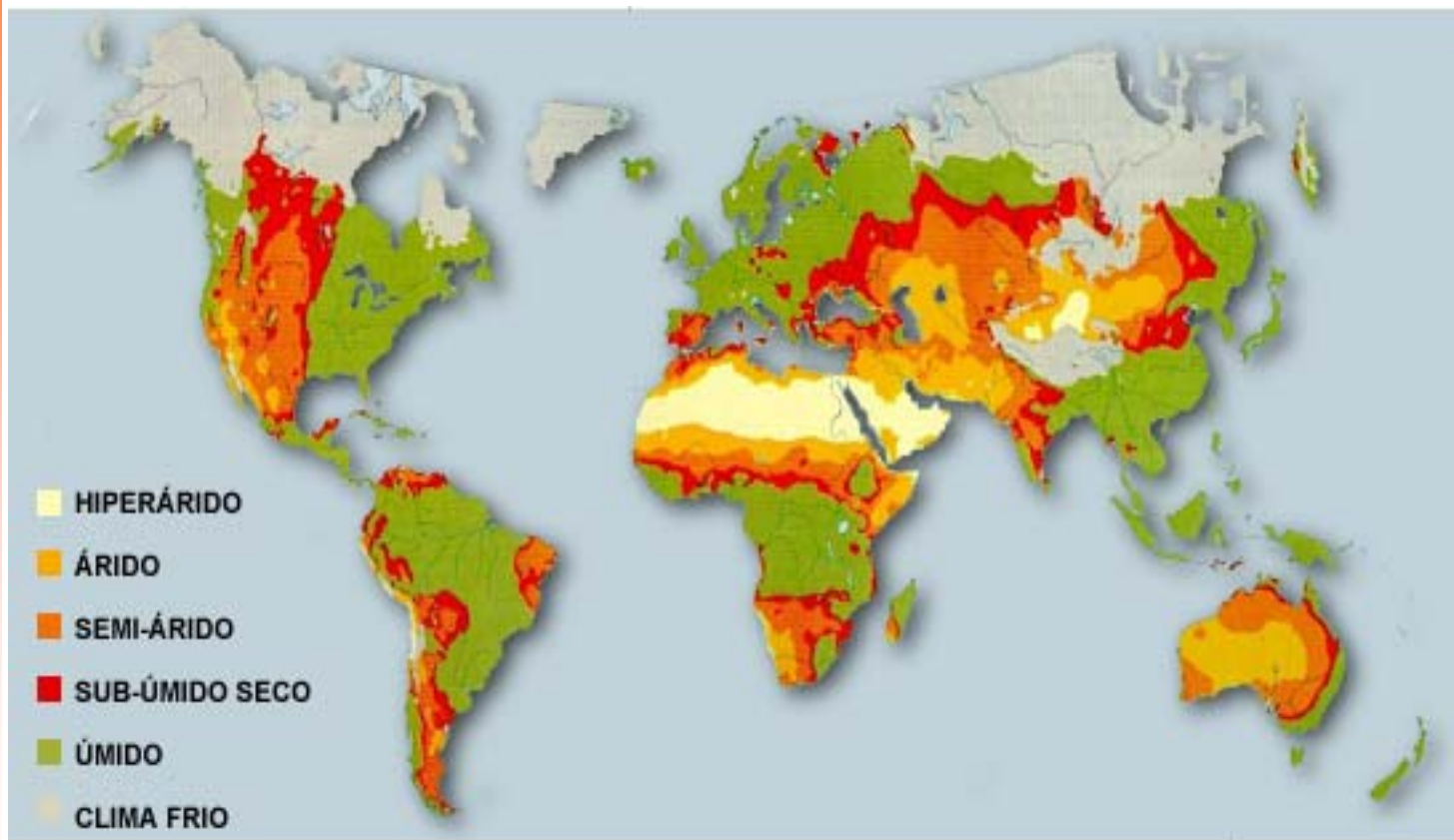
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The Drylands



World drylands





Some general data on drylands

- 30% of the earth surface
- More than 1 billion people live in the drylands
- Low level of water availability (drought and irregular precipitation in space and time)
- Deep levels of poverty (it is estimated almost 70% of total population)
- High level of economic and environmental vulnerability
- 20% of the world food production



Specifically

- Physical loss of soils
 - Affects Agricultural productivity (irrigation and dry farming)
 - Affects water dams, reservoirs and riverbeds
 - Affects the energy production (turbine corrosion)
- Sand storms (spreading out viruses and other microscopic fungi and insects – cactoblastis cactorun, Nile virus) or affecting productive soils (deposition)
- Contribution to climate change/variations (drought, flood, heat waves) – urban impacts
- Deterioration of water resources
- Losses in:
 - Biodiversity
 - Forest and timber production
- Contribution to poverty, migration and changes in the social structure (social costs)

The idea is to develop an “economy of desertification” integrating all these factors



Economic concerns on drylands

- During the 1980's – economic issues were part of the Agenda of Desertification
- But suddenly....were removed from the agenda.
- This is reflected in the UNCCD text. There are only two articles where economic issues can be identified (both of them in a very weak sense).
- The result is that the Convention has no approach or methodology for approaching economic issues



Background (from the 80's)

- Harold Dregne and UNEP
 - a) Costs of land degradation – economic losses
 - 1st Hypothesis – 40% loss of productivity
 - 2nd hypothesis – degradation has the same intensity wherever it is considered
 - research based on small data from Australia and USA
 - Direct losses are:
 - Irrigated land – USD 250.00 ha/year
 - Rainfed cropland – USD 38.00 ha/year
 - Rangeland – USD 7.00 ha/year
 - Indirect costs are not considered
 - b) Costs of rehabilitation
 - Irrigated areas – USD 2,000.00/ha
 - Rainfed cropland – USD 400.00/ha
 - Rangeland – USD 40.00/ha
- Difficulties to apply at global level – no reliable data available, no precise diagnosis available
- The figures are referred mainly to US and Australia



- The information base upon which the estimates in this report were made is poor. Anecdotal accounts, research reports, travelers' descriptions, personal opinions, and local experience provided most of the evidence for the various estimates. Some data were available for Australia and the United States. Both of these countries have conducted comprehensive assessments of land degradation on irrigated, rainfed farming, and range lands.
- For the country data, it is impossible to estimate the error in the numbers of hectares in each degradation class because there are no accepted values against which to make comparisons.
- To our knowledge, no one except the senior author has ever attempted a global assessment, and very few have published national assessments. An earlier evaluation was published in 1983 (Dregne 1983).



Methodological constraints for an economic approach to desertification

- There is no comprehensive methodology to integrate all mentioned factors (physical, biological, socio-economic)
- There is no reliable diagnosis at national level (National Action Programmes) on the different levels of land degradation
- Poor quantitative data (Global and national level)
- Conceptual terms - environment and natural resources are (almost always) seen as economic externalities (not integrated in economy).



This approach

- To be applied in a global scale
- Based on an estimation of soil loss - Universal Soil Loss Equation (USLE)
- Why the USLE? Allows us to work with some quantitative data

Erosion rate	Losses (t/ha/year)
Very High	> 20
High	10 - 20
Moderate	5 - 10
Low	2 - 5
Very Low	0 - 2



Assumptions

- *First hypothesis:*
- Considering the slight rate of erosion (10 tons/ha/year) or just 1 mm of topsoil/ha/year – USD 10.00
- *Second hypothesis*
- Each ton of soil means at least the reduction of 0,2 m³ of water availability – USD 0.5
- *Third hypothesis*
- biodiversity and timber production loss – 50%



Situation of Desertification in LA

According to countries

Country	Total Area (Has)	Total population	Areas in process of Desertification (Hás)	Total population in areas in process of desertification
Argentina	279.181.000	36.223.947	195.426.700	10.867.184,1
Brasil	851.420.490	169.799.170	66.554.300	15.748.769
Colombia	114.174.800	44.000.000	19.351.000	20.900.000
Costa Rica (datos 2003)	5.106.000	4.089.609	51.654	
Ecuador	25.637.000	12.156.608	7.060.437	1.000.000
El Salvador	2.104.079	6.329.091	363.000	650.414
Mexico	195.924.800	104,213,503	58.689.150	22.000.000
Panamá (data from 2003)	7.551.700	2.839.117	1.876.920	662.236
Paraguay	40.675.200	5.163.198	1.000.000	
Dominican Republic	4,769,300	8,562,541	3,290,817	5,908,153
Venezuela	91.645.500	23.232.553	9.883.100	6.119.112
Total	1.635.811.369 has 16.358.113 km2	419.809.337	363.547.078 has 3.635.470 Km2	52.055.868



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Country	Areas Affected by desertification (has)	Soil losses 10 Ton/año	Cost of soil losses (USD 10.00 /ha/año)	Water losses 0,2 m3	Cost f water losses 0,5 USD	Total Cost
Argentina	195.426.700	1.954.267.000	19.542.670.000	390.853.400	195.426.700	19.738.096.700
Brasil	66.554.300	665.543.000	6.655.430.000	133.108.600	66.554.300	6.721.984.300
Colombia	19.351.000	193.510.000	1.935.100.000	38.702.000	19.351.000	1.954.451.000
Costa Rica	51.654	516.540	5.165.400	103.308	51.654	5.217.054
Ecuador	7.060.437	70.604.370	706.043.700	14.120.874	7.060.437	713.104.137
El Salvador	363.000	3.630.000	36.300.000	726.000	363.000	36.663.000
México	58.689.150	586.891.500	5.868.915.000	117.378.300	58.689.150	5.927.604.150
Panamá	1.876.920	18.769.200	187.692.000	375.384	187.692	187.879.692
Paraguay	1.000.000	10.000.000	100.000.000	2.000.000	1.000.000	11.000.000
Republica Dominicana	3,290,817	32.908.170	329.081.700	6.581.634	3.290.817	332.372.517
Venezuela	9.883.100	98.831.000	988.310.000	19.766.200	9.883.100	108.693.100
Total	357.247.078 has	3.572.470.780	35.724.707.800	714.494.156	357.247.078	36.081.954.878



Summary

- USD 36.0 billion (soils and water resources)
- USD 18.0 billion (biodiversity loss)
- Total loss = USD 54 billion annually in 11 Latin American countries
- This is the cost of inaction!!!! (not restoration)



Impacts on the GNP

Country	GNP (2004) USD	Costs of soils and water losses (2005) USD	Losses/G NP %
Argentina	153,014.000.000	19.738.096.700	15.4
Brasil	603.973.000.000	6.721.984.300	1.33
Colombia	97.718.000.000	1.954.451.000	2.37
Costa Rica	18.496.000.000	5.217.054	0.003
Ecuador	30.282.000.000	713.104.137	2.82
El Salvador	15.824.000.000	36.663.000	0.27
México	676.497.000.000	5.927.604.150	1.05
Panamá	13.733.000.000	187.879.692	1.65
Paraguay	7.343.000.000	11.000.000	1.65
Republica Dominicana	18.673.000.000	332.372.517	2.13
Venezuela	110.104.000.000	108.693.100	1.08



Ecological GNP

- Mexico is the only LAC country that has calculated the ecological GNP

1994

- Ecological account system – 7.0 % negative
- GNP – 4,0 %
- EGNP = 3,0 % negative



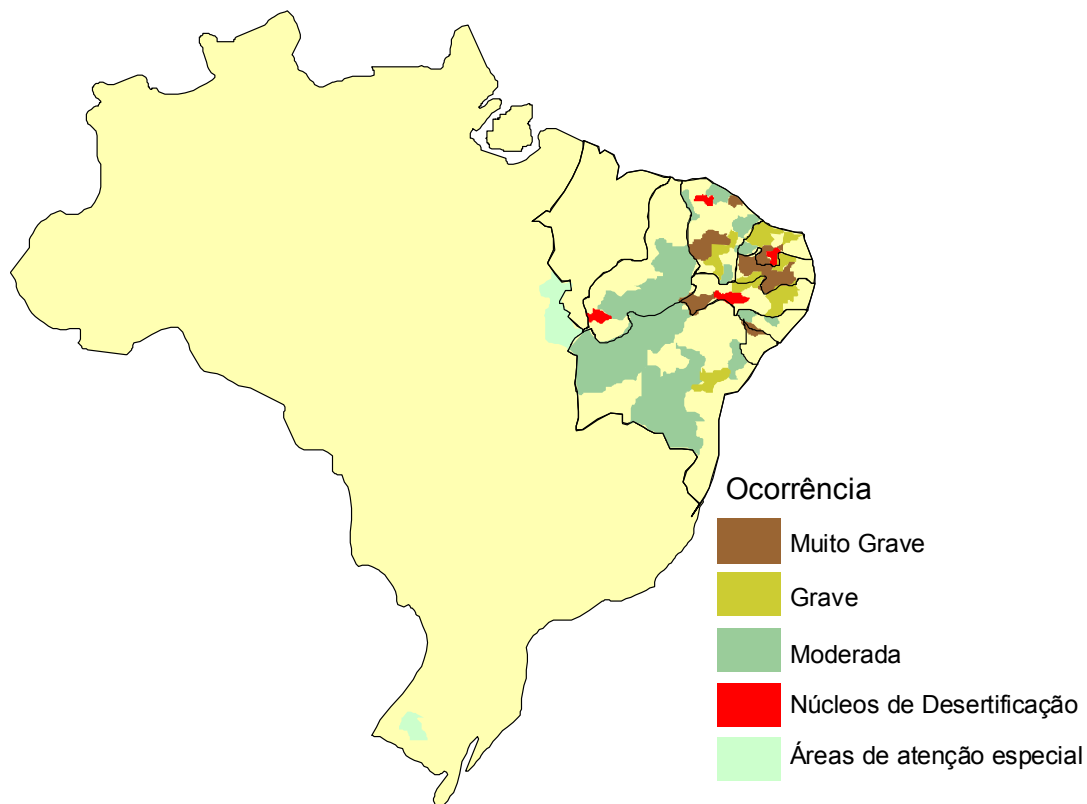
Desertification is a process

Losses in the last twelve years (since the UNCCD Approval in 1994) – 3% of growth degradation rate per year In the last twelve years means
USD 450 billion

Only for eleven LA countries

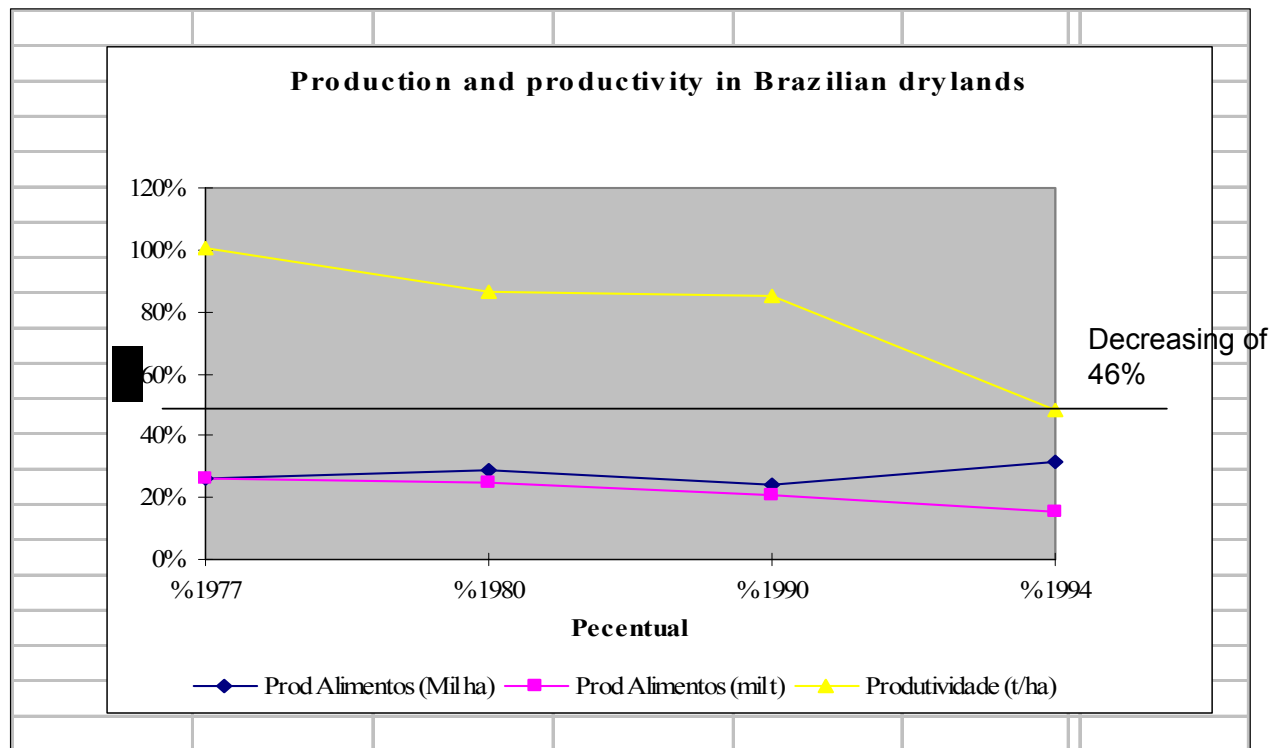


At National level or local scale - advantage of the method An example





Production and productivity in rural Brazilian drylands 1977 - 1994



Drought and desertification



Types of soils

Tons/ha/year

Erosion	PE	TRE	CE	BNC	LI
MIN	2,5	37,5	25,0	5,0	25,0
MAX	62,5	87,5	75,0	62,5	75,0
Average	32,5	62,5	50,0	33,5	50,0

PE- Podzólicos Eutroficos; TER - Terras Roxas Estruturadas; CE- Cambisoils; BNC - Bruno Não Cálcicos; LI - Litólicos;



Erosion by type of soils

Área under use in Semi-arid region	BNC Area 190.000 Km2 = 19.000.000 ha	Loss by erosion (ton/ha)	Área de LI 50.000 = 5.000.000 ha	Perda por erosão Ton/ha	Area de PE,CE e TRE 50.000 Km2 = 5.000.000	Perda por erosão '
65% of the area normal patterns of use (minimun erosion)	12.350.000 ha	61.750.000	3.250.000h a	81.250.000	3.250.000 ha	81.250.000
35% of the area erosion patterns 10% above the average	6.650.000 ha	246.050.000	1.750.000 ha	96.250.000	1.750.000 ha	84.000.000
Total	19.000.000	307.800.000	5.000.000	177.500.000	5.000.000	165.250.000



Financial Resources to combat desertification since 1994 by international cooperation

- All the GEF Operational Programmes Areas since 1991 to 2006
- 5.23 billion dollars allocation
- Africa 23 % 1.2 billion
- Asia 25 % 1.3 billion
- Latin America and Caribbean 20 % 1.05 billion
- Central Europe 18 % 0.945 million
- Others (global and regional) 14 % 0.735 million
- **Total 5.23 billion**



Toward an “economy of desertification”

1. Producing reliable data on land degradation
2. Integrated methodology for economic assessment of desertification – including agricultural, soil, water, forestry losses and social impacts (quantitative data)
3. Conventions X Commodities
 - Climate change – CO₂
 - Biodiversity – fauna & flora species (genetic heritage)
 - Desertification – soils ?



Strategy

1. Changing traditional policies based on command/control (market mechanisms)
2. New strategies and alternatives for drylands development in developing countries not based on agricultural activities

Amount of water to grow food (liters per kg)

	USA	China	India	World
Wheat	1,390	1,280	2,560	1,790
Maize	670	1,190	4,350	1,390
Beef	10,060	12,600	14,379	9,680
Pork	3,370	2,520	7,560	3,680

Source: Molden & Fraiture, 2004



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CCD

Thank you!





It is possible to estimate the erosion processes

- For each type of soils
- More precise data on land degradation (amount)
- Using realistic “prices” for soils, water and timber production losses
- Losses in production and productivity
- Other local factors