Hazard Prone Regions due to Desertification and New Security Concepts Combining Top-down and bottom-up Response Strategies

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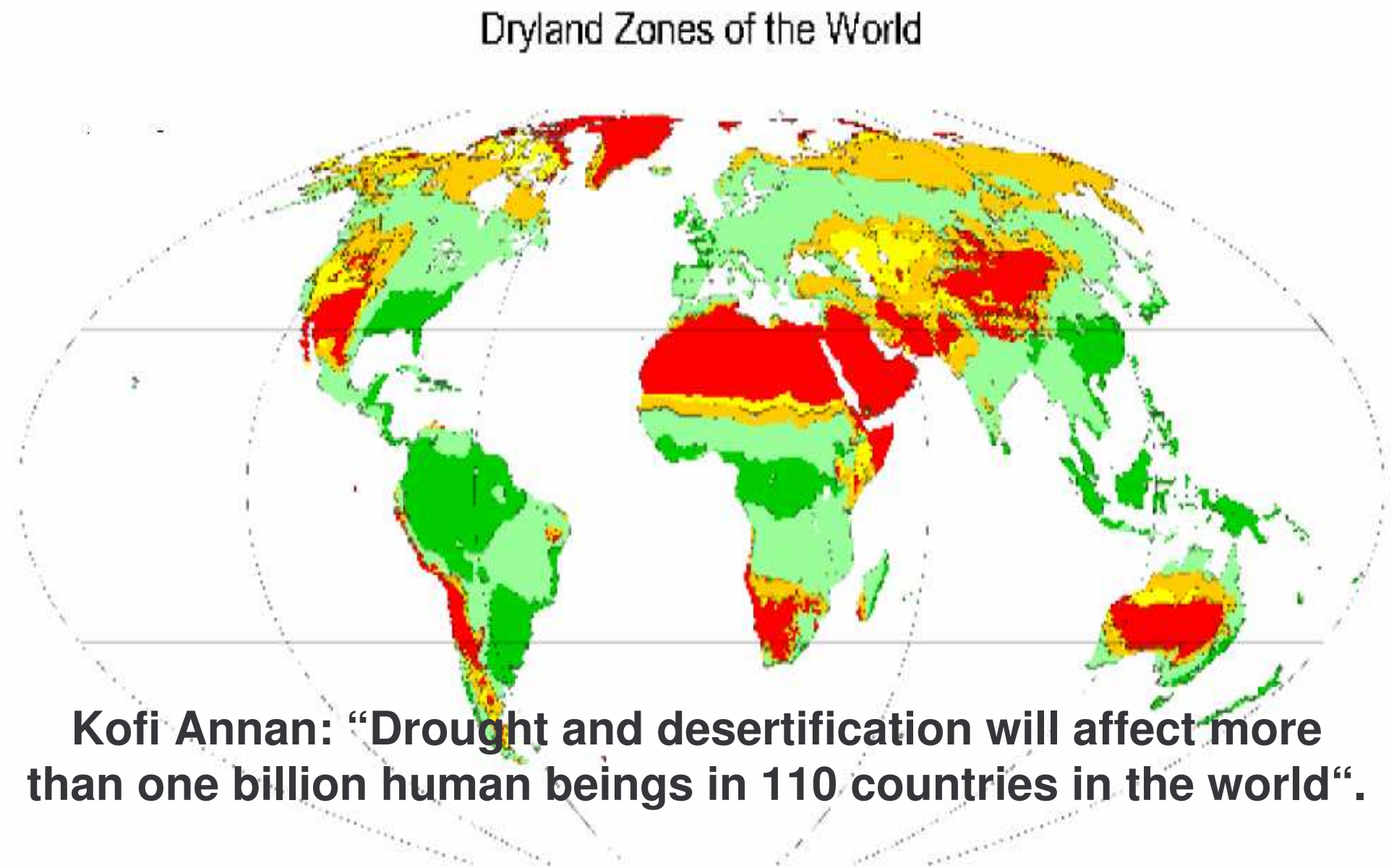
1.Desertification Prone Regions: Mexico and Africa
2.Desertification: A HUGE security challenge
3.Paradigmatic Shift: Security vs. Food Sovereignty
4.Coping with Social Vulnerability , Conflict Resolution and Prevention with Sustainability

Desertification

- **1/3 of the World soils** is threaten by desertification**:** 4 billion hectares
- Over 250 million human being are directly affected
- **24 million tons of fertile** soils are lost each year
- Desertification is involved in **11%** of all hydro-meteorological disasters
- **Desertification is accelerated by** c**limate change** and **anthropogenic activities**, which affects fragile ecosystems. Bad soil management, socio-economic overexploitation, extensive livestock activities, nomad and herd migration, deforestation, depletion of aquifers, salinization and sodification of soils through irrigation, over-fertilization and the wide use of agrochemicals have negative effects on soil quality and accelerate desertification process**.**
- **Migration and refugee** can aggravate the situation in environmental fragile regions, and armed conflicts can transform existing food scarcity into famine. Corrupt governments and miss of political consensus can increase poverty & hunger, and deteriorate the complex situation of deserts (UNCCD, 2005).



Kofi Annan: "Drought and desertification will affect more than one billion human beings in 110 countries in the world".

Quantitative Data on Desertification

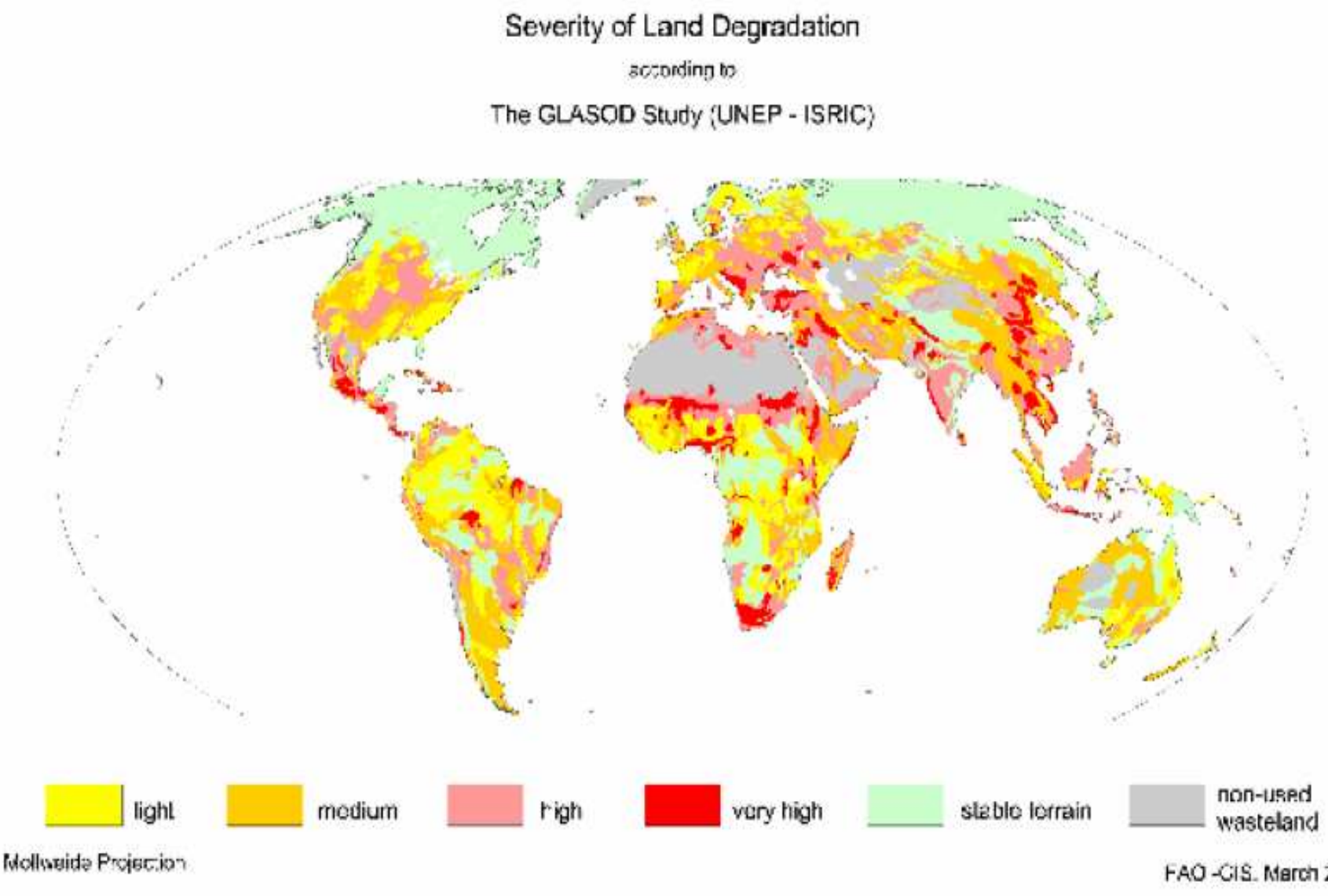
- Surface of Earth are **14.9 billion** hectares. UNEP (United Nations Environmental Program) indicate that **6.1 billion** hectares are **dryland** and 1 **billion** hectares are natural hyperarid **deserts**.
- The rest of the dryland is involved into a desertification process or threaten by aridization.
- **One fourth** of world population lives in dryland and their livelihood depends on this ecosystem.

Qualitative View: Desertification is complex

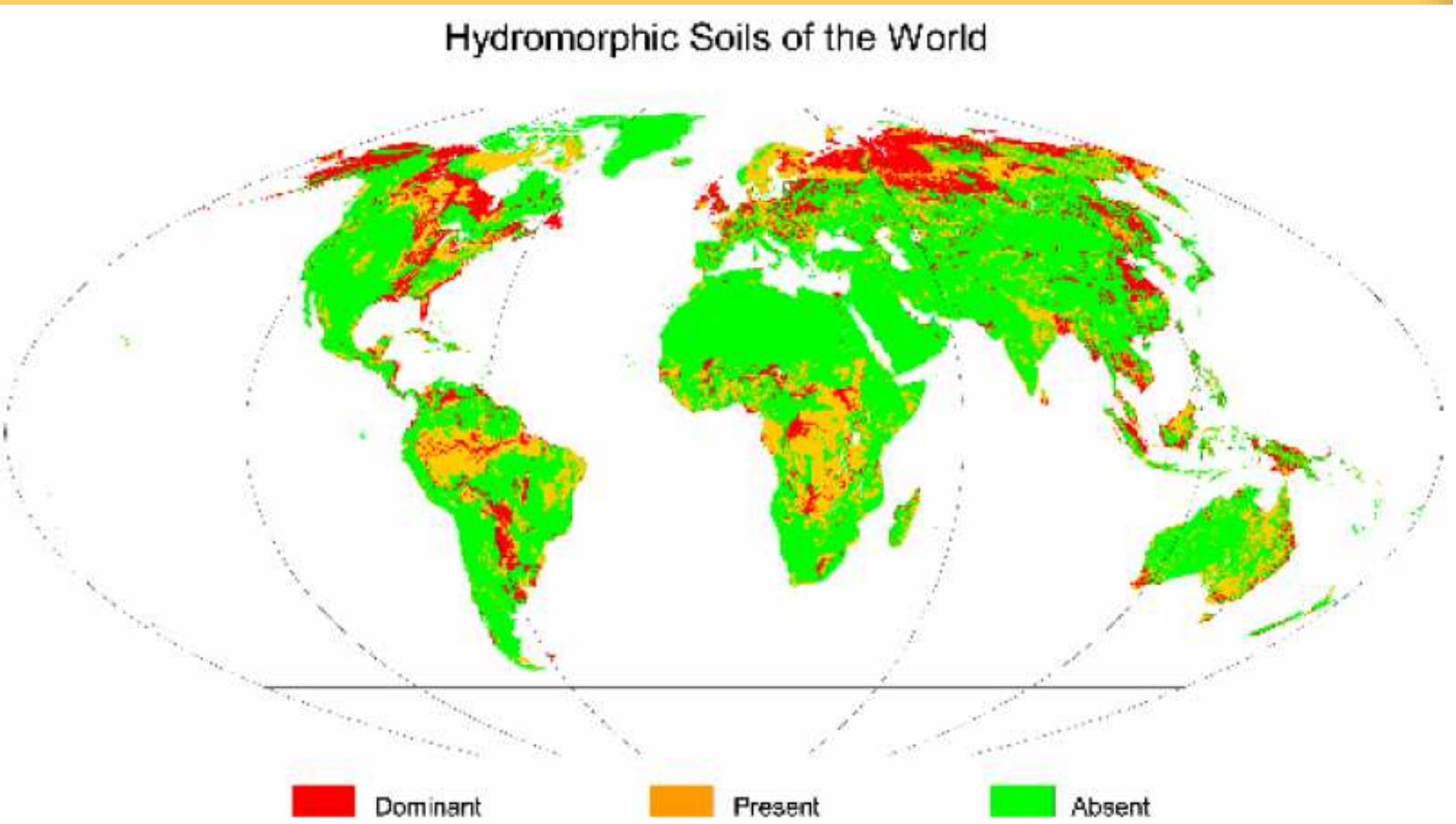
Convenient to separate **causes and mechanisms from effects** of desertification process

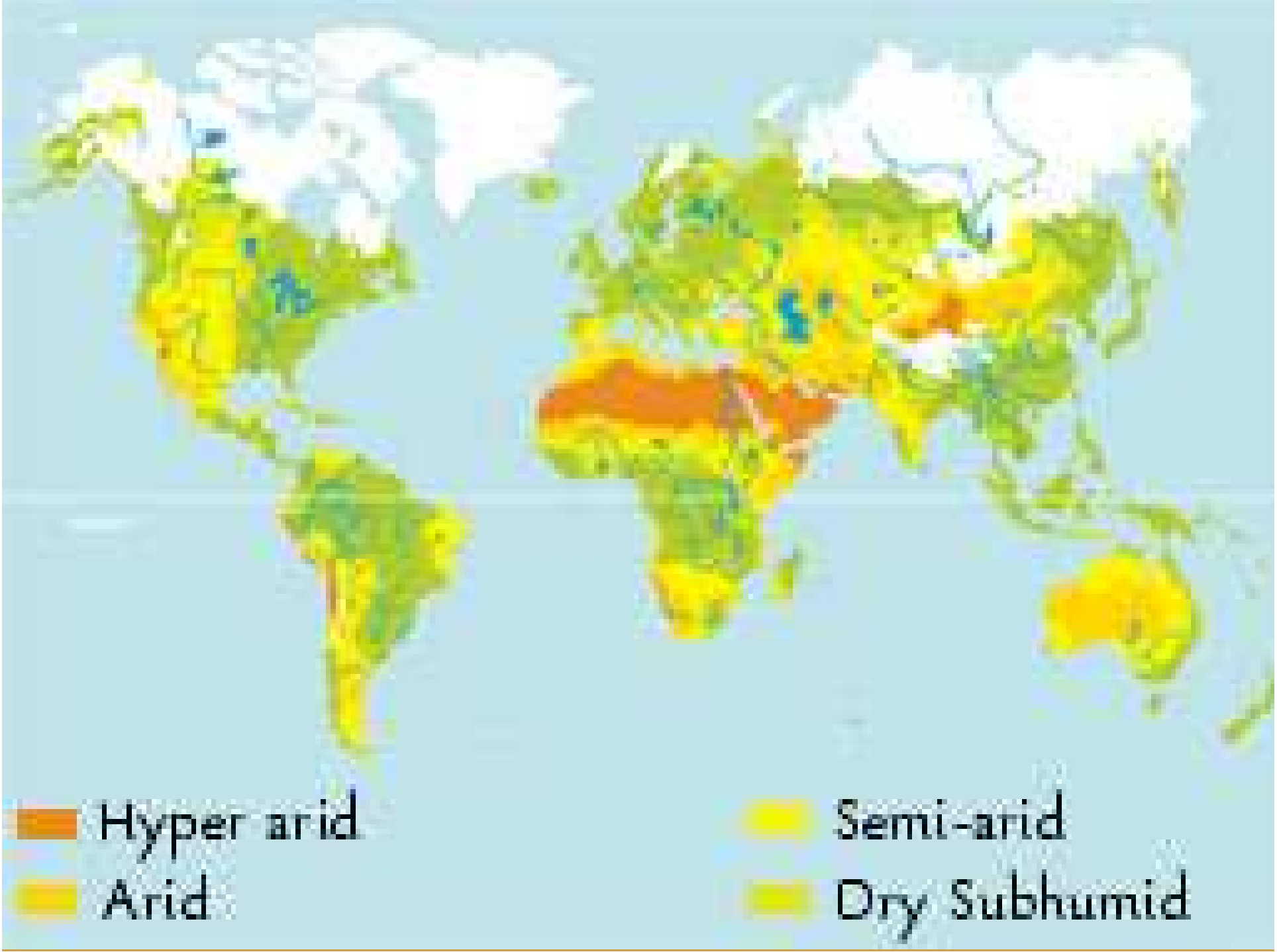
- ***Causes:*** difficulties to distinguish between natural or climatic factors and human induced activities. After one century of studies there is no evidence of aridification process in the XX century.
- ***Mechanisms:*** overgrazing, concentration of herds around water and wells; transportation of water; mega-irrigation project; agribusiness and green revolution intensive productive practices; inadequate soil practices; deforestation of tropical and rain forests; population growth, settlement of nomads; urbanization and industrialization with soil and water pollution; migration and environmental refugees;
- ***Effects:*** cyclical dryness get transformed into structural phenomena; humans migrate; wind, water and soil erosion get reinforced by anthropogenic induced salinization and sodification as a result of overexploitation of aquifers; erosion; sandstorms; unfertile land, climate change, desertification and aridization

Severe Destruction of Soils



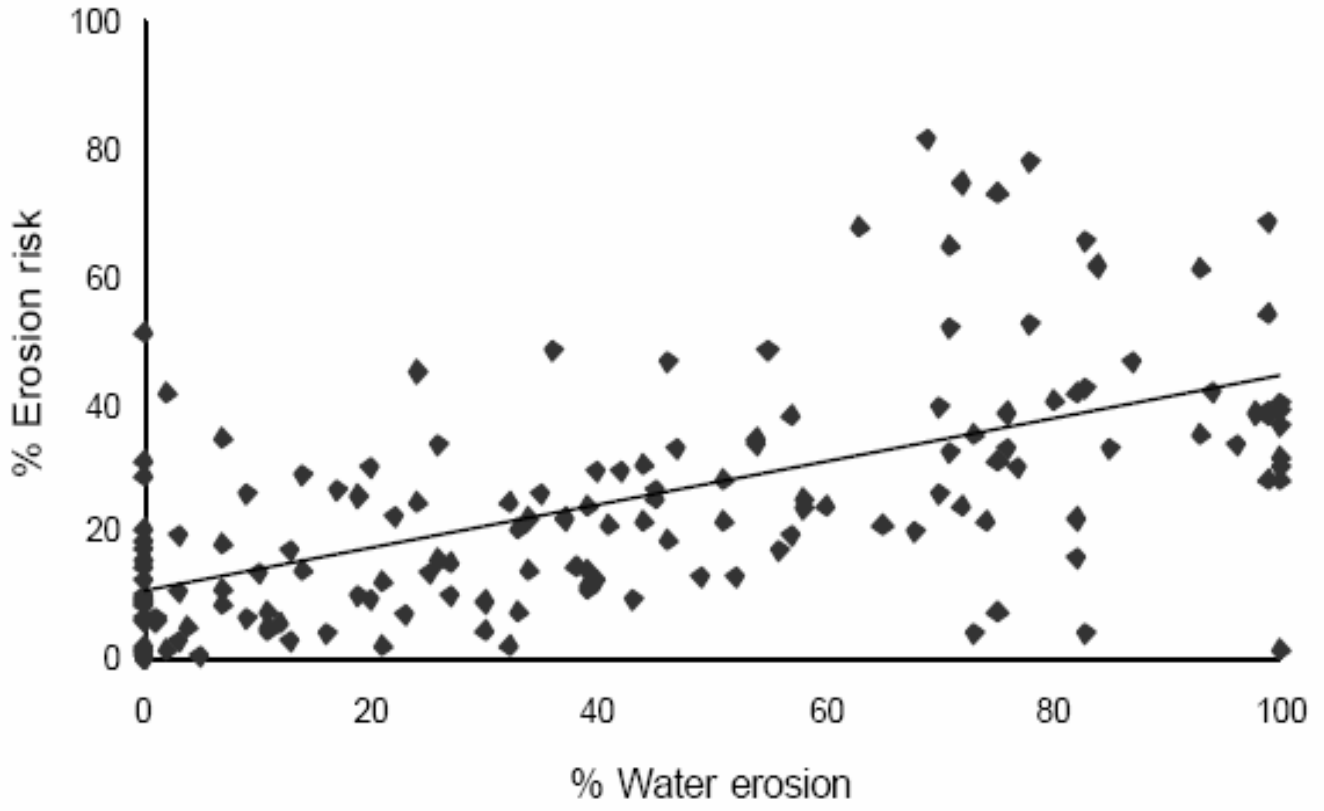
Natural Soil Limits




Hyper arid
Arid
Semi-arid
Dry Subhumid

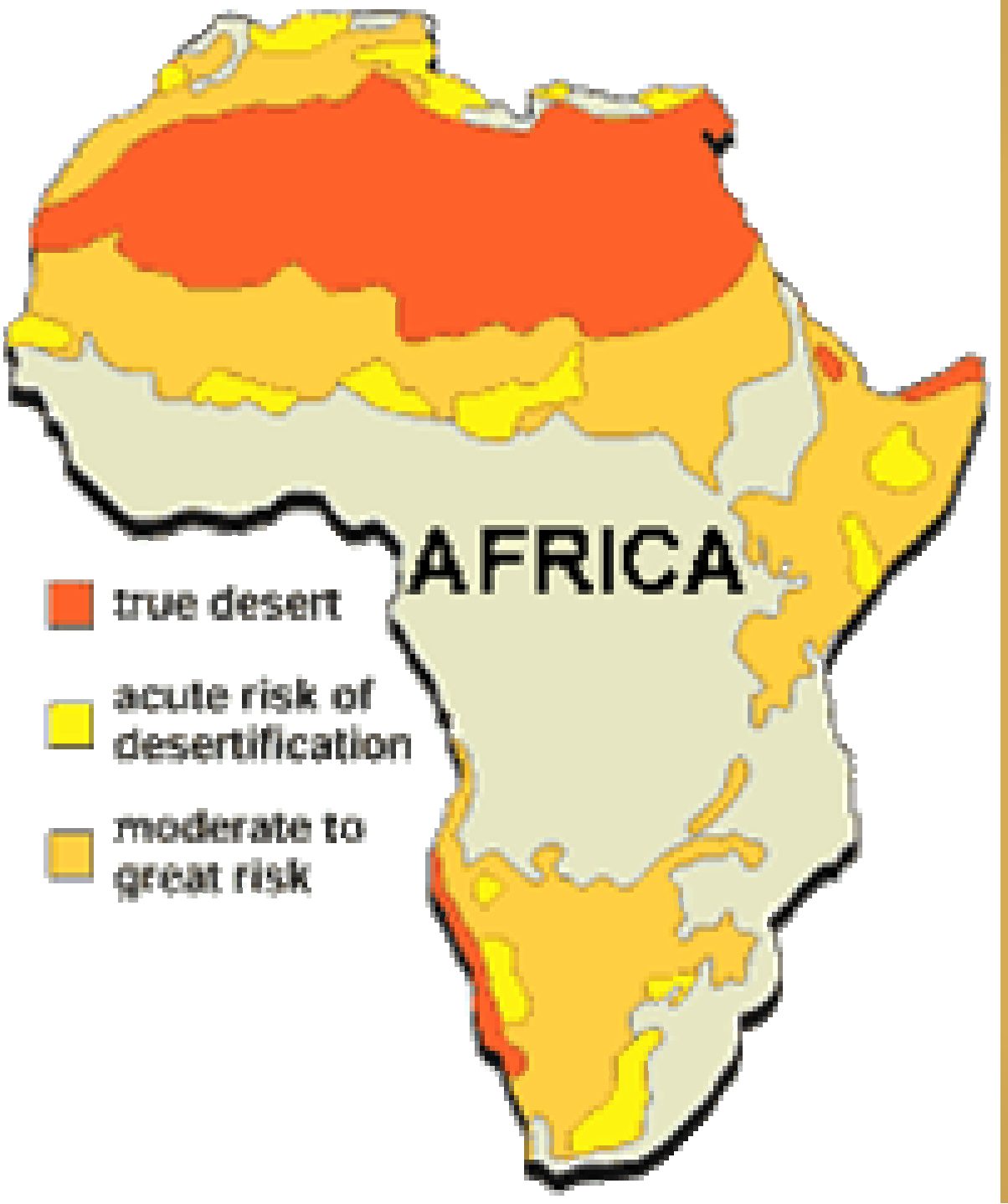
Threats of erosion

Erosion hazard and observed erosion, at country level. (R^2=0.34; n=160)



Nachtergaele and Young 2000, 32

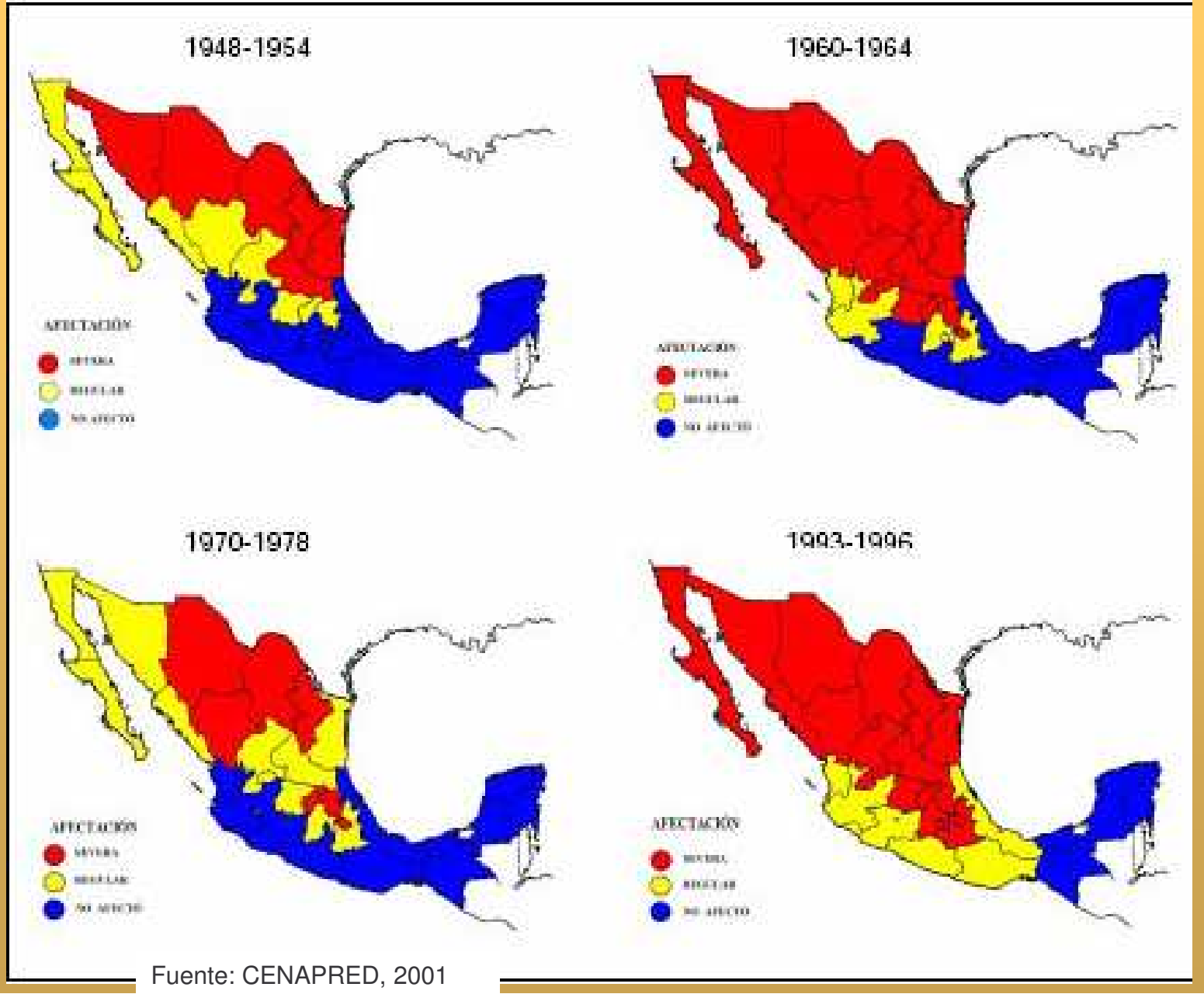
2. Desertification Prone Regions: Mexico and Africa


AFRICA
true desert
acute risk of desertification
moderate to great risk

Desertification in Africa

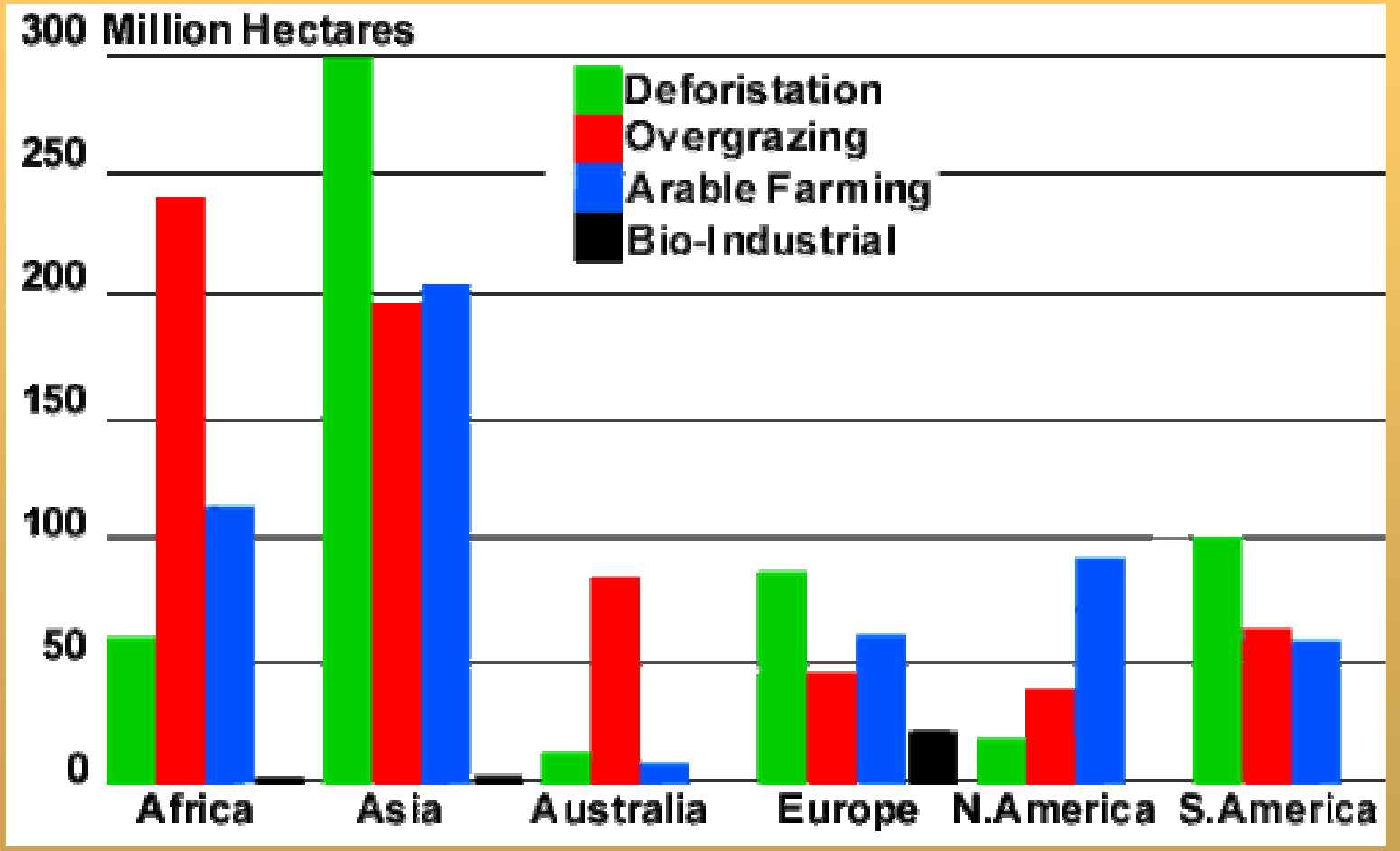
- **25 countries** suffer under insufficient agricultural production inducing that 200 million persons suffer food insecurity.
- Over-cultivation, over grassing, deforestation, unsustainable irrigation projects, bad management of soils and destruction of the ecosystem get pressure from two deserts: Sahara und Kalahari.
- 1,959 million hectares (**65%) of the continent and 1/3 of dry regions of the world are situated in Africa**: 1/3 are hyper arid desert (672 Million ha) and only with inhabitants in the oasis. The rest of the 1,287 million ha are situated in arid and semi-arid regions where 400 million persons leave (**2/3 of the African population**).
- **Severe droughts**: 1968-73, 1982-85 and 1990-92 with famine
- About **73%** of the agricultural used dryland suffer under e**rosion**; 61% of the field are rain-fed and 18% are irrigated. These fields have lost **25% of their natural soil fertility**.

Severe Droughts, Mexico



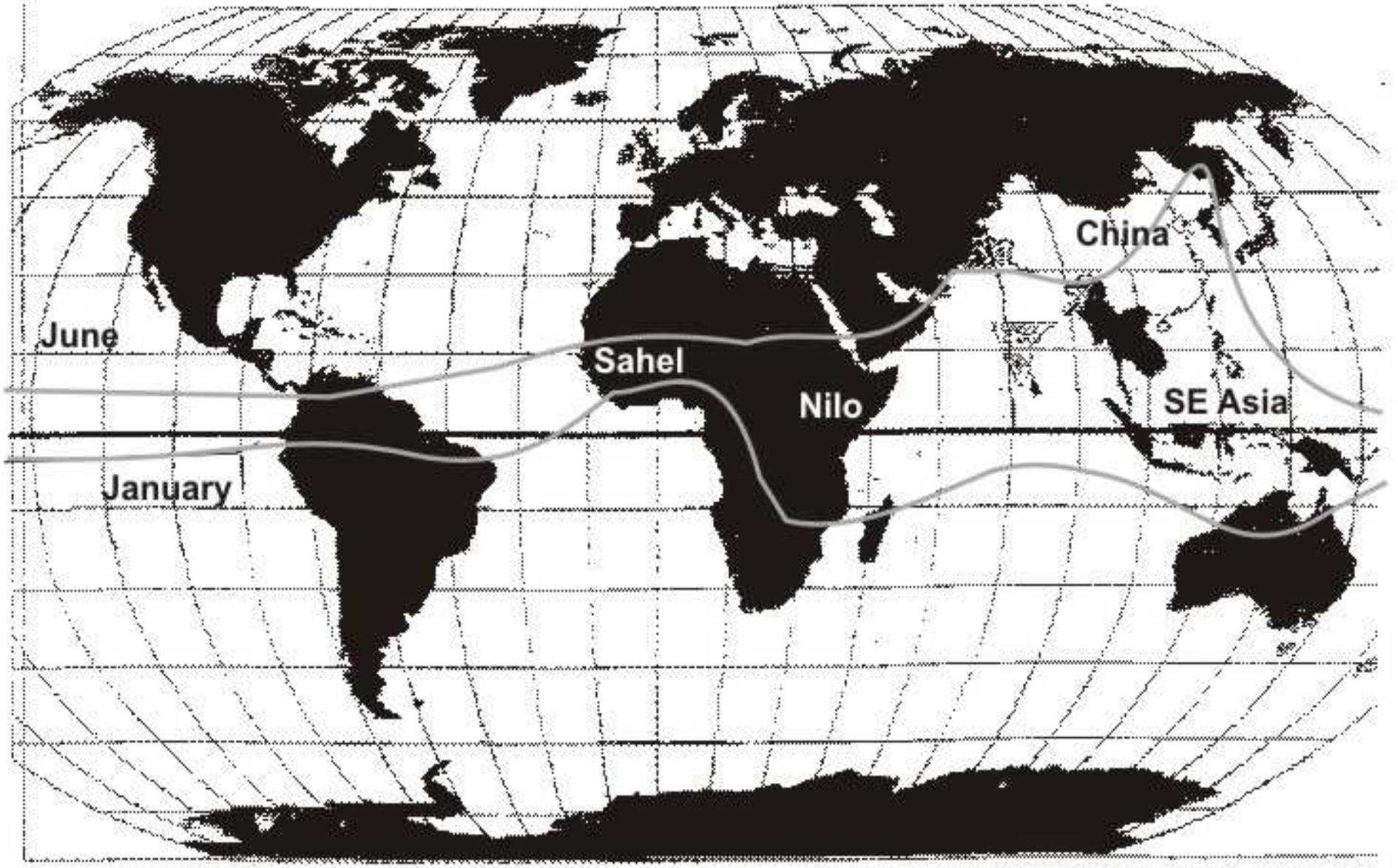
Fuente: CENAPRED, 2001

Anthropogenic reasons of soil destruction



UNEP, 2005

Climate Change
the High Vulnerable Tropic

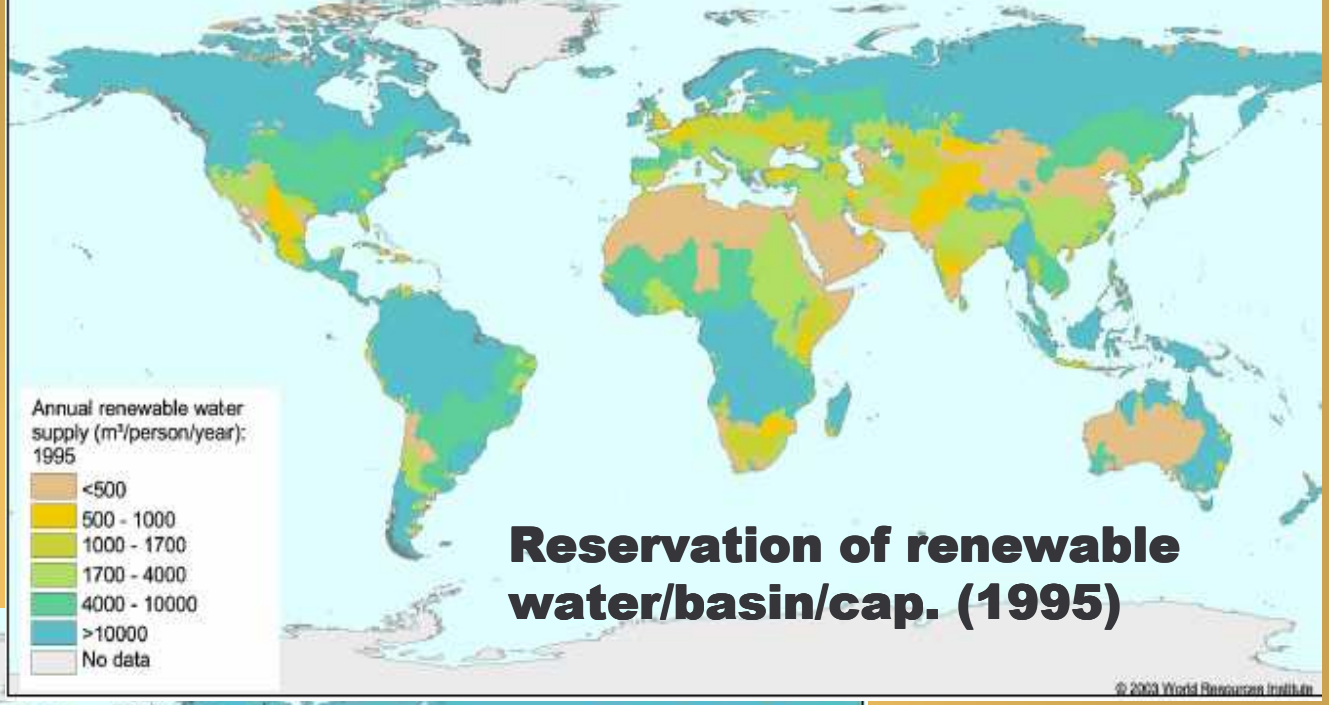


Source: http// water.hut.fi/wr/research/glob/acewww/sld010.html

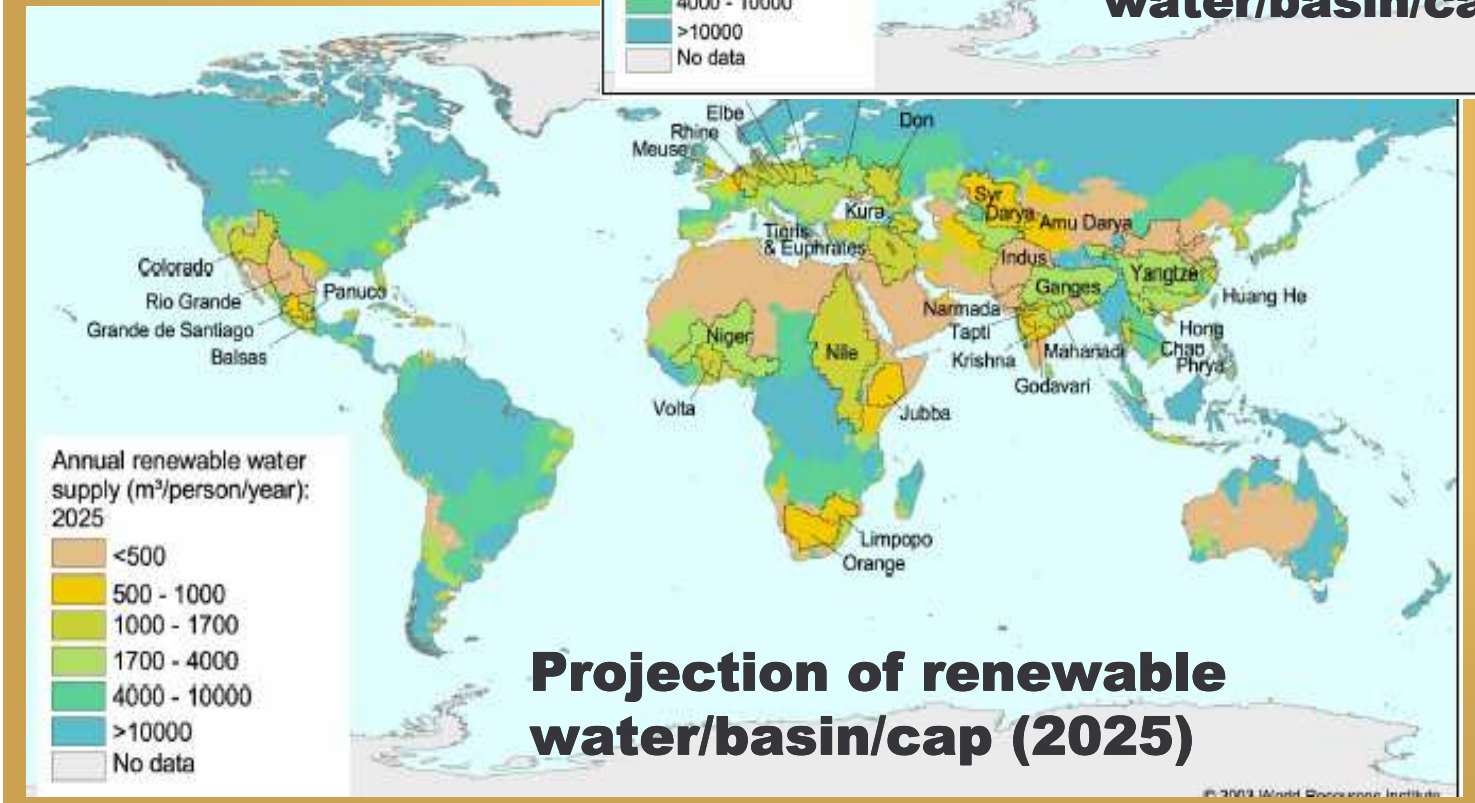
Water disposal

Location	Volume 103/ cm3	% of water	Recycled volume	Period of renew/years
Aquifers	10,530	30.1	-	1,400
Swamps	16.5	0.05	16,500	1
Glaciers	24,064	68.7	2,477	-
Lakes	91	0.26	-	-
Rivers	2.2	0.006	43,000	16 days
Biol. water	1.12	0.003	-	
Atmosfere	12.9	0.04	600,000	8 days
Total	35,029.2	100	-	-

Source: Shiklomanov 2005

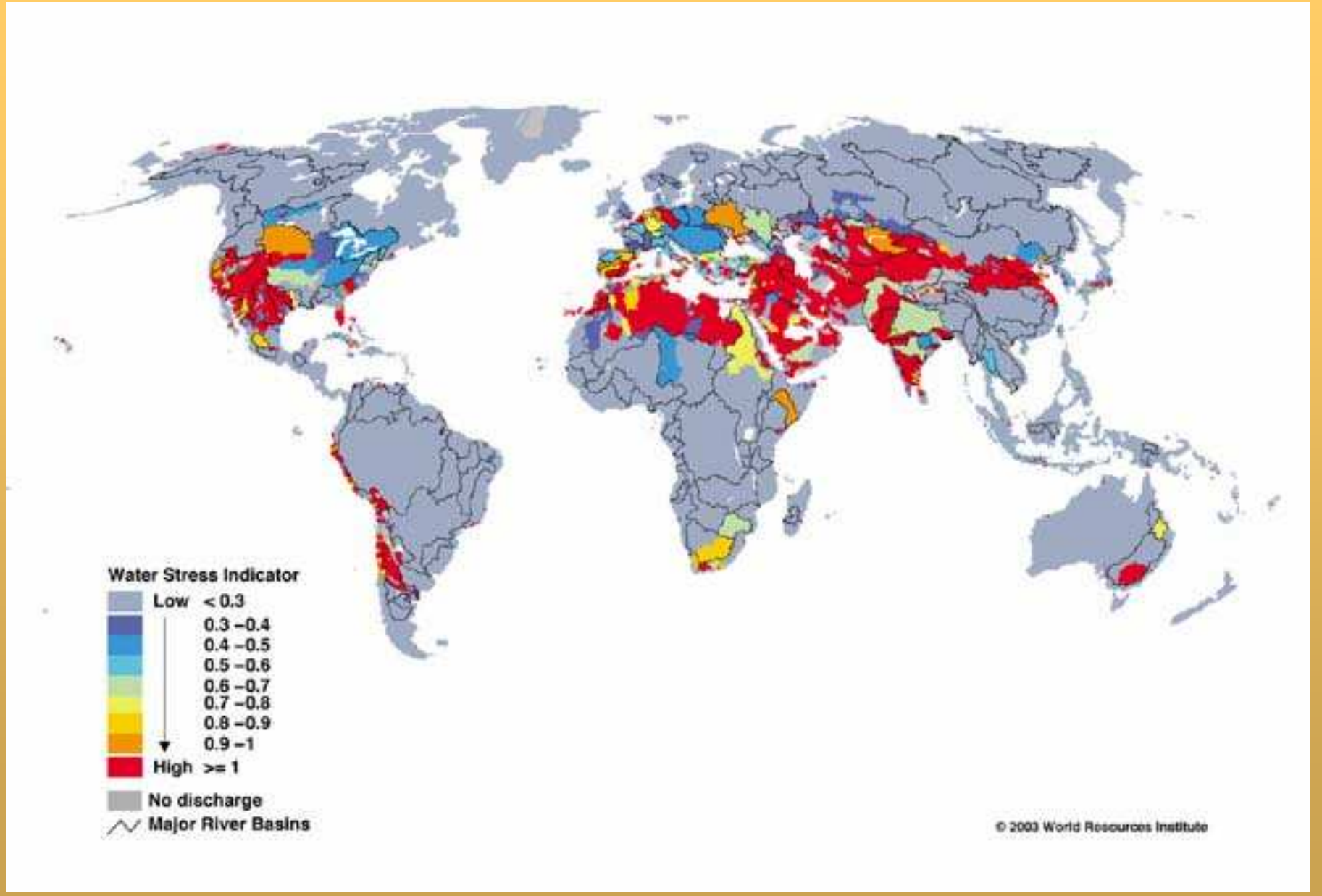


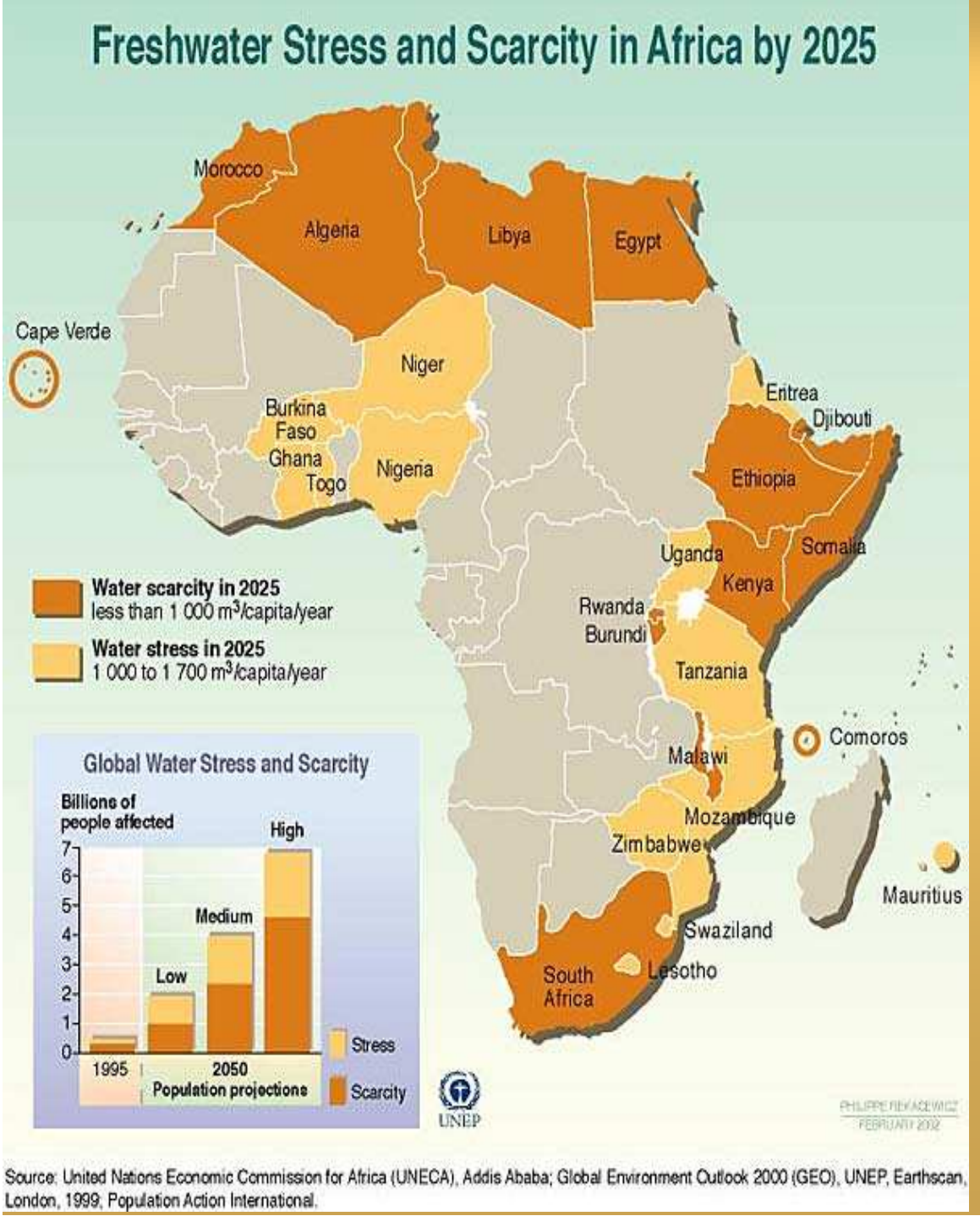
Reservation of renewable water/basin/cap. (1995)



Projection of renewable water/basin/cap (2025)

Regions with major water-stress

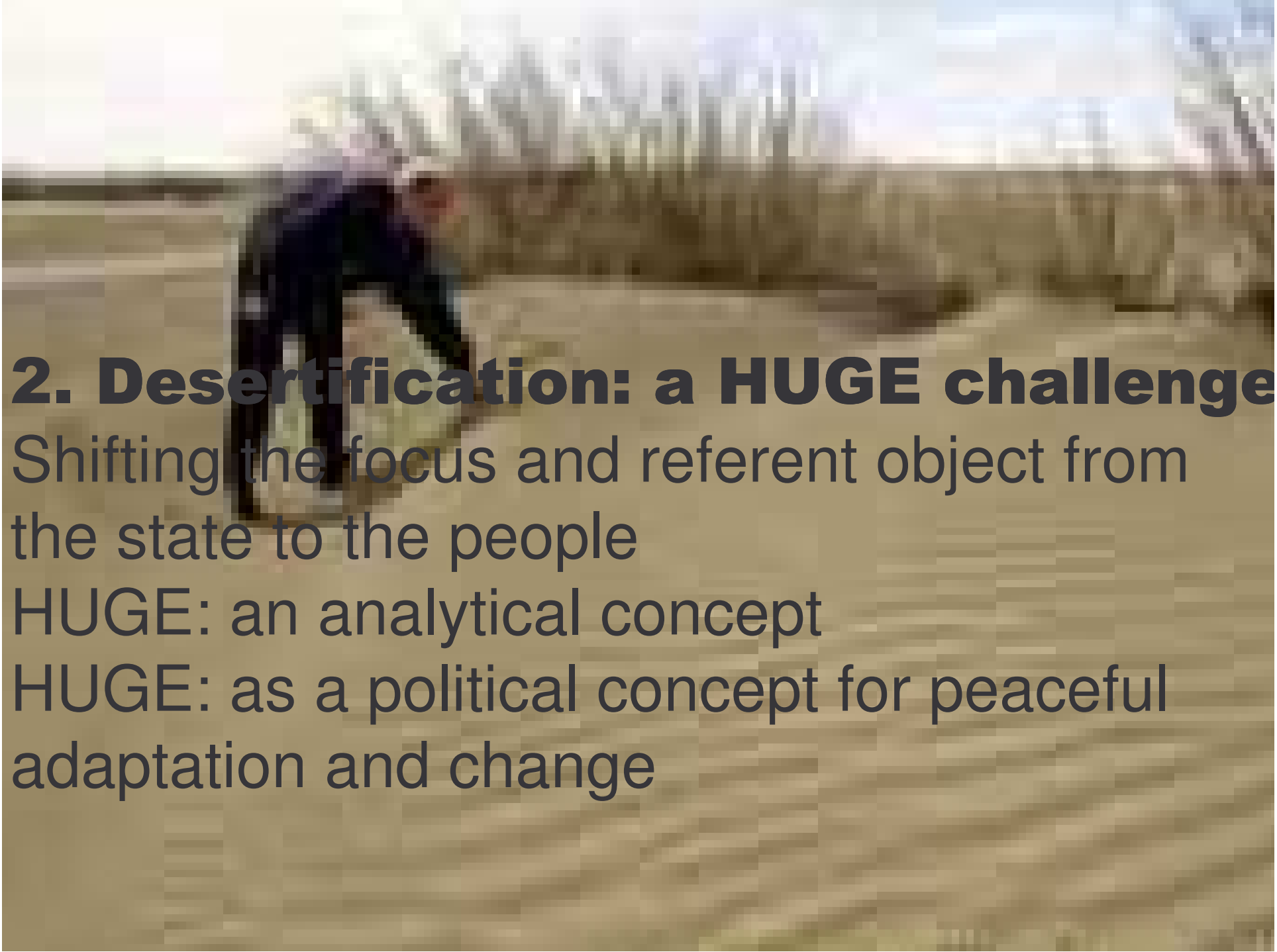




Source: United Nations Economic Commission for Africa (UNECA), Addis Ababa; Global Environment Outlook 2000 (GEO), UNEP, Earthscan, London, 1999, Population Action International.

Water Stress in Africa in 2025

- Water scarcity, water stress & vulnerability will become extreme in North, East and South Africa by 2025
- This will have severe impacts on food security.



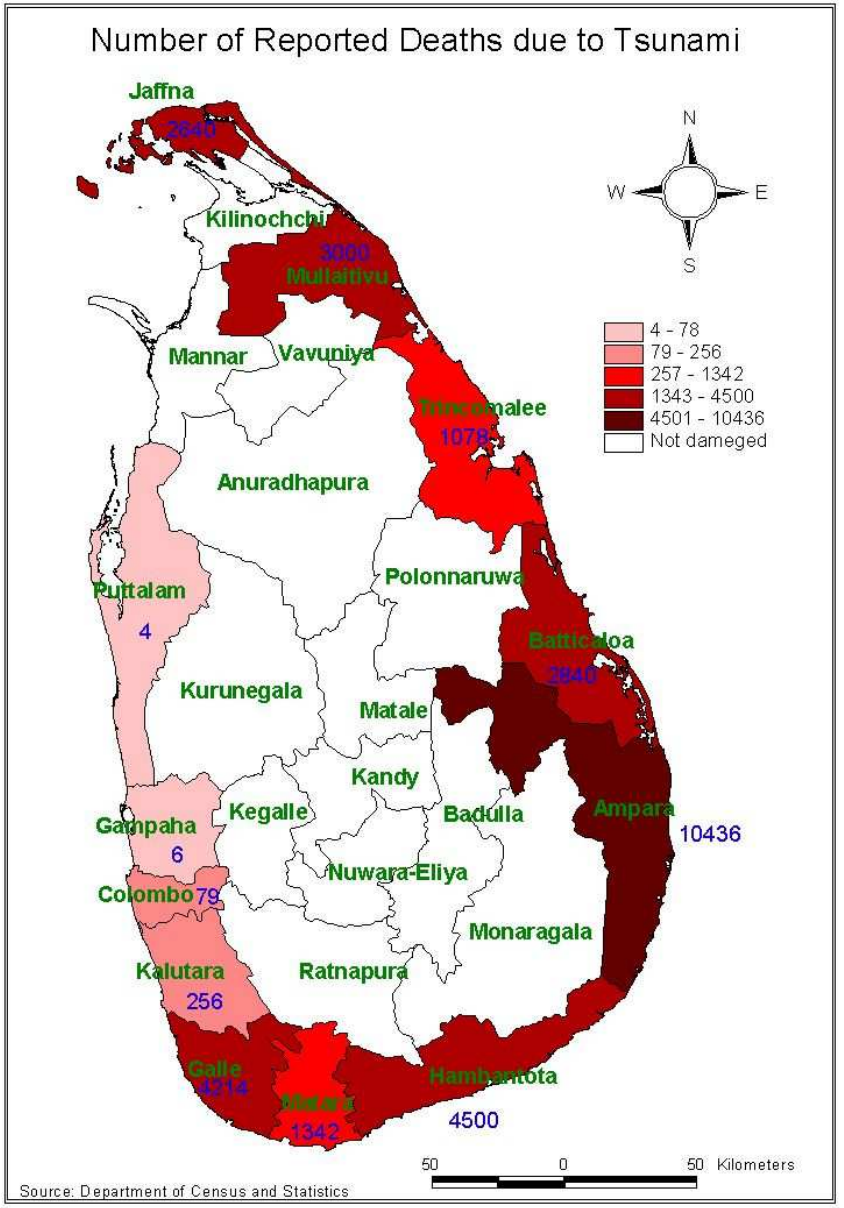
2. Desertification: a HUGE challenge

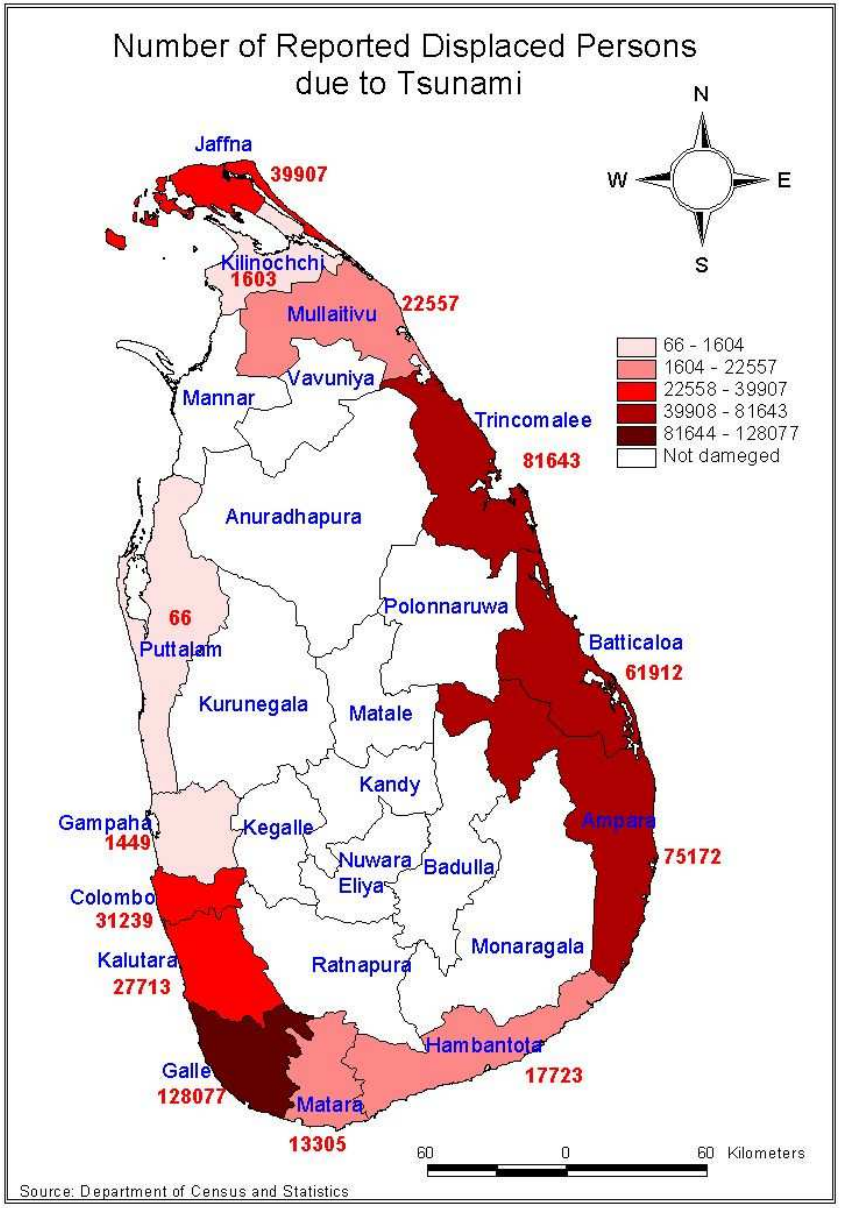
Shifting the focus and referent object from the state to the people

HUGE: an analytical concept

HUGE: as a political concept for peaceful adaptation and change

Regional Vulnerability in Disasters





Source: Siri Hettige – University of Colombo
Sarath Amarasinghe – University of Ruhuna
Nishara Fernando – University of Colombo

Dead and Missing: Gender and Age Bias

Gender (%)	
Female	**65.3**
Male	34.7
Total 100 (72)	

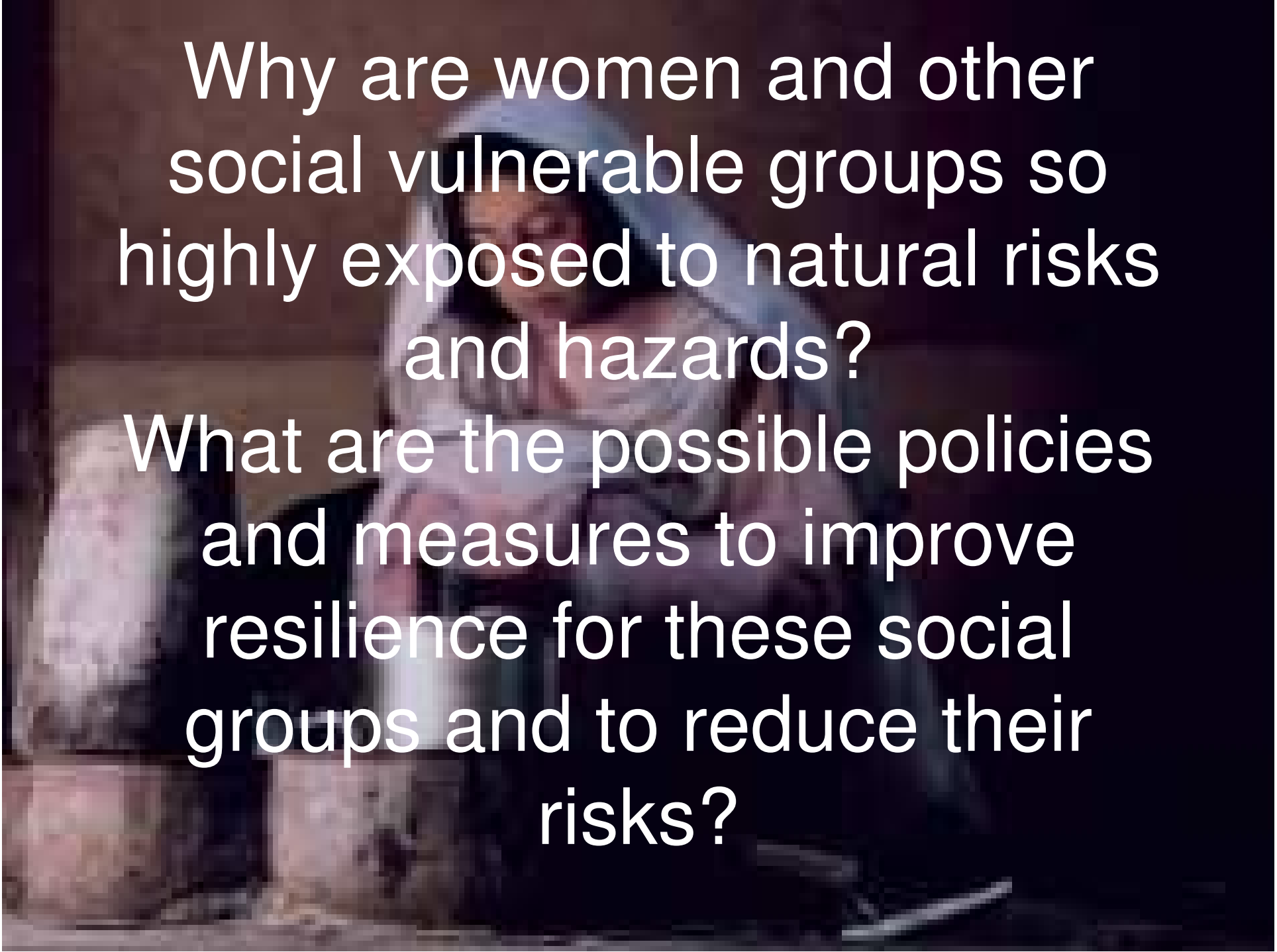
Marital status (%)	
Never married	45.1
Married	49.3
Widowed	5.6
N/A	1.4
Total	100 (72)

Educational status (%)	
1-5	36.4
6-10	32.7
O/L	12.7
A/L	16.4
Higher education	1.8
N/A	23.6
Total	100 (72)

Age (%)	
1-4	13.9
5-9	11.1
10-17	11.1
18-25	1.4
26-35	13.9
36-45	6.9
46-55	16.7
56-70	9.7
71>	15.3
Total	100 (72)

Activity (%)	
Student	27.4
Household work	21.0
Unemployed	12.9
Employed	27.4
Unable to work	11.3
N/A	13.9
Total	100 (72)

Source: Siri Hettige – University of Colombo
Sarath Amarasinghe – University of Ruhuna
Nishara Fernando – University of Colombo


Why are women and other social vulnerable groups so highly exposed to natural risks and hazards?
What are the possible policies and measures to improve resilience for these social groups and to reduce their risks?

Human, Gender and Environmental Security (HUGE

Level of expansion	Determination Which security?	Mode of expansion Reference object Security of whom?	Value at risk Security of what?	Source(s) of threat Security from whom or what?
Without expansion	National security (political, military dimension)	The State	Sovereignty, territorial integrity	Other States, terrorism, sub-state actors, guerrilla
Increased	Societal security	Nations, social groups	National Unity, national identity	(States), Nations, Migrants, Alien cultures
Radical	**Human security**	**Individuals (Humankind)**	**Survival, quality of life, cultural integrity**	**The State, globalization, nature, GEC, poverty, fundamentalism**
Ultra-radical	**Environmental Security**	**Ecosystem, urban and agricultural system**	**Sustainability**	**Nature Humankind**
Trans-radical	**Gender security**	**Gender relations, indigenous, minorities**	**Equity, identity, social relations**	**Patriarchy, totalitarian institutions (élites, governments, religions, culture), intolerance**

Source: Bjørn Møller, 2003:279 and Úrsula Oswald, 2001, 2004

Gender security & identity

- Refers to the process of socialization to "**become" a gendered** human being; a men or a women, depending on the position of the social structure.
- Gender security is **socially constructed** and systemic within the present patriarchal society, and it is normally taken for granted. The relations are linked to gender status– ethnicity/race, class, age and minority status- in relation to the model of reference. **Equity and identity** are values at risk. The source of threat comes in first instance from the patriarchal hierarchical and violent order, characterized by exclusive, dominant and authoritarian institutions such as non-democratic governments, churches and élites.
- The symbolic distribution of space and time assigns the male the **public sphere**: production, *res publica*, *homo sapiens;* and the **women the private**: reproduction, home, *homo domesticus.*
- The **distribution of power** acquires also generic forms. Men exercise a hierarchical and vertical power of domination and superiority.

HUGE

- Oswald (2001, 2006) **widened gender concept** of HUGE including vulnerable (children, elders, indigenous and other groups)
- Human-centered focus on *environmental security* and *peace challenges*.
- HUGE analyzes patriarchal, violent & **exclusive structures** within family & society **questioning** gendered social representation-building & traditional role assignation by overcoming women discrimination & narrow feminist male-female opposition.
- '***Human security***' focuses on equity & development through social organization, governmental policies, private investments & legal reinforcements by stimulating sociopolitical participation of women, young and elders.
- At the international level HUGE examines the free & equal access to world & regional **markets** without trade distortions, stimulating world **solidarity** for poor countries with financial aid, technological support and debt relief.

- As a holistic concept it includes '**environmental security**': healthy environment, integral management of natural resources, prevention and remediation practices reducing vulnerability to hazard impacts.
- Hazard-prone countries are enabled to develop technical, economic and human **support to reduce** social vulnerability through bottom-up internal organization & resilience-building, top-down policies and institutions guaranteeing early warning, evacuation, disaster support & reconstruction.
- **Nonviolent conflict resolution** with diverse systems of values, ideas and practices overcoming contradictory messages and behaviours.
- HUGE examines participatory democracy and governance, promoting conflict prevention, nonviolent conflict resolution and peace-building; in summary a '**huge' solidarity** process of **sustainable and equal** development.

Women and Disasters Management

Water and food production in hand of women:

- Under normal conditions women produce **half of world food**; in developing countries even up to 60% to 80%;
- Women in México **own** 17% of their land & in Africa only 2%
- Women practice **survival strategies** in coping with **short & long-term disasters** such as economic crises and **famine**.
- They contribute in Africa to:
  - 33% of the paid labor force
  - 70% of agricultural labor days
  - 60-80% of subsistence production
  - 100% of food transformation
  - 80% of food storing
  - 90% of spinning and weaving
  - 60% of harvesting and market activities
  - 2% own land or have land rights (FAO, 2002)

Gender, Threats and Disasters

Women contribute subjective and objective values

Subjective values** (social identity)**:

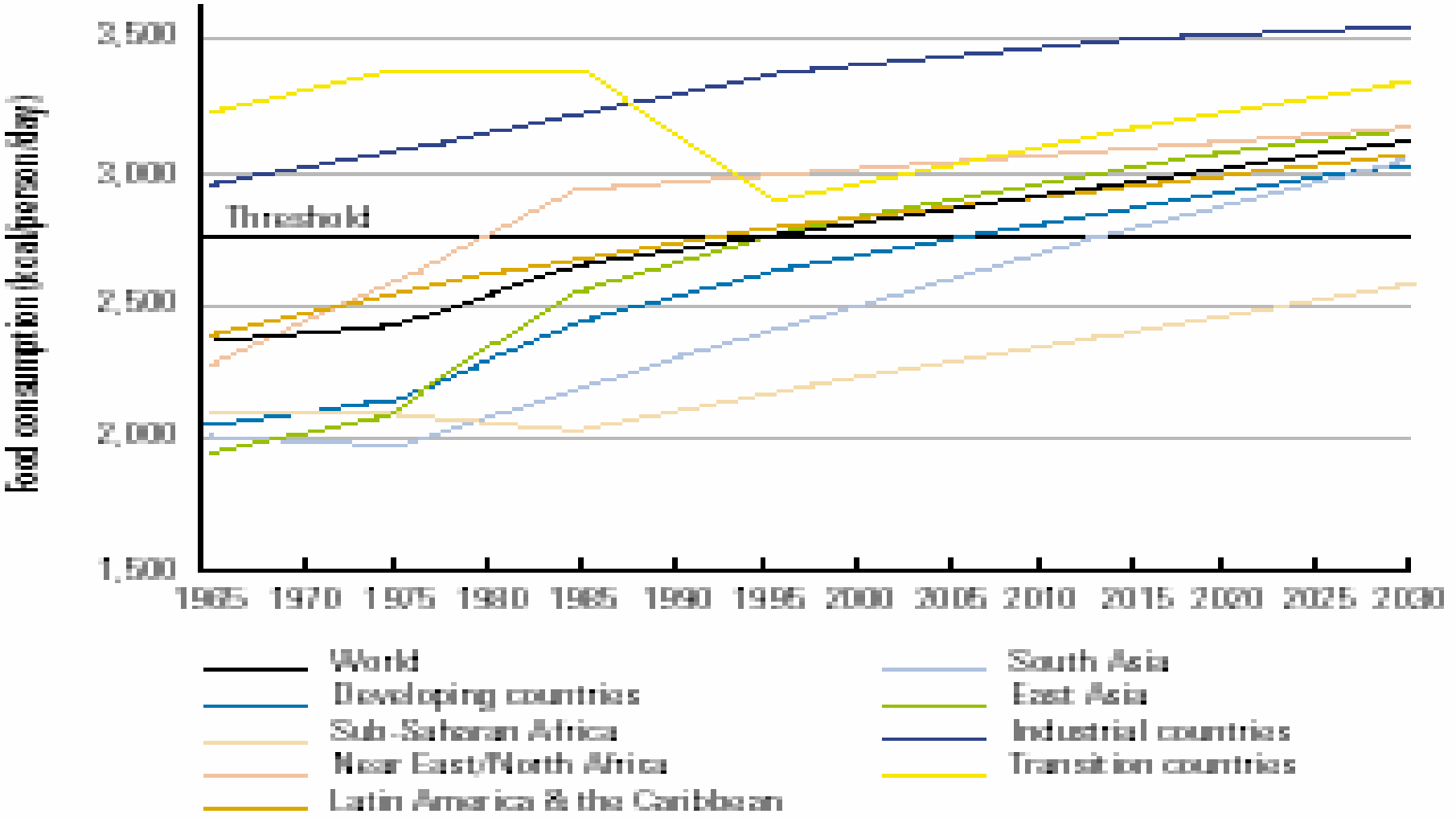
- Caring about their families, children, neighbors and those in need
- Positive self-esteem in crisis situations
- Emotionally stabilizing families before, during and after a disaster
- Guardians of traditions and values
- Locally attached

Objective values (social representation):

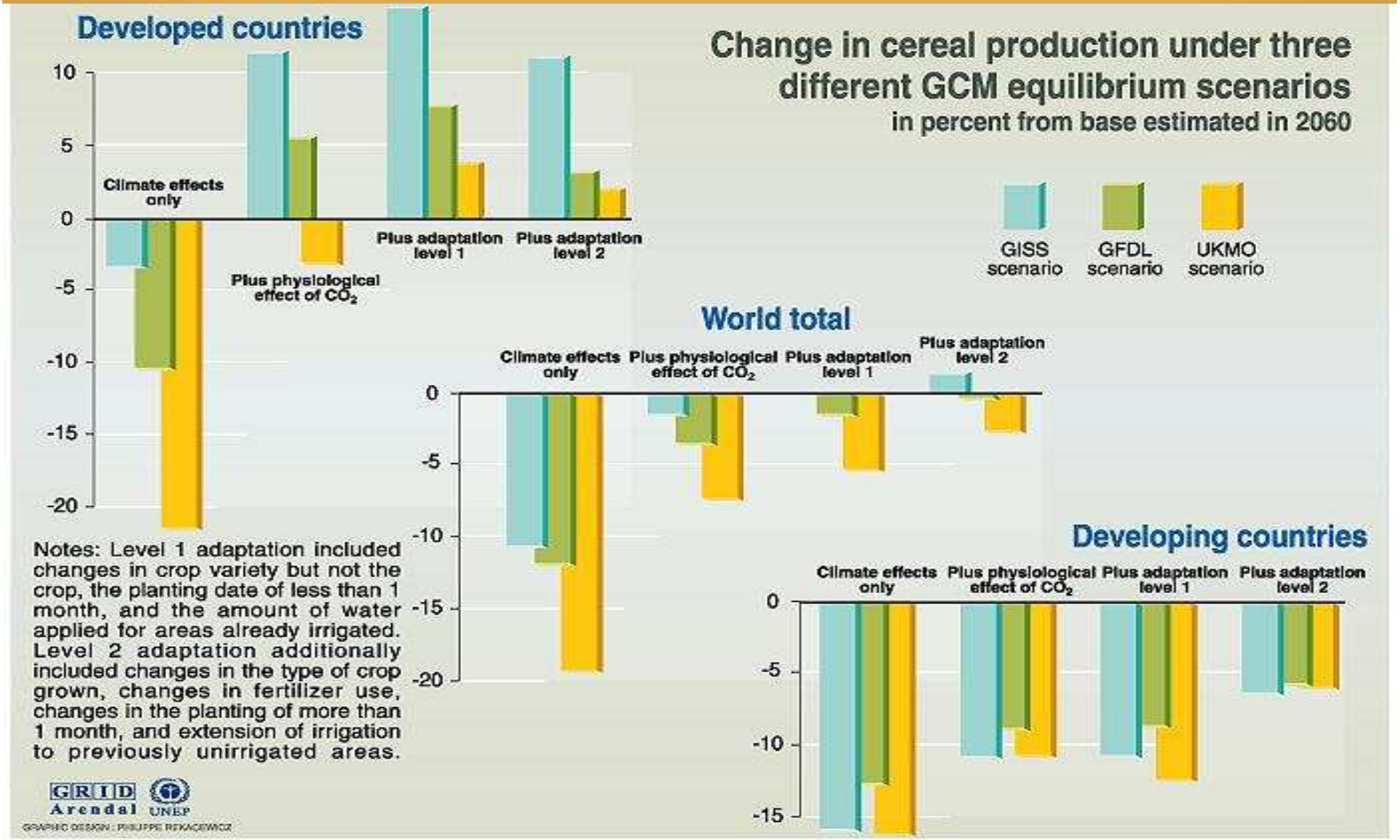
- Flexible, adaptable and able to shift activities immediately by diversifying (refugee camps, survival activities, collection, reconstruction, services, agriculture, reforestation, ecotourism,)
- Open to collaborate in rescue activities
- Generate survival strategies in case of disasters
- Contribute to the national economy
- Create local employments, incomes and stabilize emigration
- Generate political stability and conciliate conflicts

3. Paradigmatic Shift: Security vs. Food Sovereignty

Evolution of Food Situation



Source: FAO, 2002

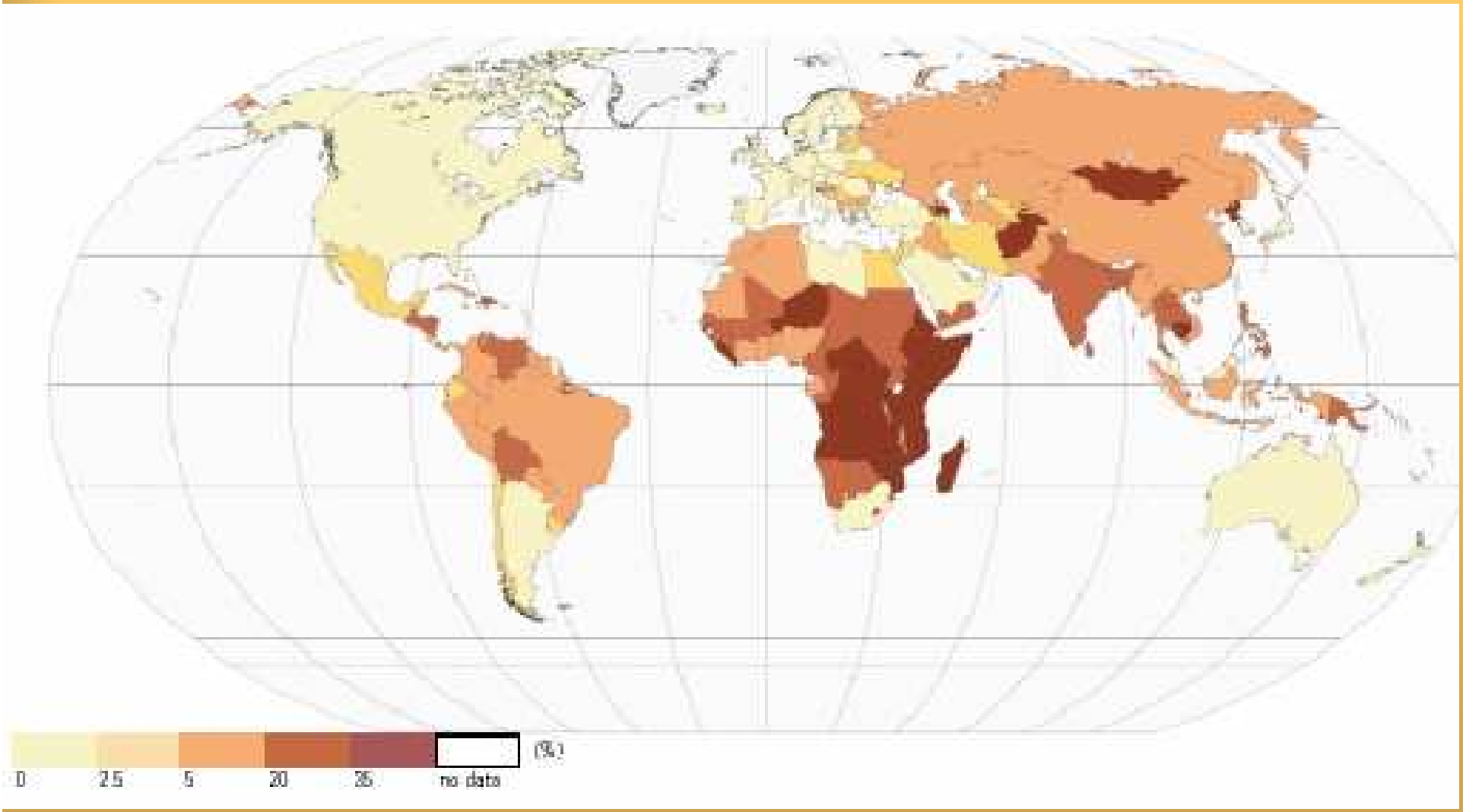


Source: Climate change 1995, Impacts, adaptations and mitigation of climate change: scientific-technical analyses, contribution of working group 2 to the second assessment report of the intergovernmental panel on climate change, UNEP and WMO, Cambridge press university, 1996.

Productivist Paradigm

- Offer is in the centre. Started 200 years ago. Tried to industrialize agriculture through massive production tools (monocultivation, intensive use of chemicals, veterinarian drugs, improved seeds, machines, fossil energy and irrigation systems).
- Politically, this systems depend on high governmental subsides (USA,EU, OCDE, Japan), offering consumer homogenized and cheap products.
- Production is in hand of agronomist, veterinarians and chemical industry.
- Health and environment are marginal and Ministry of Agriculture manage natural resources such as soils, water and fishes.

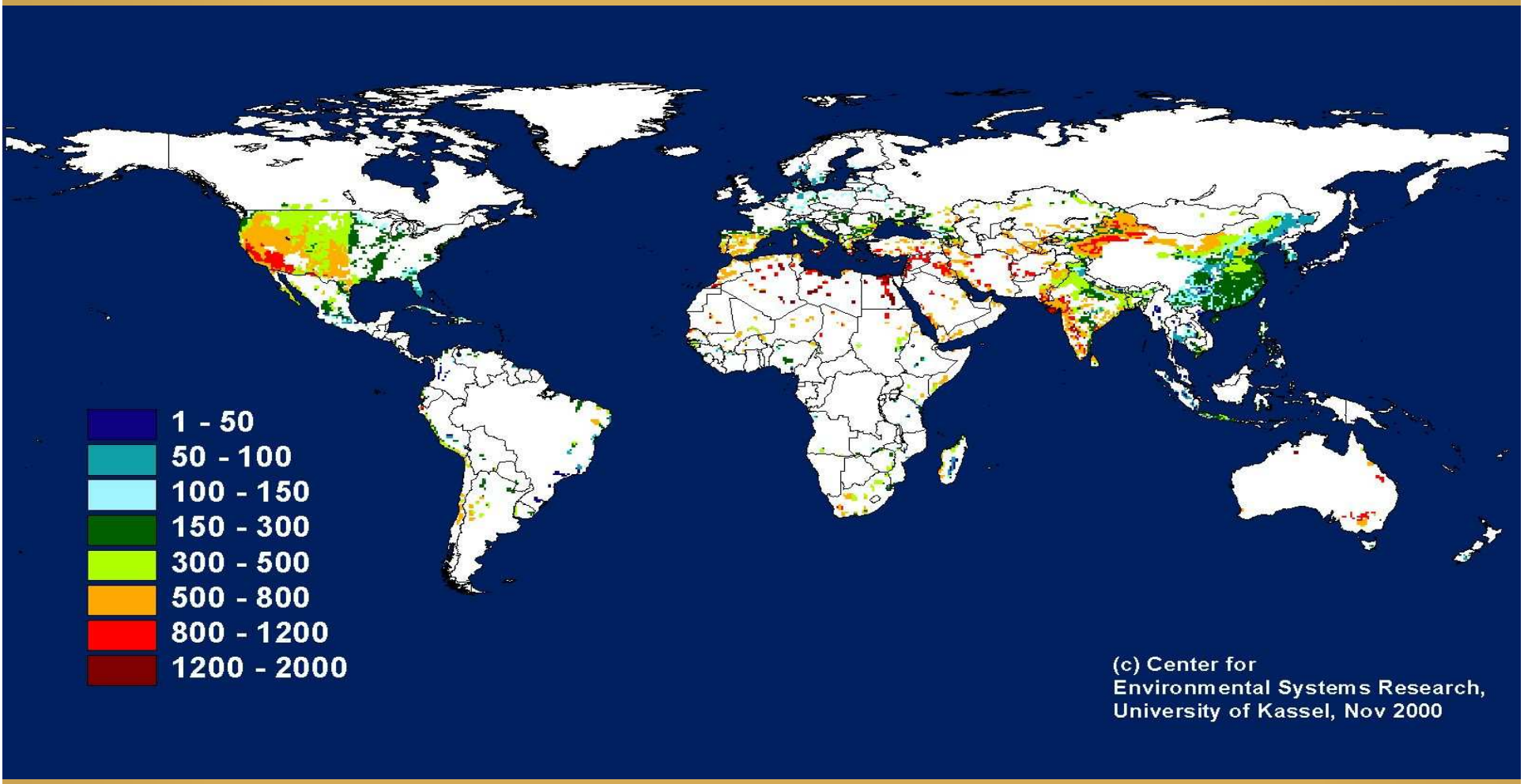
% de Undernourished Persons



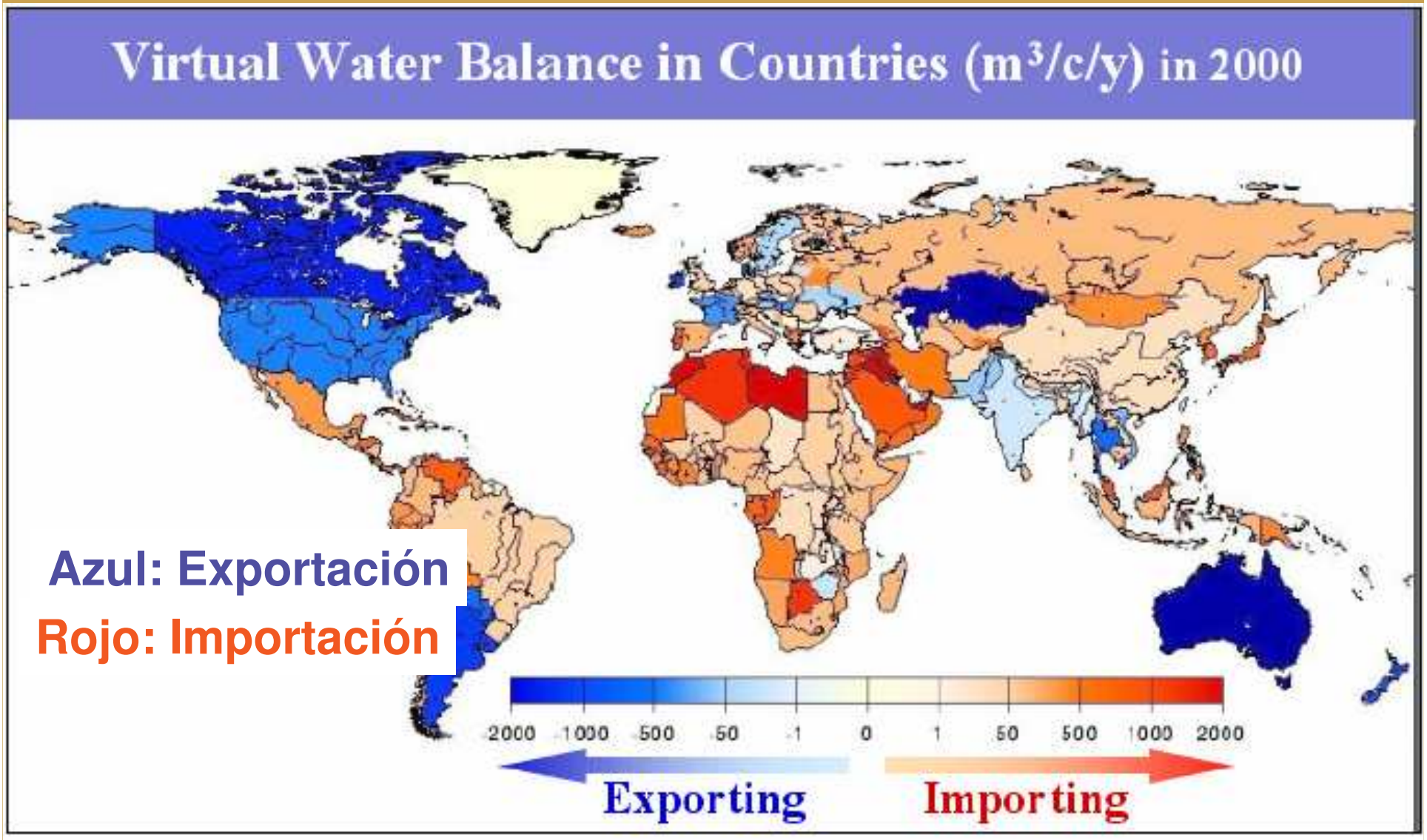
Source: FAO, 2001

Water Use – Agriculture

Irrigated Area and Water Use

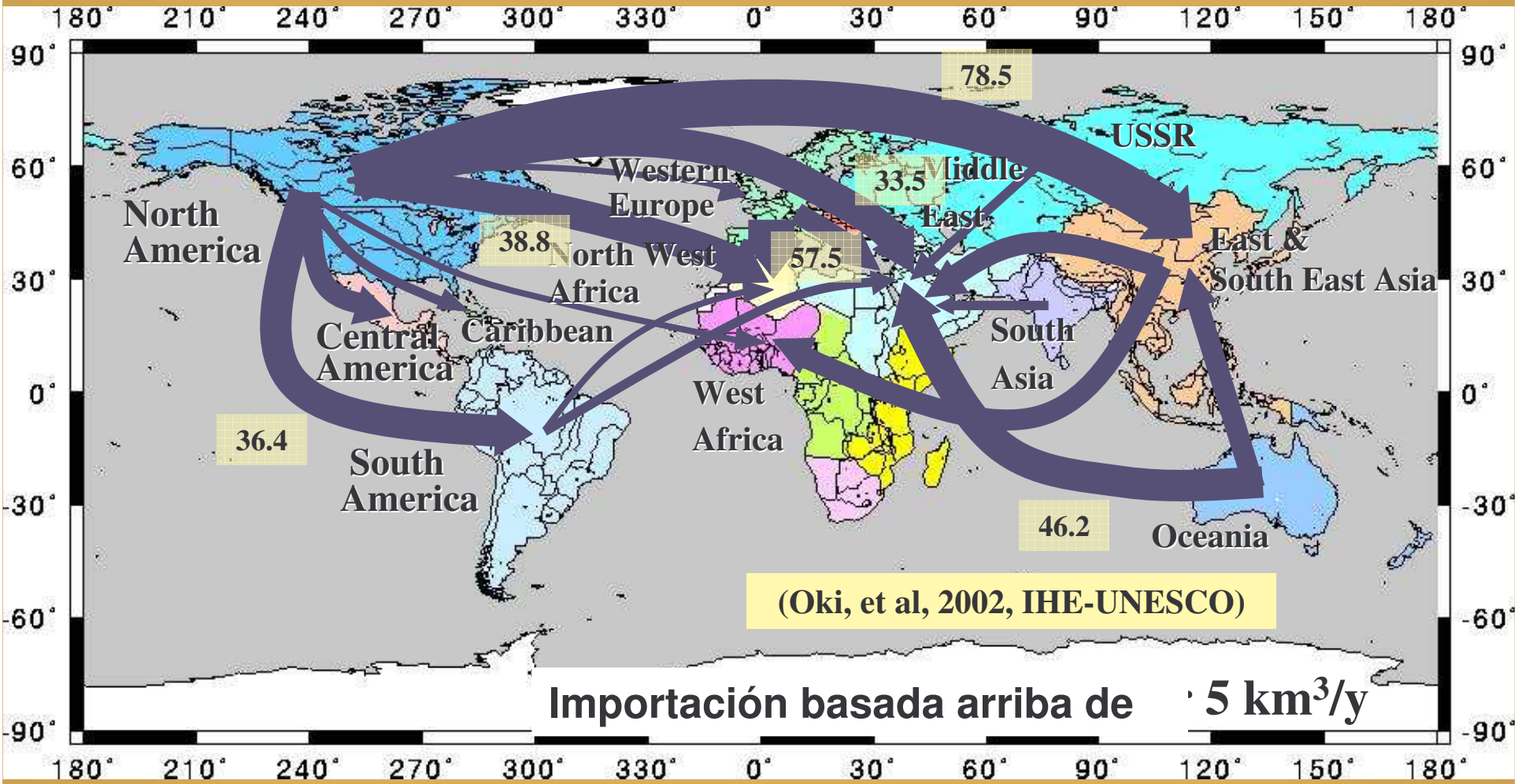


Source: WaterGAP, 2000



Oki et al. 2003

“Virtual Water” flow in 2000 (cereals only)



1~5 5~10 10~15 15~20 20~30 30~50 50< km³/y

(Based on Statistics from FAO etc., for 2000)

Figure 4. High Potential for Food Crisis 1901-1995.

←Hiogh Potential of existing food crises (1901-1995)

Alcamo/Endejan 2002: 143

Food Crises:

with climate change and medium GDP growth (2001-2050)

Alcamo/Endejan 2002:143

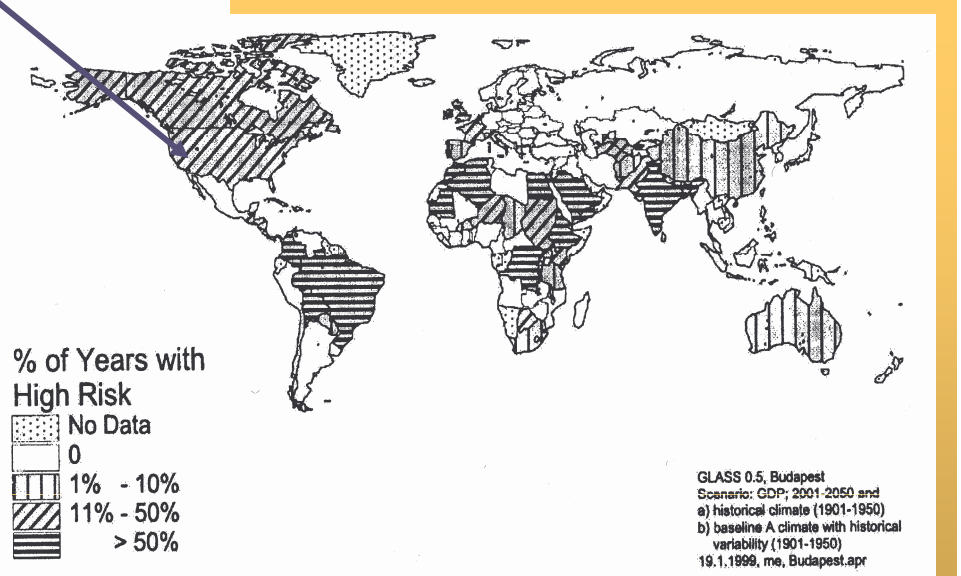


Figure 6. High Potential for Food Crisis 2001-2050 – with GDP Increase and Climate Change.

Science of Life Paradigm

- Demand oriented to final consumer and its necessities. Productivism is still important. Refers to the balanced daily intake of proteins, carbohydrates, vitamins and minerals, necessary to live healthy.
- Mayor integration of food chain in cluster related to transformation and trade of food.
- Links to genetic research including biology, engineering, nutrition, pharmacology, mobile labs in fields and industries in hand of multinational food chains offers clean, safe and homogenous products able to be weeks in supermarket shelves thanks to genetic modified organisms (GMO).
- Food is modified with artificial nutrients to prevent illness, thanks to enzymes enrichments.
- Experts and MNE are supervisors and arbiters (Beck, 1998) in process of production of enriched “healthy” food.
- Centre of concerns is individual health, limited to a technological proceeding in labs with high technology and specialists (Nestlé, 2002).

Undesired Effects of Modern Agriculture

- GMO started in 1995 and in 2005 is produced in more than 80 million hectares.
- USA (68%), 22% in Argentina, 6% in Canada y 3% in China.
- One holding (Monsanto) controls 90% of seeds with genetic modified proprieties: a herbicide (roundup) and a insecticide (Bt).
- The recombinant process could produce unknown effects, some irreversible in natural plants, destroying biodiversity, getting new toxics, new plagues and resistant insects.
- Socially, oligopoly with 8 MNE produce 83% of biotechnological research in the world.
- Expulsion of small farmers due to high productive processes and subsidies concentrated within big enterprises and though patents (TRIPS).

Feminizaton of Agriculture

- Women in poor countries produce between 60 y 80% of food in the world
- In Mexico only 17% of women have land rights or proprieties
- In Africa women generates (FAO, 2002):
  - 33% of labor force
  - 70% of agriculture paid labor
  - 60-80% of subsistence production
  - 100% of food transformation
  - 80% of conserving of food
  - 90% of weaving
  - 60% of market activities
  - 2% have land rights

Hunger and Food Security

Food Security and the Millennium Goals:

- **75% of the 1.1 billion people living on less than 1 USD/day lives in rural areas**
- **852 million suffer from chronic hunger with 842 of them living in developing and transition countries.**
- **Chronic child undernourishment, iodine and iron insufficiency reduces intellectual capacity by 10-15%**
- **Hunger (protein-caloric malnutrition and the loss of micro-elements) generates an economic loss of GDP per year of 5-10% of all poor countries, equivalent to 500 billion USD**

Social Gap in Mexico

Concept	% of Population	% of Nat. Wealth	% of Financial Savings
Very Rich	0.23	40.3	78.0
Workers	52.7	18.4	10.0

INEGI, 2004 and Bank of Mexico, 2004

Internal Gap: Bank Savings

Account	Number of bank accounts	% of Mexican population	% of National Saving
More than 1 Million pesos	73,481	0.07	63
More than 1,000 pesos	16’027,000	14.6	s.d.
Less than 1,000 pesos	15’700,000	14.2	s.d.

Bank of Mexico, 2004

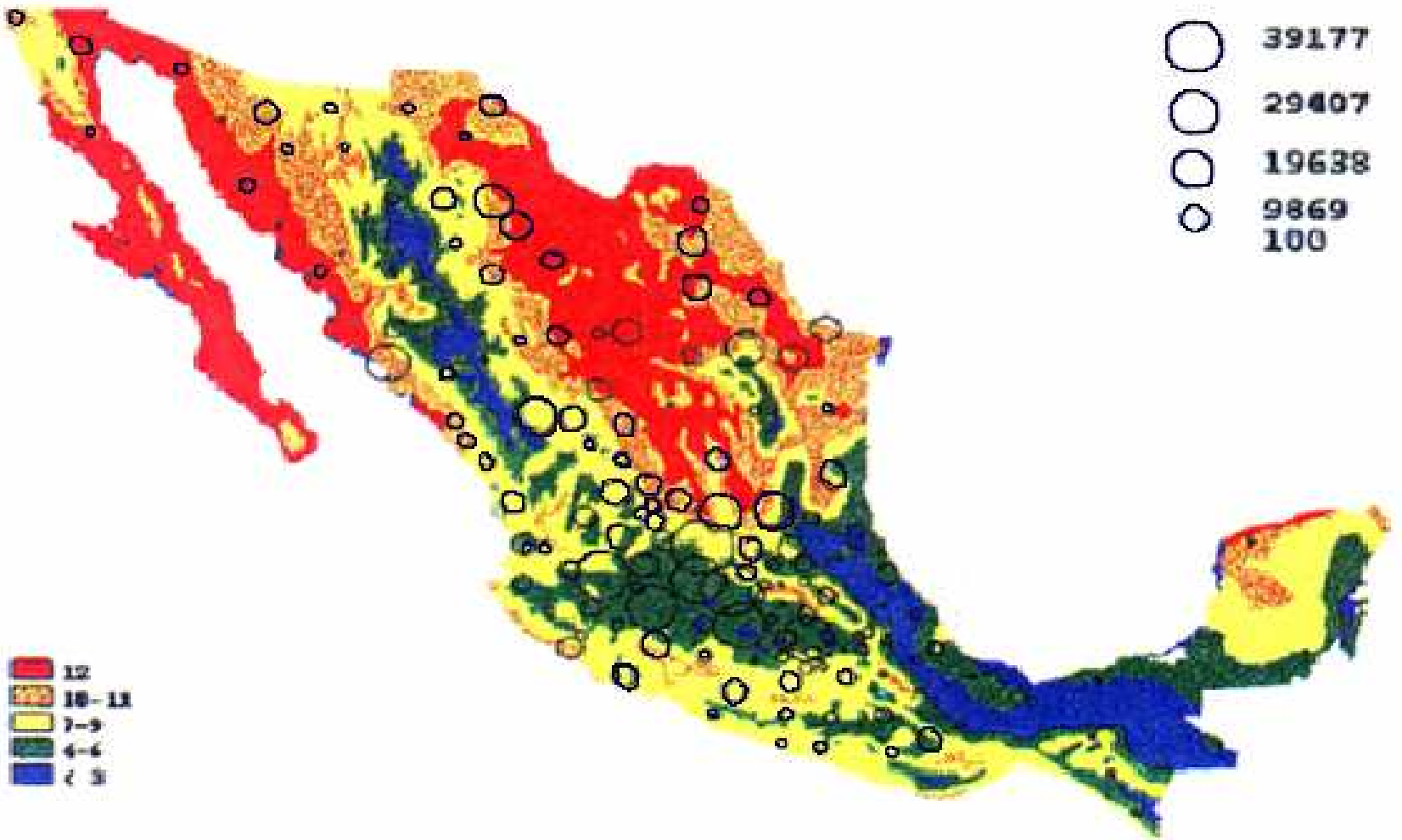
Trade, NAFTA and Food

- Price of corn lost in real term from 1985 to 1999: 64%
- Beans: loss 1985-99: 46%
- Basic food basket: increase 1985-99: 257%
- 78% of Mexicans live in poverty and rural poverty is over 80%
- USA subsidies in agriculture US$ 21,000/ha; México US$700/hectare

Effects of NATA to Peasants in Mexico

- 1,780,000 peasants emigrated during 1 decade
- Two of Three Peasants live under the poverty line
- Profits of Mexican Agribusiness per year:
  - Bimbo: 3.3 bn US
  - Pulse and Savia 1.2 bn US
  - Maseca 1.221 bn (14 mt and 50% more profit in 1 year)
  - Bachoco 1 bn
- Importation of Maize and loss of Food Sovereignty:
  - Increase from 2.5 a 6.148mt of maize
  - Increase of 8.7 a 18.7 mt in basic grains
  - Importation of 95% of soya, 58.6 of rice, 49% of wheat, 25% of maize, 40% of meat
  - **Costs of Food Importation: 78 bn US$**

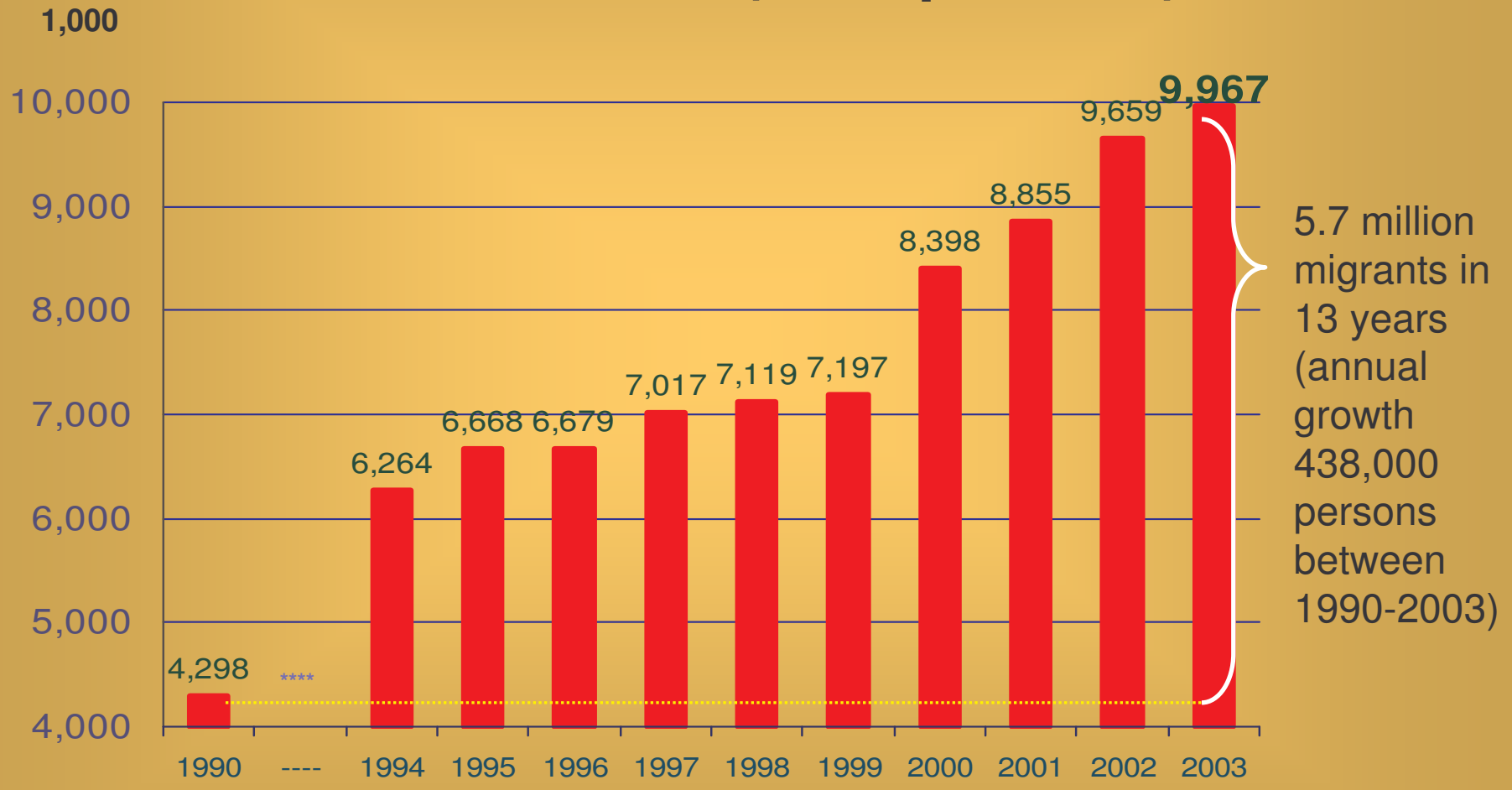
Number of Dry Months and Migration



Number of dry months and flow (estimation for 1993) of Mexican migrants living and working in the US, surveyed on the border on their return to Mexico (spatial distribution according to their region of birth in Mexico, rural and urban localities).

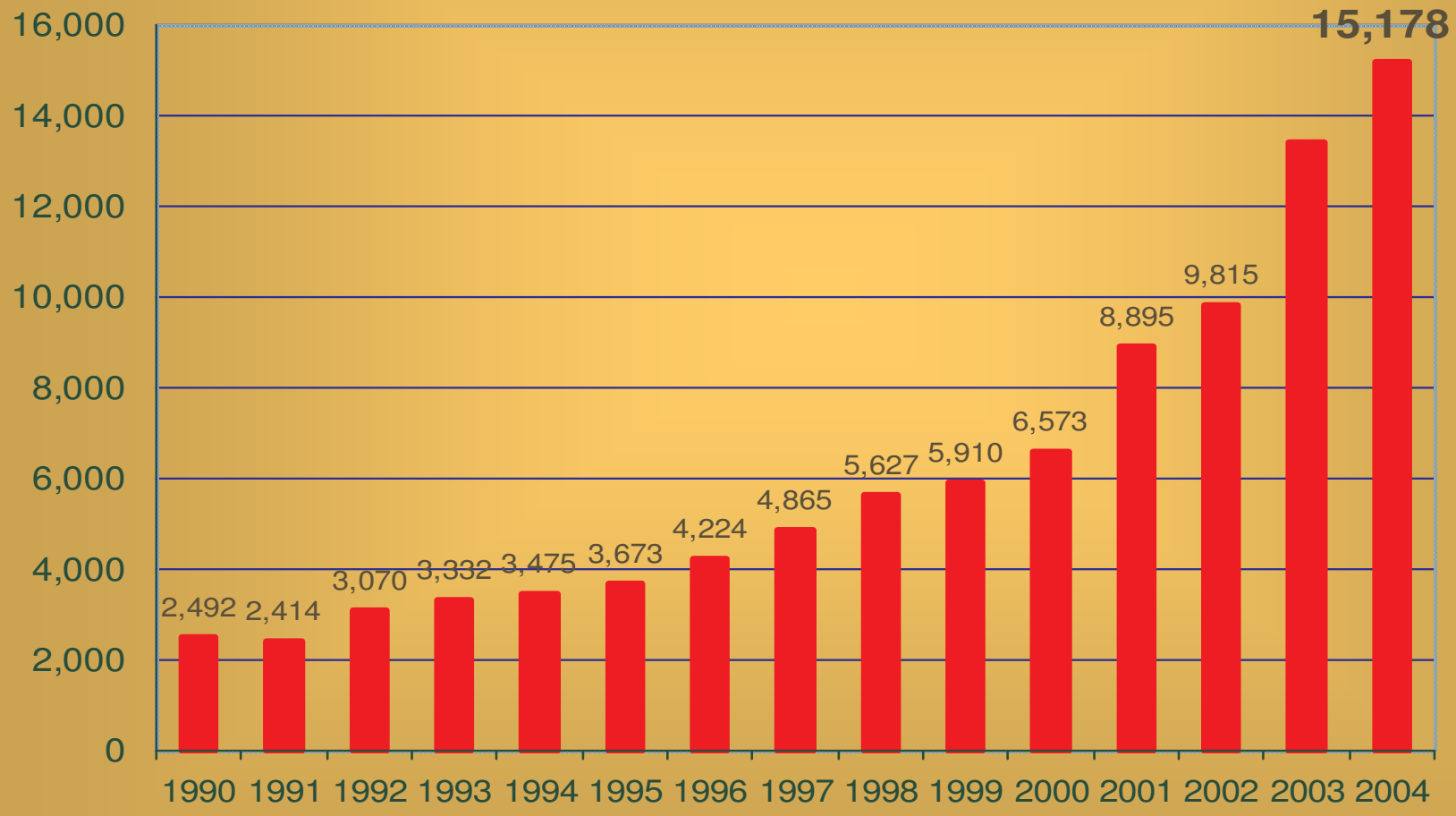
Sources:
Survey on Mexican-US migratory flow (COLEF)
Atlas Nacional de México de (INEGI)
Sistema de información Geográfica y Estadística en la Frontera Norte (COLEF, INEGI, ITAM)

Migration from Mexico to USA: 1990 – 2003 (1000 persons)



Fuente: Public-use files from the US Census Bureau, Current Population Survey, March Supplement, elaborated by Fernando Lozano, 2005

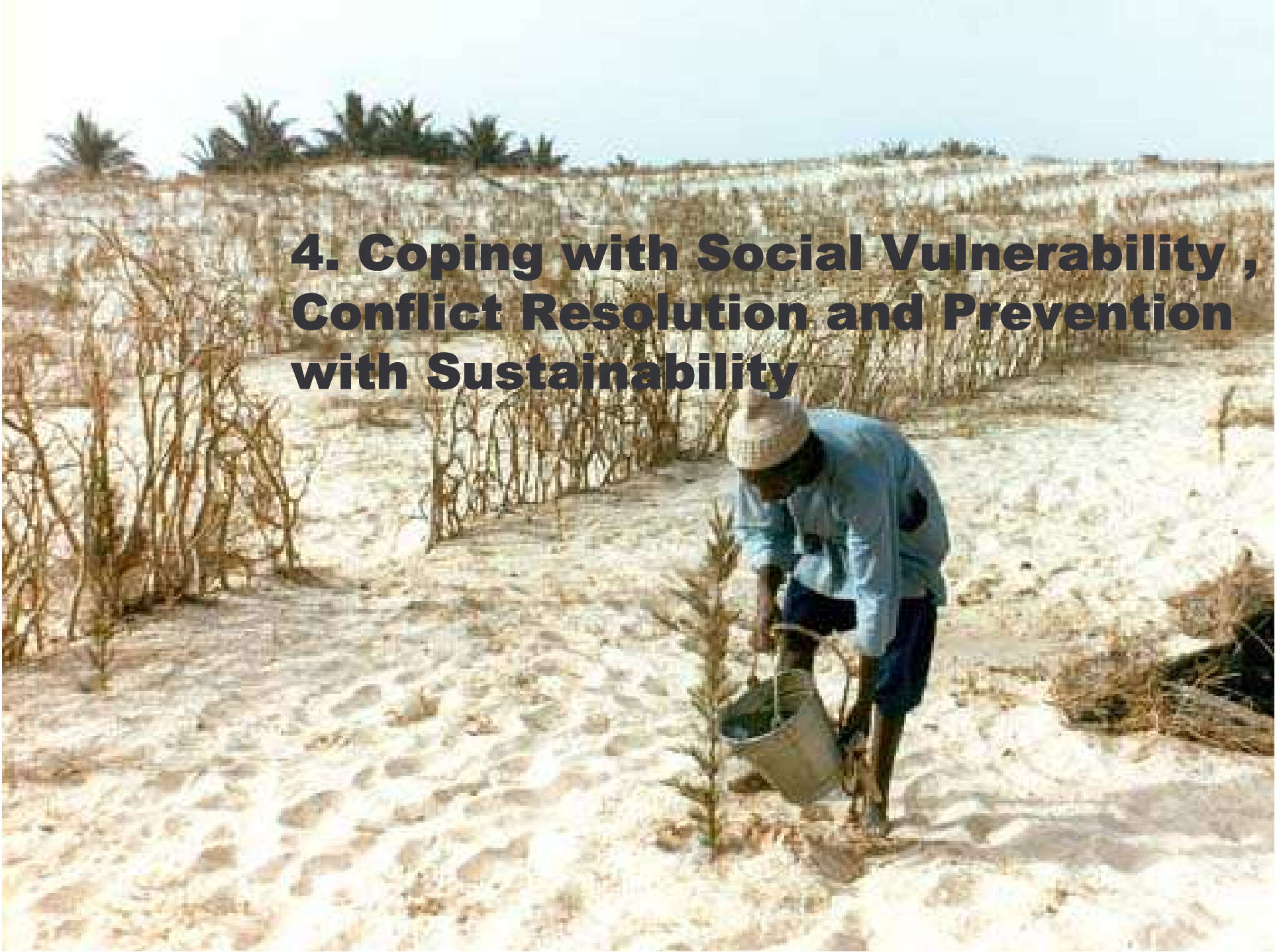
Remittance sent from USA to Mexico: 1990-2004 (billion US $)



2005: 20 billion US$

2006: 24 billion US$

Source: Informes Anuales Banco de México, varios años. www.banxico.org.mx, elaborado por Fernando Lozano, CRIM, 2005


4. Coping with Social Vulnerability ,
Conflict Resolution and Prevention
with Sustainability

Definition of Food Security and Nutritional Gap

- *Food security* is defined by FAO as the sufficient disposal of food for individuals, families, regions or nations, after discounting non-food use. (Only two thirds of grains world-wide produced are used in human feeding).
- The Department of Agriculture in the United States (USDA) defines national *food security* by "measuring the gap between actual food consumption (domestic production, plus commercial imports) minus non-food use and consumption targets".
- The *nutritional gap* measures the minimal daily nutritional requirements, in accordance to age, activities and gender.

Hunger and Food Security

Food Security and the Millennium Goals:

- **75% of the 1.1 billion people living on less than 1 USD/day lives in rural areas**
- **852 million suffer from chronic hunger with 842 of them living in developing and transition countries.**
- **Chronic child undernourishment, iodine and iron insufficiency reduces intellectual capacity by 10-15%**
- **Hunger (protein-caloric malnutrition and the loss of micro-elements) generates an economic loss of GDP per year of 5-10% of all poor countries, equivalent to 500 billion USD**

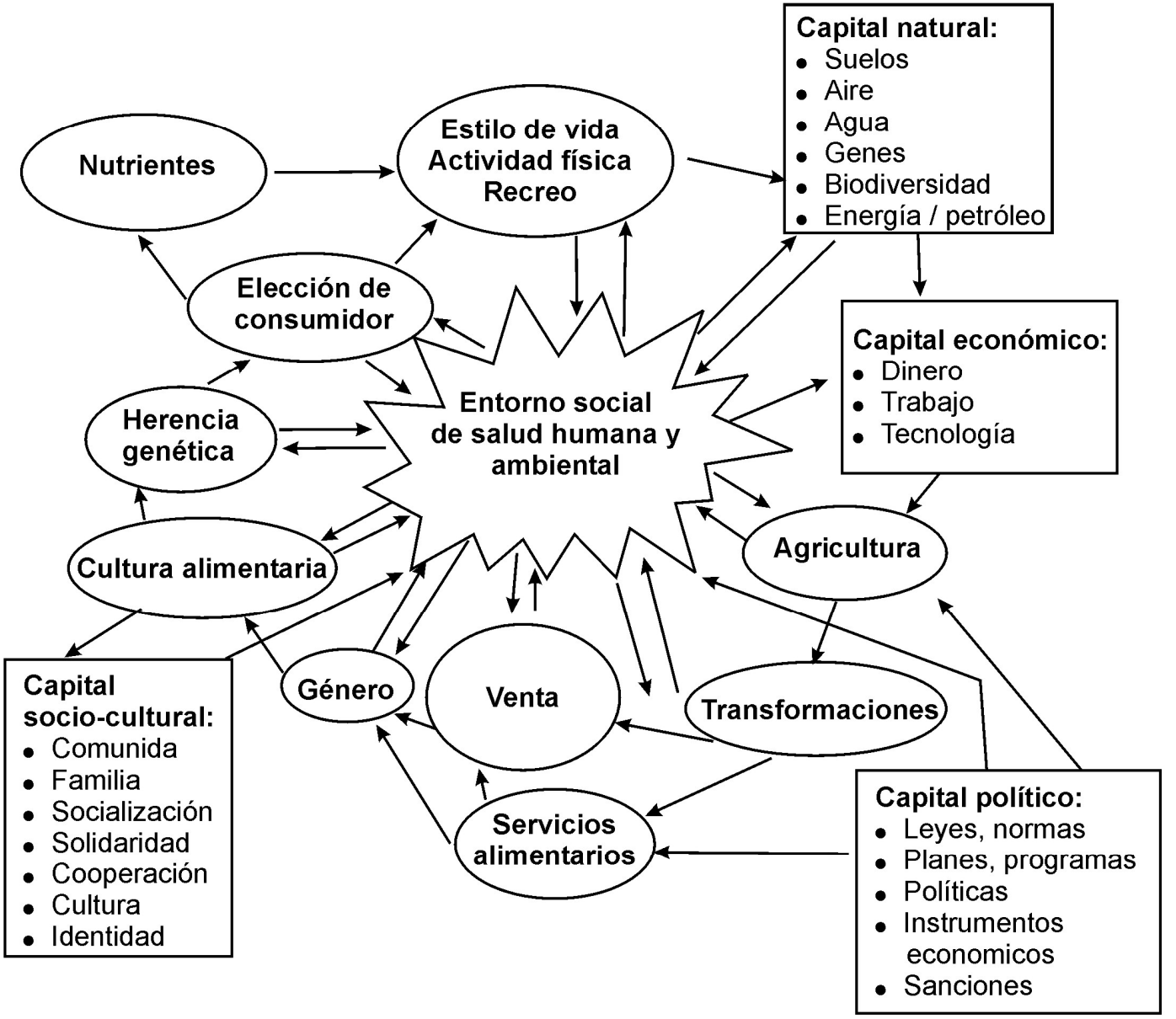
Food Sovereignty

- Local agricultural production and trade, with access for women and peasants to *water, seeds, credits, technical and financial support;*
- Guarantee women the *access to land for production and livelihood*, in order to overcome the violent and patriarchal structures inside of their families, countries and in the global economic system;
- Promote *women* peasants as *key elements in food issues* and agricultural production and commerce;
- Encourage *participation* of women, indigenous and peasants in the national and regional definition of *rural policies;*
- The right to produce and *consume healthy, permanent and culturally accepted food,* locally produced, sold, cooked and consumed;
- The right of regions and nations to *protect* themselves *from subsidized food imports*, establishing agricultural prices which cover production costs;
- The obligations of national and local *governments to improve the nutritional situation* through stimulation of local food production and transformation, clean water and sanitation and elimination of parasites;
- Linking *environmental services into farming*, land planning and participative democracy in order to create areas and a human right to no-migration, which includes prospects to live a dignified life in their own village and country.

Key Issues linked to Hunger:

- public resources to reduce poverty and hunger have to come from domestic and international sources, coordinated and interrelated from top to bottom and bottom-up and administrated by women;
- food security and rural development must be addressed in an integral way;
- agricultural financial instruments, risk management tools and volatility of prices creates vulnerabilities for peasants;
- poverty reduction has to be combined with global public services;
- private investments can complement (but not substitute) public ones, and economic stability;
- programs directly liked to access to food in hand of women improve the situation of vulnerable groups, and women-headed households and victims of diseases and disasters should receive special attention;
- food aid has to be targeted to avoid distorting non-market and local production systems.

Salud Integrada Ecológicamente

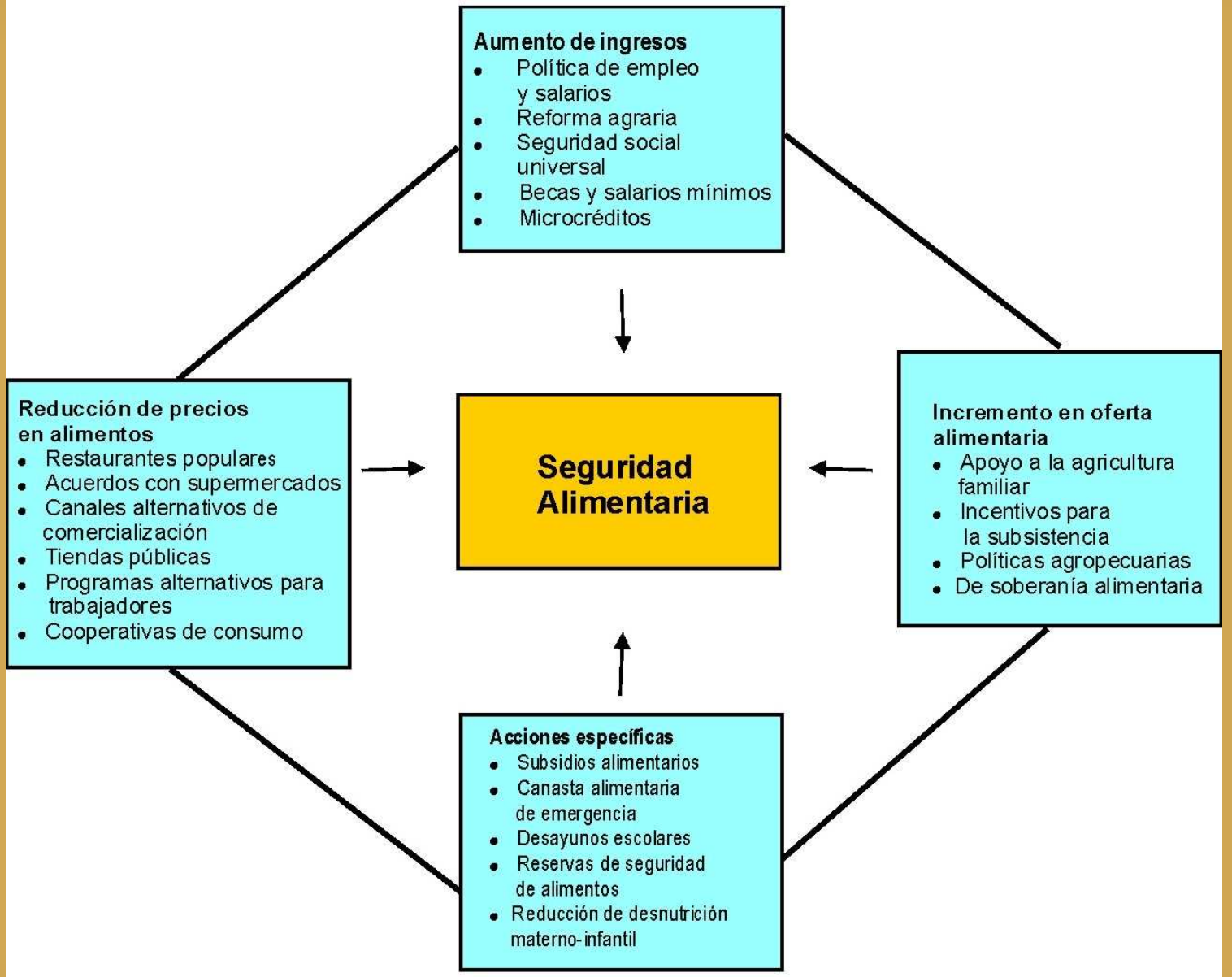


Fuente: Lang y Heasman, 2005: 39, modificado por Oswald, 2006

Organic Agriculture at Small Scale

- Symbiotic relation and mutual dependency between nature and food production.
- soft methods regionally diverse: policultivation, association of products, rotation, fixation of nitrogen from air to soil, bio-plaguicides, traditional methods of soil conservation and food, integral management of water and environmental services.
- Combination among traditional knowledge and modern one consolidating regional food sovereignty.
- Conserving diversity of species it is agro-ecological. Safe ecosystems and social relation creates synergies and cooperative social relations with health care and cultural diversity at local level.
- This mode of production is no able to be globalized. Commercialized surplus goes to the regional market reducing environmental pollution and global warming.

Programa "Fome Zero" (Sin Hambre) en Brazil



Fuente: Instituto Ciudadanía, 2001, Sao Paulo, Brazil

Conclusions

- Complex **social networks** sustain humans in normal times. Human vulnerabilities during disaster bring **disruption or failure** of these networks.
- **Gender analysis** will lend a more nuanced understanding of **women as social** beings aligning in networks of family and community.
- More accurate understanding and training will facilitate network support that underlies a **resilient society**: women educate, care, reproduce historical memory, cultural background, & material family sustenance.
- Active female participation reduces social vulnerability, improves resilience to hazard, increases survival of communities, & reduces gender violence and insecurity before, during and after disasters.
- Central challenge for policy: existing data banks do **not distinguish between gender** and other demographic questions, **overlooking social vulnerability,** and ignoring **gender identity** in crises.
- Future research & policy on resilience-building should improve **theories, data and concrete trainings** about impacts of disasters, and other disruptions.

Thanks for your attention

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http://www.afes-press.de/html/download_oswald.html