

**Ministry of Higher Education and Scientific
Research Democratic and Popular Republic of Algeria
Center of Scientific and Technical Research on Arid Regions
Omar El BERNAOUI**



26-27 October Murcia, SPAIN

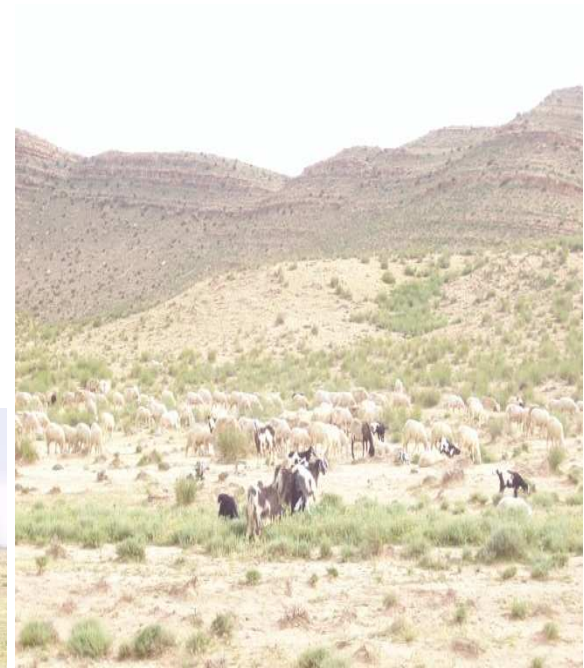
Figure -1- Desertification Process

The first stage of the desertification is the decline of the sward in terms of :

- Density
- Recovering
- And biodiversity



(a)



(b)



(c)

Figure -2- Steppe (a) in decline (b)&(c)

This means the degradation of the soil

- The more plant cover declines, the more desertification accelerates and hence stripping of the soil under the effect of hydrous and wind erosion.
- Depending on the degree of degradation ,the situation can be reversible or not.

2- The Impact Zones

- The desertification affects all continents, with nearly the third of the emerged lands are threatened.

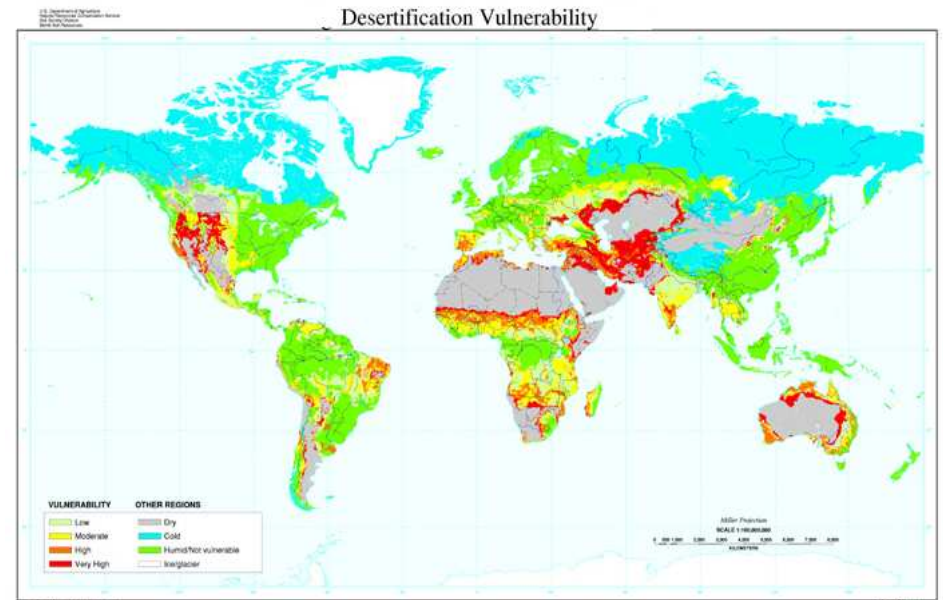


Figure 3 : the vulnerable territories to desertification(source : F.A.O)

-The most vulnerable zones are in the arid and semiarid areas and particularly at the circumference of the natural desert.

- Desertification threatens many parts of the Mediterranean bassin

-The South of Europe is not spared. and in particular the Iberian Peninsula

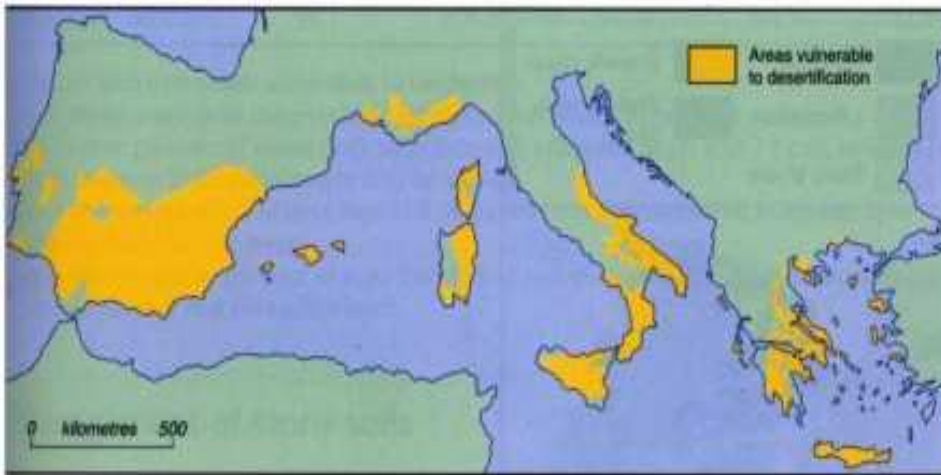


Figure 4 : Vulnerable terretories to desertification in Southern Europe(F.A.O).

This is due to : The geographical position of these countries and climate ,

But also to the demographic pressures and economic activities..

3- Common climatic criteria in the Mediterranean

➤ Short winters

• **A rainy season between October and April(350 à 750 mm/year)**

• **irregularity of rainfall in time and space**

➤ Hot and dry marked by several droughts can lasts several months

-04 months in Tunis and Algiers;

-07 Months in Alexandria ;

-02 months in Barcelona;

-03 months in Istanbul .

➤ The Droughts sometimes multiannual can cause:

• **The drying up of rivers;**

• **The reduction of agricultural production;**

• **Forest fires .**

Ex 1: Algeria (Aurès) (1990-1994), Ex2: French (1989-1992)



Of this climate a geography of water is declined :

Of a total of 842 km³ of average flow theory for Mediterranean countries :

-6.3% return to the Maghreb;

-11.9% return to Near East and the Mashreq;

-81.6% to the countries of the North shore.

The resources of the Maghreb and Middle East represent only a quarter of the North Shore.

Contrasts also exist between countries of the same Shore.

For example : case of some countries in the South Shore

Table 05 –availability of freshwater in 1997 and pressures in 2025

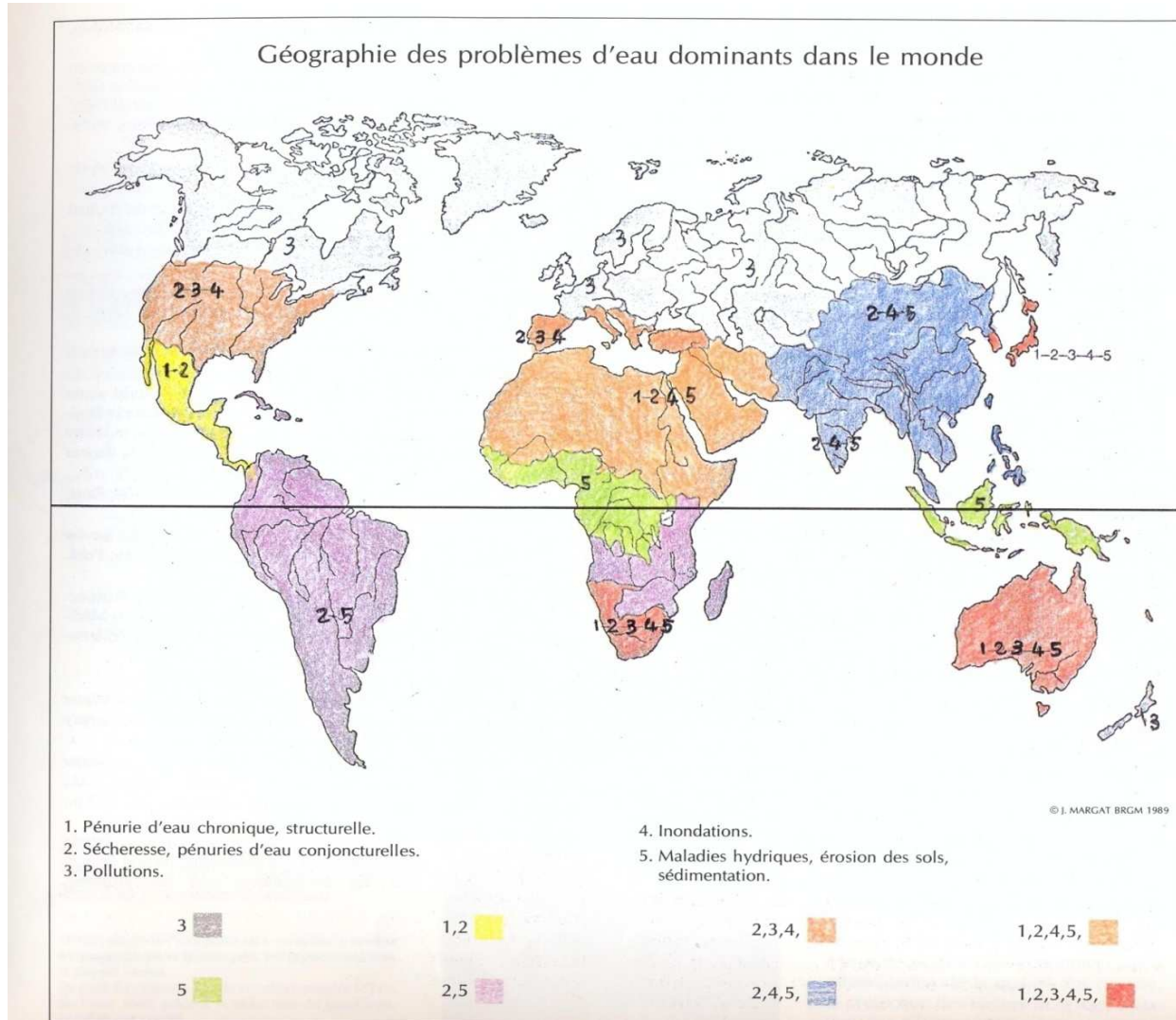
Renewable Freshwater	Total Resources km ³	Population 1997 in thousands	Total Resources m ³ /hab.	Population 2025 in thousands	Total Resources in 2025m ³ /hab.
Algeria	19	29 800	637	45 000	422
Egypt	58	64 800	895	86 000	674
Jordan	1.1	4 400	250	9 000	122
Lebanon	3.9	3 900	1 000	6 000	650
Libyae	0.7	5 600	125	14 000	50
Morocco	30	28 200	1 063	41 000	731
Tunisia	4.35	9 300	468	13 000	334

(Extract from Mutin 2006)

Note that some countries are already below the threshold of a shortage of 1000 m³/inhab/year

Water scarcity concerns also countries of the northern shore like Spain and Malta already forced to required at non conventionel waters.

- The correlation between the water resource and the socio-economic factors shows :



- A chronic shortage of climatic origin amplified by the demographic pressure for the south.

- Cyclical shortages caused by drought in the North especially for countries like Spain, Italy and Turkey ,

Here, the question of water arises especially in terms of quality because of pollution.

Figure 06 : Map of the geography of water problems prevailing in the world

In this climate will shape the biomes

A Mediterranean forest with :

- A tree layer (oaks, pines and cedars)
- A shrubby layer(Pistacia, Juniper and Kermes oak)

In addition to the effect of drought .

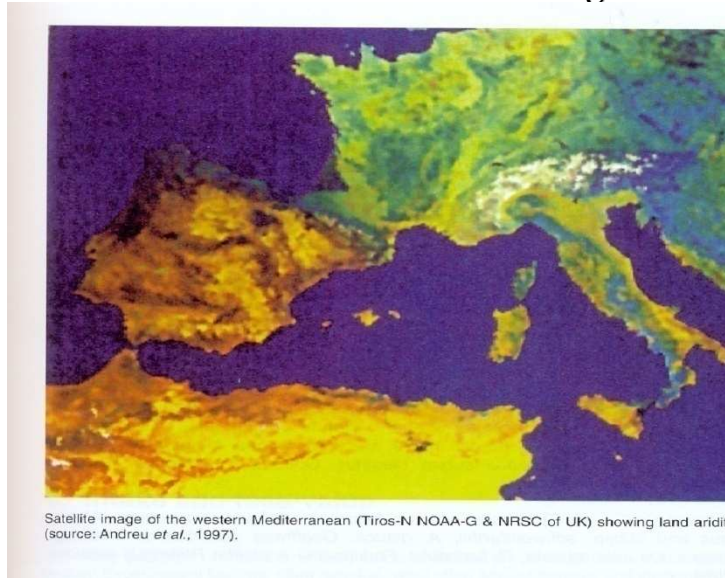


Figure 07 : vegetation Map of the Mediterranean basin

A Mediterranean forest in decline for several reasons

- Clearing,
- Overgrazing,
- Fire,
- Urbanization (mainly coastal),
- Pollution.



Figure 08 : Carte de la cédraie en Maroc et en Algérie

Even on the north shore, the forests suffer dieback attributed initially to pollution: :

- Acid Rain
- Polluted sea spray

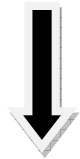
Currently, it is confirmed that the advanced decline of the Mediterranean forests is also due to drought.

Degradation of the Mediterranean forests



Gives rise to plant formations more vulnerable to desertification

- The Maquis and the garrigue = Matorral



Further degradation

steppe

For example : The steppe/Algeria/20Millions d'ha

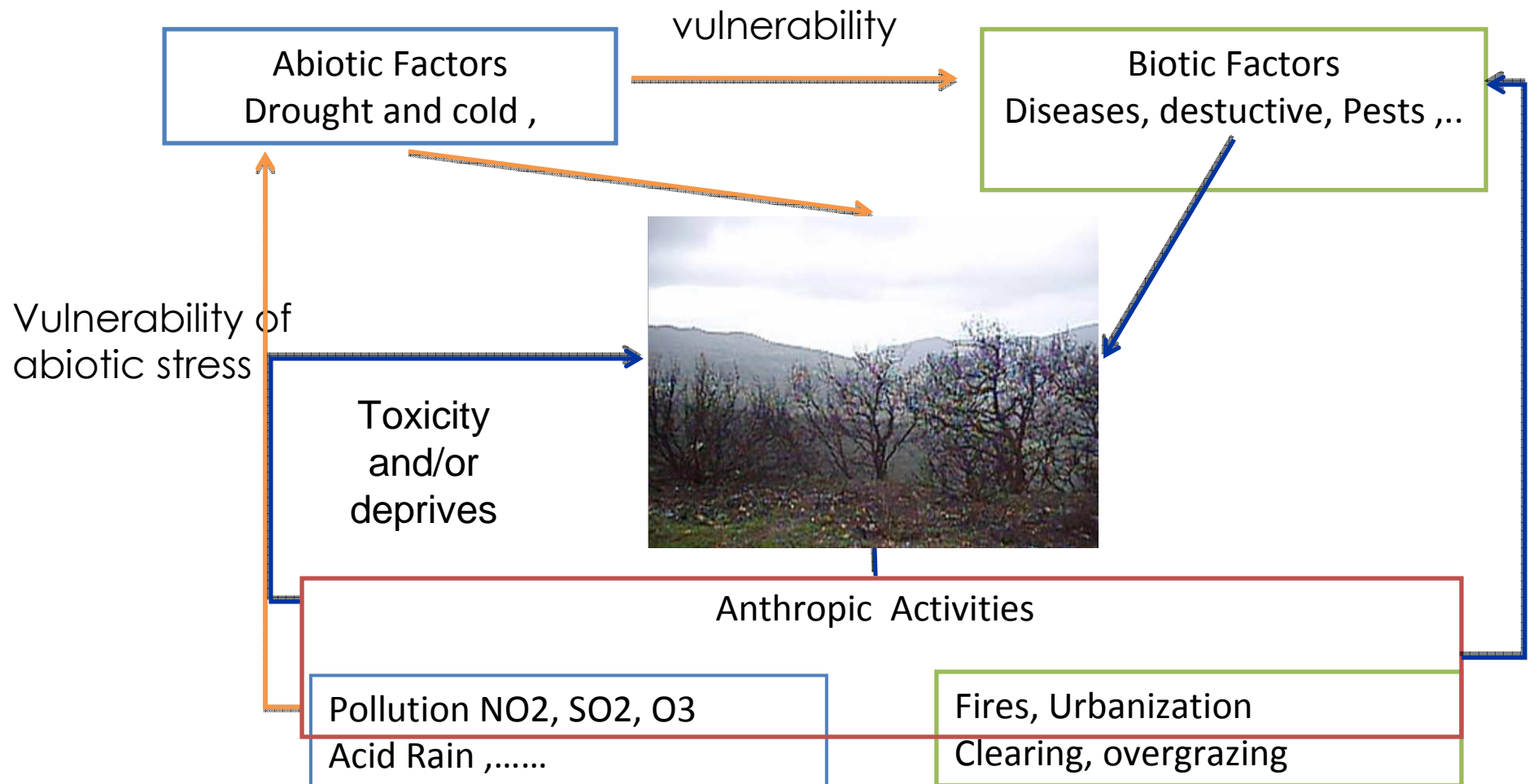
- Where the canopy is discontinuous and low represented by :
 - Esparto
 - Sparta
 - Artemisia
- where there has been an acceleration of desertification processes and especially to the west which combines the dual action of drought and overgrazing in the last twenty years.



The decline of the climatic taxa and the appearance of the steppe degradation .



FACTORS OF DECLINE OF THE MEDITERRANEAN FOREST



Desertification and Other Hazards

Examp1 1 : A risk can hide another

- The sand dune is a terrible risk that occurs when the soil is desertified.
- Currently, it threatens many human settlements in arid regions.



Examp1 2 : A risk can amplify another

Global warming accelerates desertification

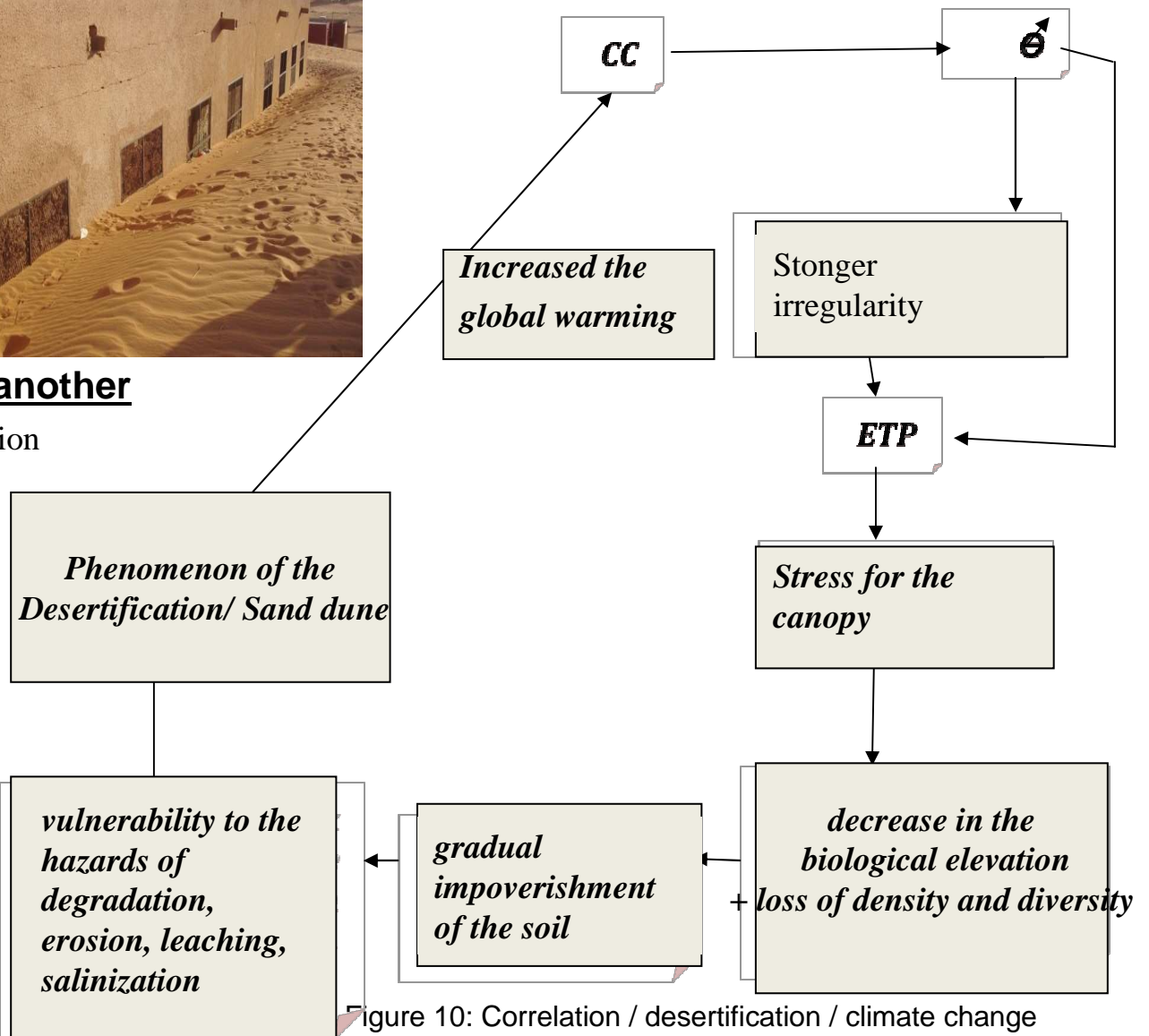


Figure 10: Correlation / desertification / climate change

Climate projections on Algeria 1990-2025

-Comparison of the climate series 1930-1960

-Using the English model with high resolution (UKHI) indiquent



-A rise of the average temperature (0.8 à 1.1°C)

-A decrease in the annual average rainfall (10 à 20%)



Increasingly aridity

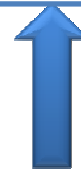


Consequences

- isohyets moving north (100km)
- A reduction of water resources
- A change in the agricultural calendar
- Decreased production of agricultural of the irrigated crops and mainly dry crops
- A worsening of soil erosion
- regression of biological recovery and biodiversity due to droughts and heat waves.
- An acceleration and expansion of desertification .

Convention/Climate change
Convention/Biodiversity
Convention/Desertification

global Convention ?



**Chain
reactions**

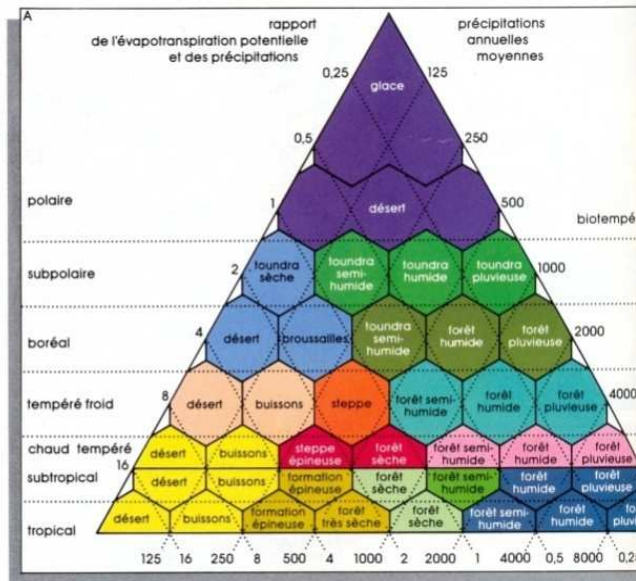


**An acceleration and expansion of
desertification**

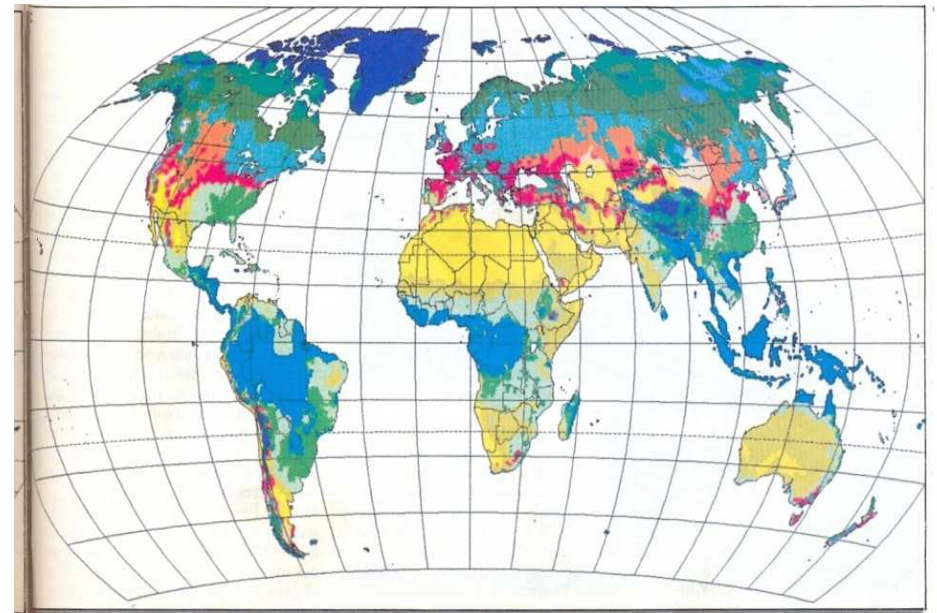
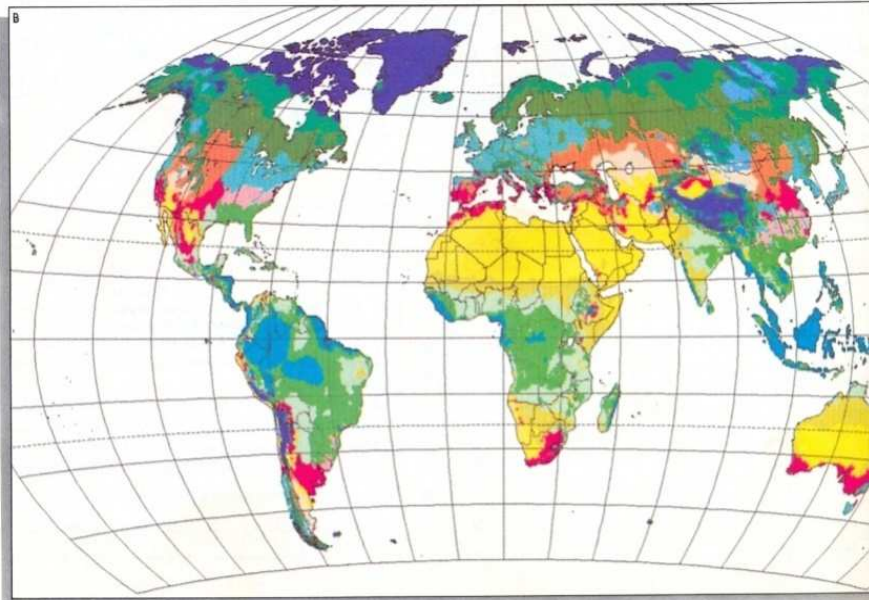


JAN GOUDRIAAN

LA VÉGÉTATION ET
L'AGRICULTURE
RISQUENT-ELLES DE
SOUFFRIR
DU RÉCHAUFFEMENT
CLIMATIQUE,
S'IL SE PRODUISAIT?
MALHEUREUSEMENT,
LES ÉLÉMENTS
DE RÉPONSE SONT
ENCORE
PEU NOMBREUX.
JAN GOUDRIAAN
PRÉSENTE ICI LES PLUS
SIGNIFICATIFS.



What goes in the same sense that the projections for land cover change based on global warming (since the 1990s)



GOUDRIAAN, 1992,

If this scenario were to arise  The questions raised are :

- ☐ How beings will they react to adapt ?**
- ☐ Will they have time to do it ?**
- ☐ What is the future of agriculture ?**
- ☐ What development strategies to consider?**

Developing a strategy is needed at all levels from:

- Policies;
- The Executive;
- Citizen.

1- Policy through :

- **Combined efforts to federate the actions of the three conventions in the field of fight against desertification;**
- **Decision making in the public interest (against hunger, poverty);**
.The fight against economic dependency ;

2- Executive through effective socio-economic and cultural management at different economic enterprises , educational and cultural Institutions;

3- The citizen must be able to adapt to new social and environmental conditions imposed on him (save the environment and biodiversity, water conservation...).

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Thank you for your attention