DeSurvey: A Surveillance System for Assessing and Monitoring of Desertification

Meeting of Coordinators of EU funded projects on Land, Soil, Desertification and Urban Issues 22nd and 23rd of October - Brussels

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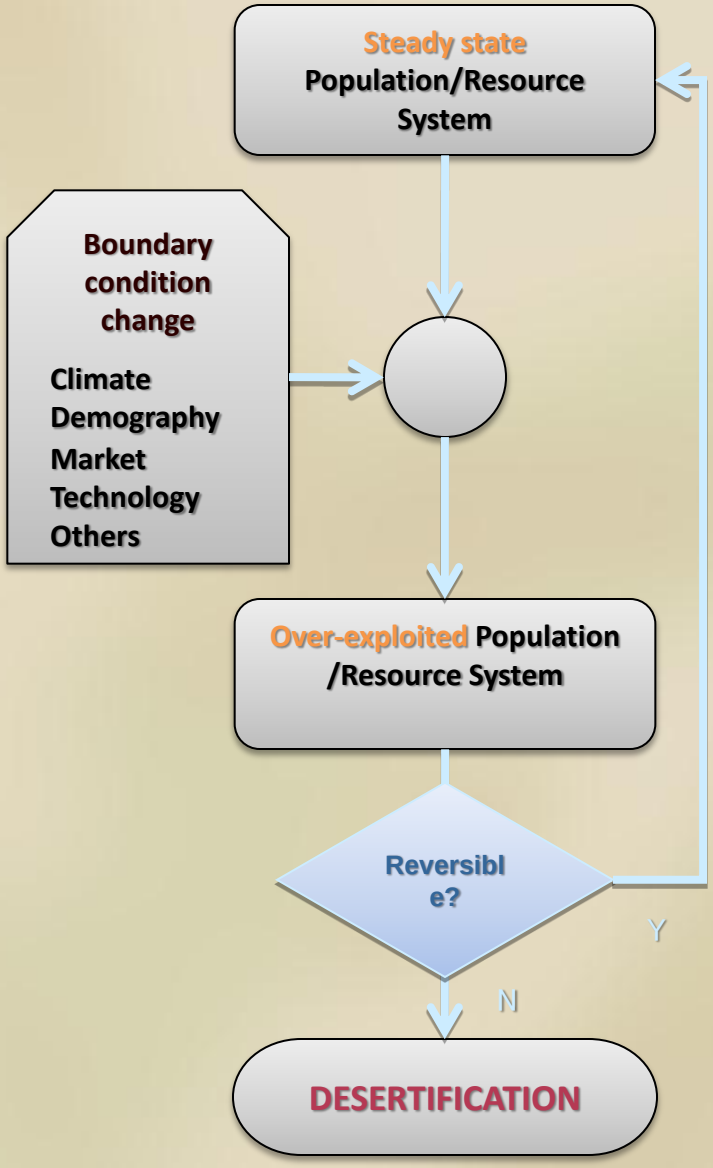
DeSurvey essentials 1

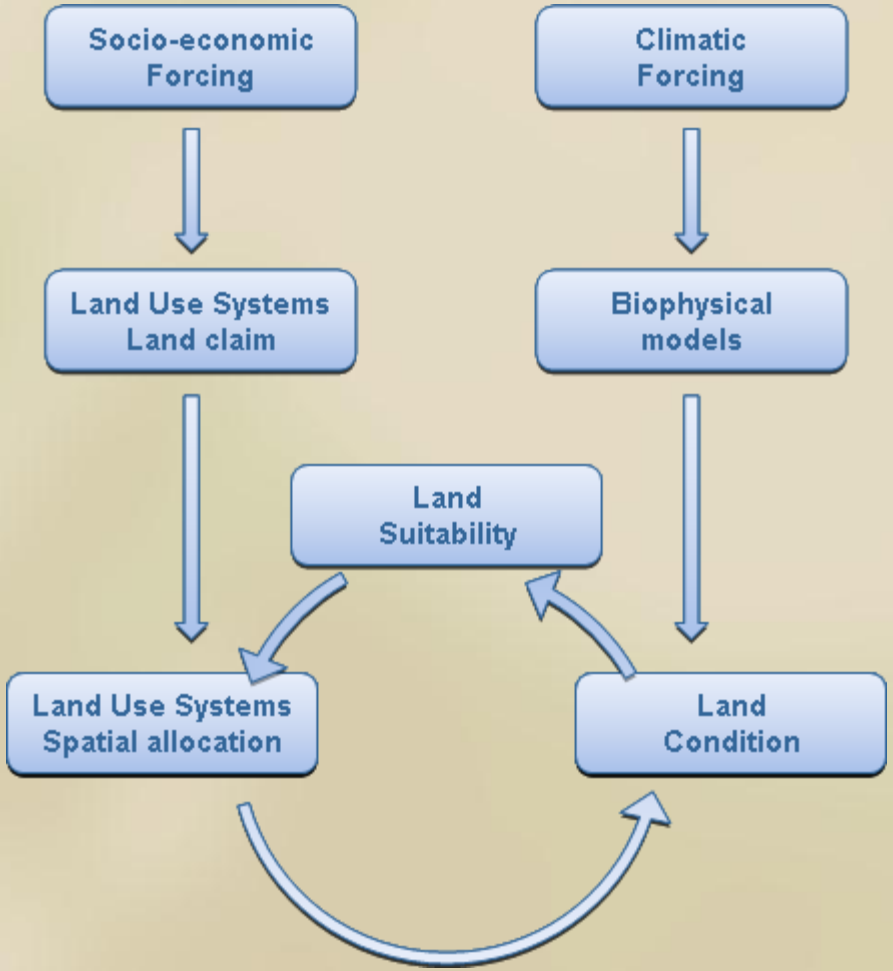
Project Type	**Integrated Project of EU FWP6**
Funding	**EU conribution 7.8 M €**
Time span	**11 March 2005 – 10 March 2010 (Extended to 10 October 2010**
The consortium	**39 Organizations** **10 EU Member States** **6 Third Country States**
Co-Coordinator	**Prof. J. Puigdefabregas** **Estación Experimental de Zonas Áridas** **Consejo Superior de Investigaciones Científicas**

DeSurvey essentials 2

To whom is addressed	**Environmental & agricultural authorities** **International, national & regional levels**
What will be delivered	**A prototype with monitoring, forecasting & vulnerability facilities** **Tailored to user requirements** **Tutorials and training courses**
Geographical scope	**From the Northern Mediterranean to threatened areas in** **The Maghreb, Senegal, Northern China and Chile**
Which scale	**Exploratory (~8km)** **Standard (1 km)** **Local (100 m)**

DeSurvey paradigms





Main Products essentials

MP1 Assessment & Monitoring

Diagnostic of land degradation. Information about the impacts of disturbance and performance of mitigation programmes.

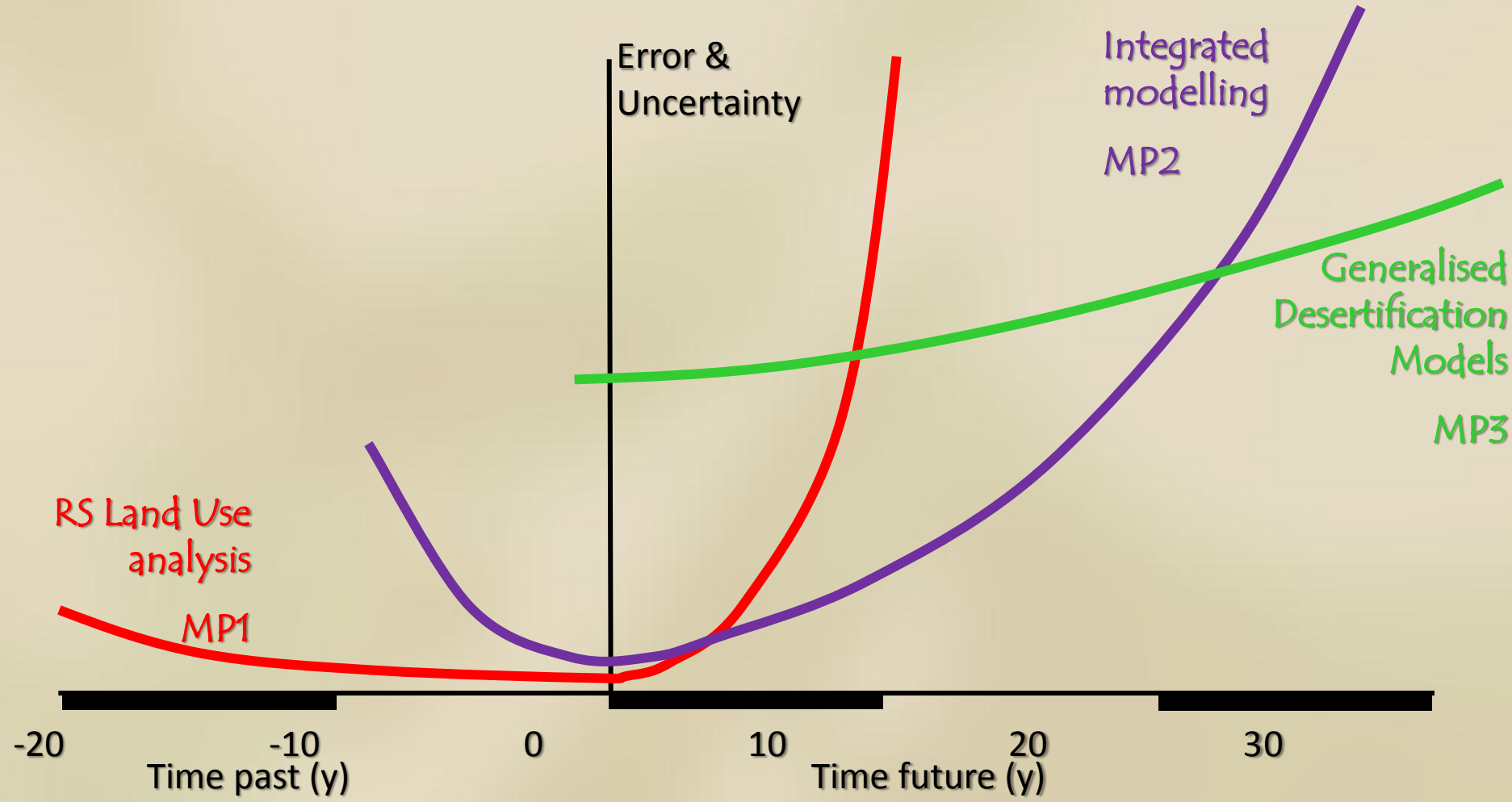
MP2 Forecasting

Forecasting medium term trends of spatially distributed land degradation status under several hypothesis and future scenarios.

MP3 Vulnerability

Identifying crashing risk for targeted land use systems, and the direction of change under scenarios

Forecasting horizons for alternative modeling approaches



DeSurvey sites

Coqimbo Region
Chile

Synergetic impact of climate and agro-pastoral systems fluctuations on desertification

Lagadas County
Greece

Grazing systems over marginal lands versus agriculture intensification in the plains

Ferlo
Senegal

Iimpact of rainfall variability on the vulnerability of agro-pastoral systems to desertification

Naiman County
China

Impact of agricultural encroachment over sandy rangelands

South Atlas Region
Morocco

Impact of agricultural encroachment over steppe rangelands along a climatic gradient.

Chietti
Italy

Coastal sub-humid Mediterranean poly-culture (sub-humid)

Haddej Bou Hedía
Tunisia

Agriculture encroachment over steppe rangelands

South-Oran High plains
Algeria

Impact of agricultural encroachment on steppe reangelands

Eastern La Mancha
Spain

Increasing irrigation / down falling water tables. Soil erosion in cereals-pulse systems.

Central Crete
Greece

Overgrazing in rangelands and Mediterranean poly-culture (semi-arid)

Mertola,Baixo Alentejo
Portugal

Cereal cropping on marginal areas and 'montados' (semi-arid)

DeSurvey facts and findings

1. Desertification does not mean expansion of desert

DeSurvey facts and findings

2 Desertification is trigered by out range driver fluctuations

Inner Mongolia case: grassland management disruption by agriculturalists

DeSurvey facts and findings

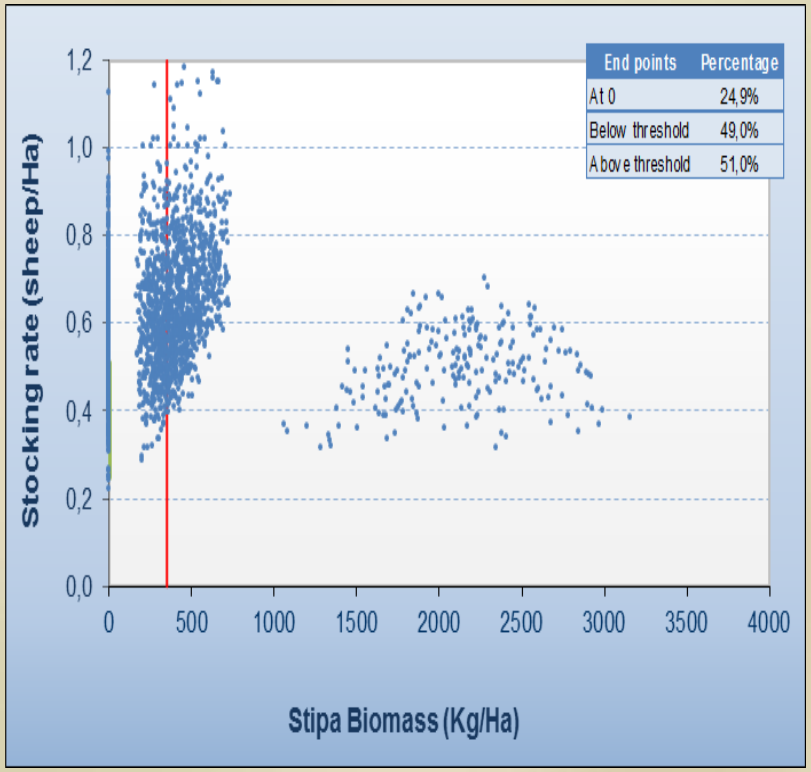
3. Rangelands are de historical starting reference for desertification

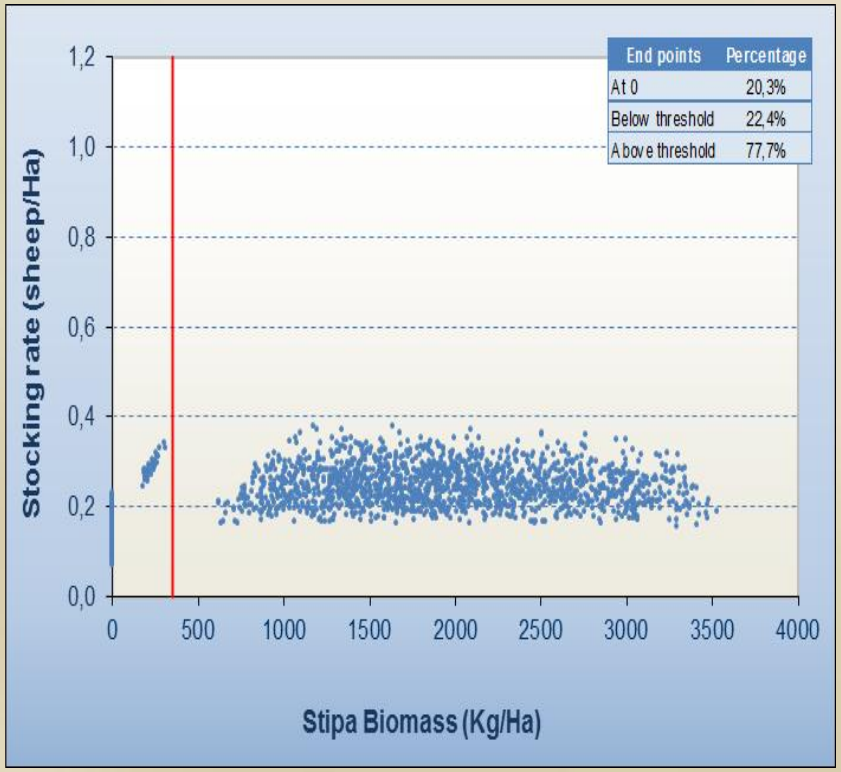
DeSurvey facts and findings

4. Desertification hot spots fed from surrounding areas
The case of Oued Mird oasis in Morocco

DeSurvey facts and findings

5. Subsidies and external help to production often accelerate desertification. Lower grain prices to nomadic sheep breeders in the Algerian high plains increase stock size and pushes grassland beyond reversibility threshold (red line).

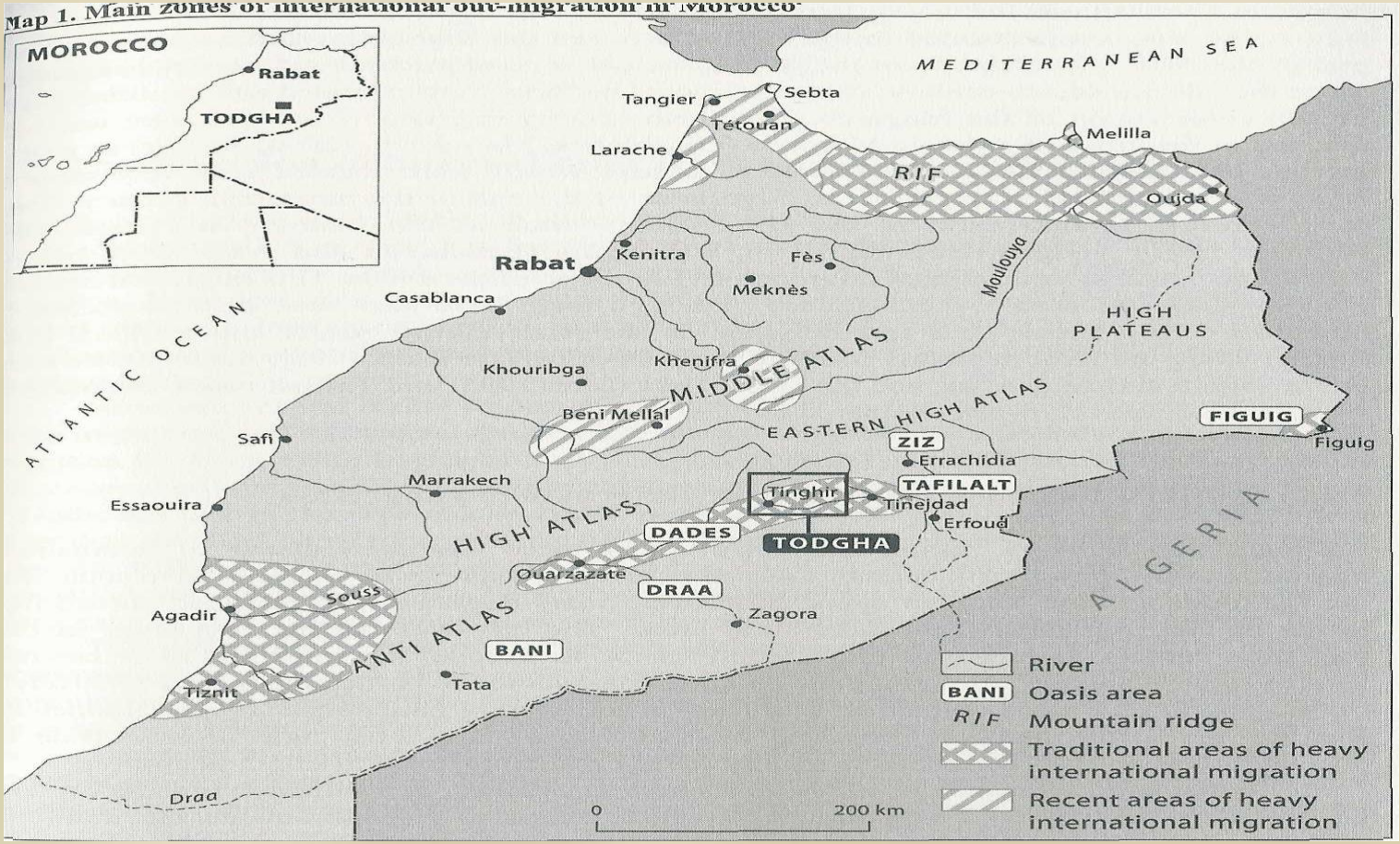




DeSurvey facts and findings

6. Does desertification trigger migrations?

Source areas do not coincide with desertified land in Morocco



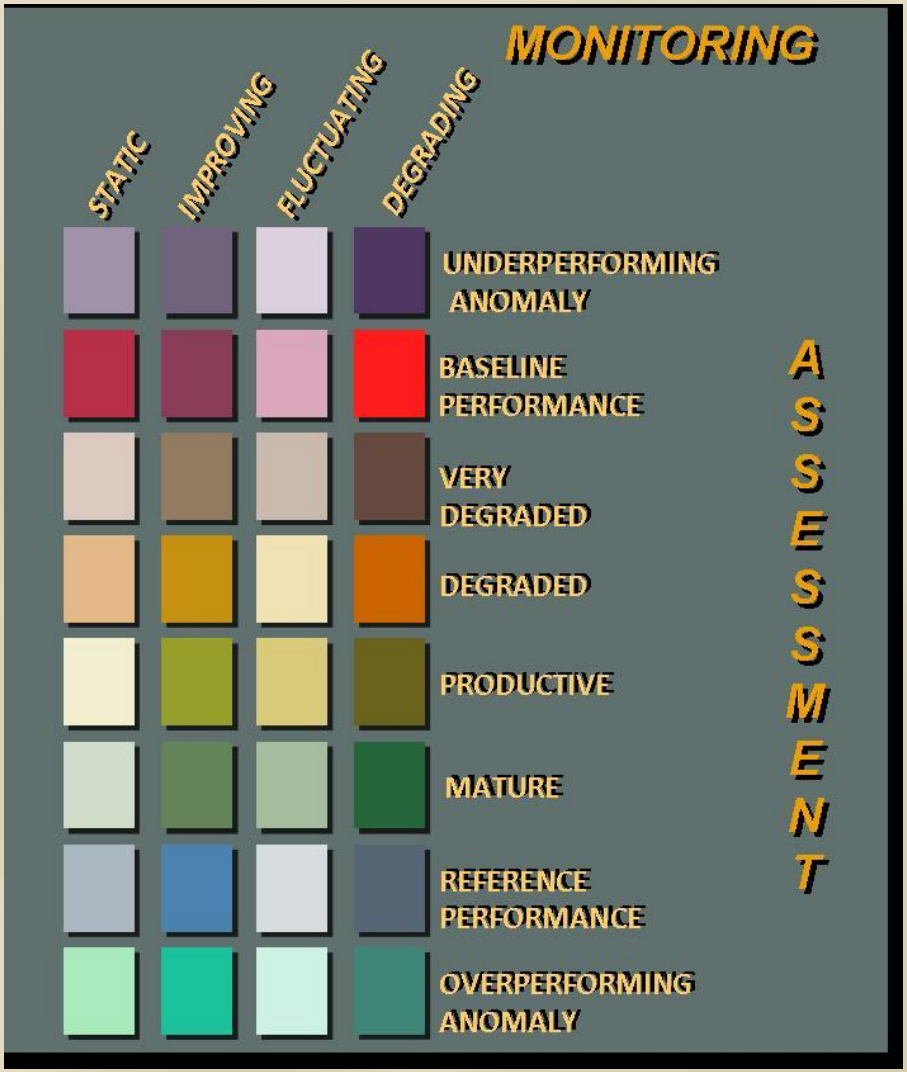
DeSurvey facts and findings

7. Non-economic factors in land managemet deccisions are widespread in drylands: Cattle stok in Senegal nomads as prestige label and buffer of drought impact

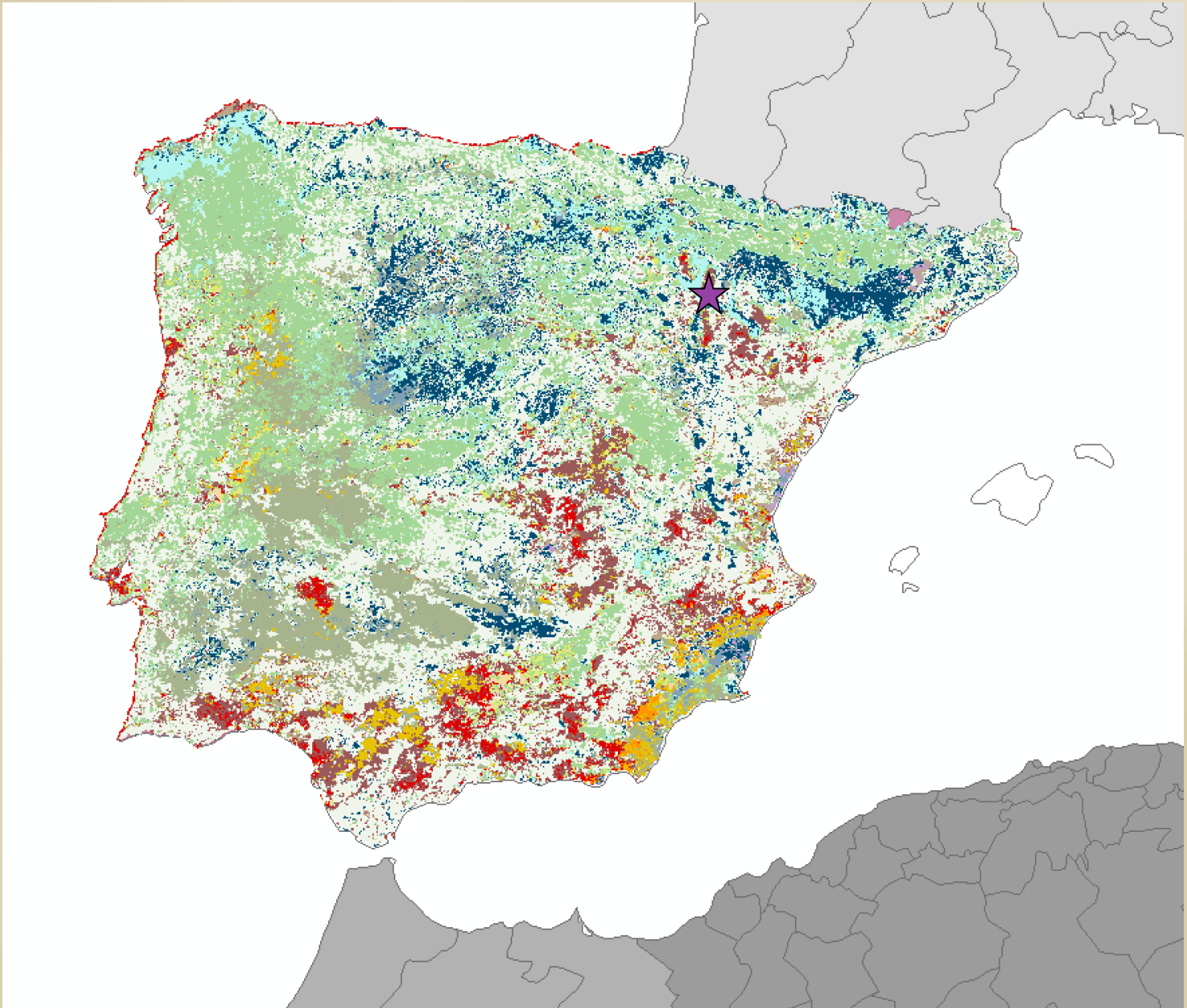
MP1 Monitoring LDI-2dRUE

- Rainfall Use Efficiency (RUE)-based diagnosis as an ecosystem maturity index
- Interpreted using available documentation
- Consistency tested in field visits with local experts

MP1 Monitoring LDI-2dRUE: land condition legend



Iberia Land Condition (1989-2000)



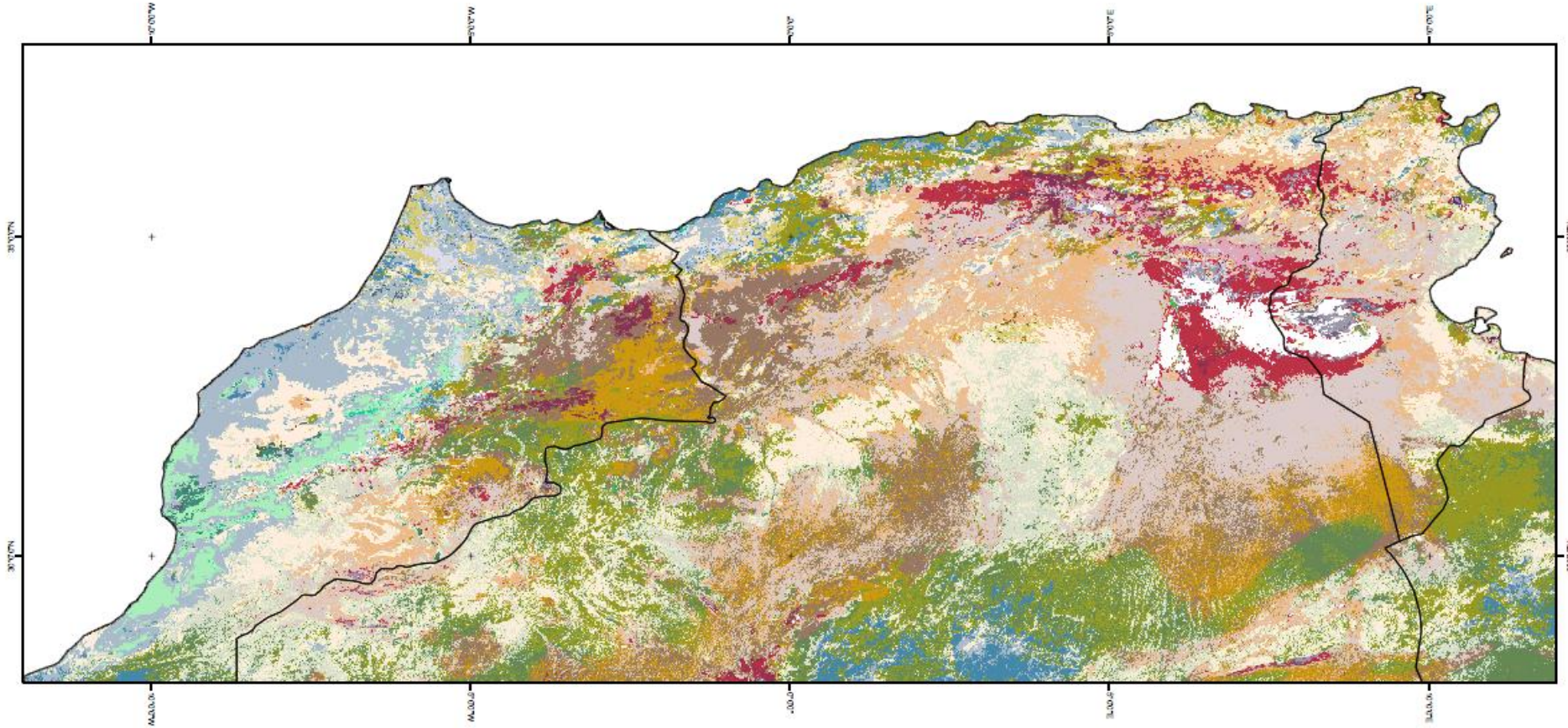
Unusually degraded
- static
- fluctuating
- recovering

Degraded
- static
- fluctuating
- recovering

Good
- degrading
- static
- resilient
- improving

Unusually good
- degrading
- static
- resilient
- improving

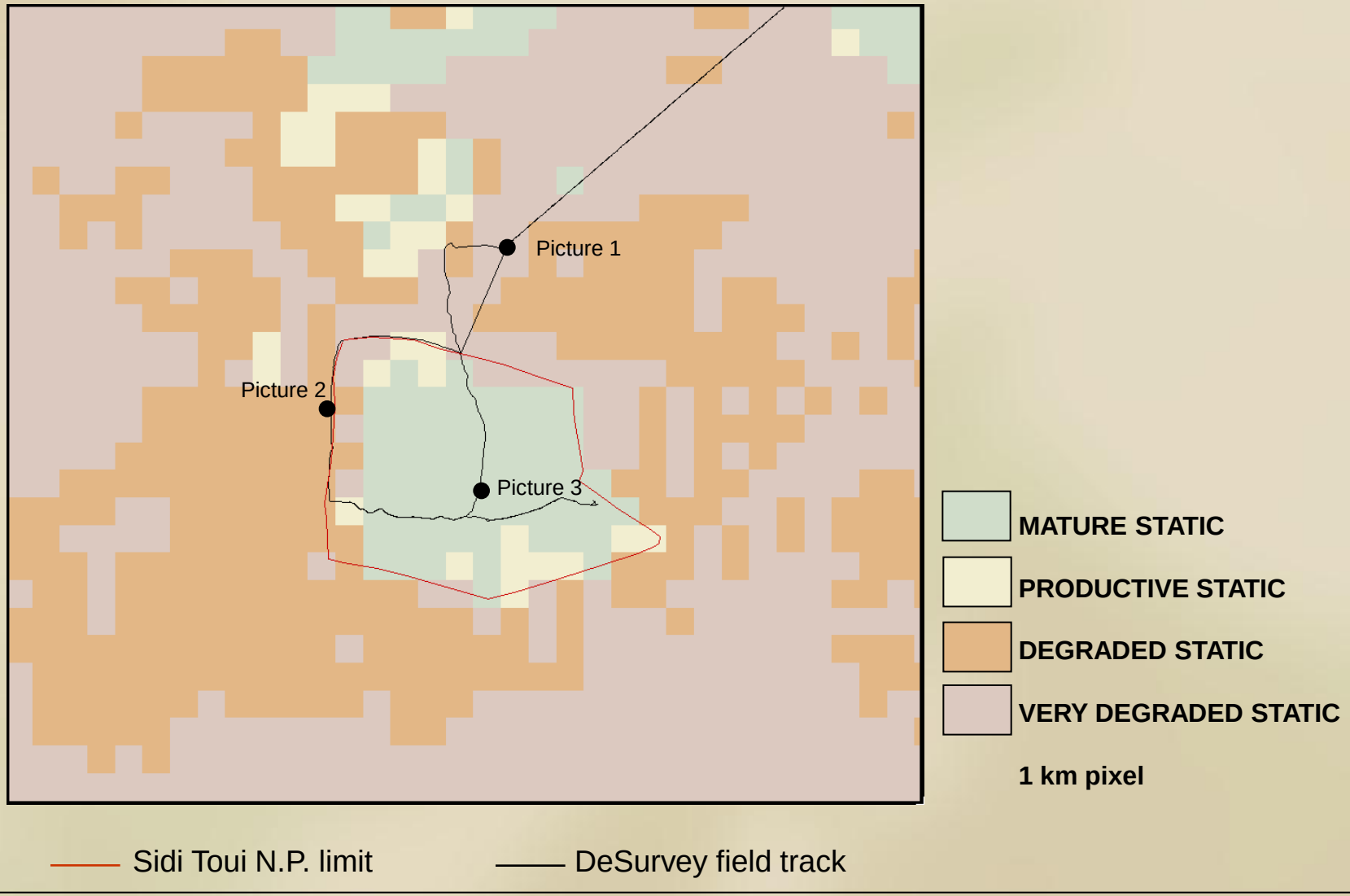
Maghreb Land Condition (1998-2008)



LAND CONDITION CLASSES

- UNDERPERFORMING ANOMALY DEGRADRING
- UNDERPERFORMING ANOMALY FLUCTUATING
- UNDERPERFORMING ANOMALY IMPROVING
- UNDERPERFORMING ANOMALY STATIC
- BASELINE PERFORMANCE DEGRADING
- BASELINE PERFORMANCE FLUCTUATING
- BASELINE PERFORMANCE IMPROVING
- BASELINE PERFORMANCE STATIC
- VERY DEGRADED DEGRADING
- VERY DEGRADED FLUCTUATING
- VERY DEGRADED IMPROVING
- VERY DEGRADED STATIC
- DEGRADED DEGRADING
- DEGRADED FLUCTUATING
- DEGRADED IMPROVING
- DEGRADED STATIC
- PRODUCTIVE DEGRADING
- PRODUCTIVE FLUCTUATING
- PRODUCTIVE IMPROVING
- PRODUCTIVE STATIC
- MATURE DEGRADING
- MATURE FLUCTUATING
- MATURE IMPROVING
- MATURE STATIC
- REFERENCE PERFORMANCE DEGRADING
- REFERENCE PERFORMANCE FLUCTUATING
- REFERENCE PERFORMANCE IMPROVING
- REFERENCE PERFORMANCE STATIC
- OVERPERFORMING ANOMALY DEGRADING
- OVERPERFORMING ANOMALY FLUCTUATING
- OVERPERFORMING ANOMALY IMPROVING
- OVERPERFORMING ANOMALY STATIC

Field check example: Sidi Toui N.P. (SE Tunisia)



Sidi Tui example. Picture 1: very degraded state

Sidi Tui example. Picture 2: degraded state(NE: N.P. border)

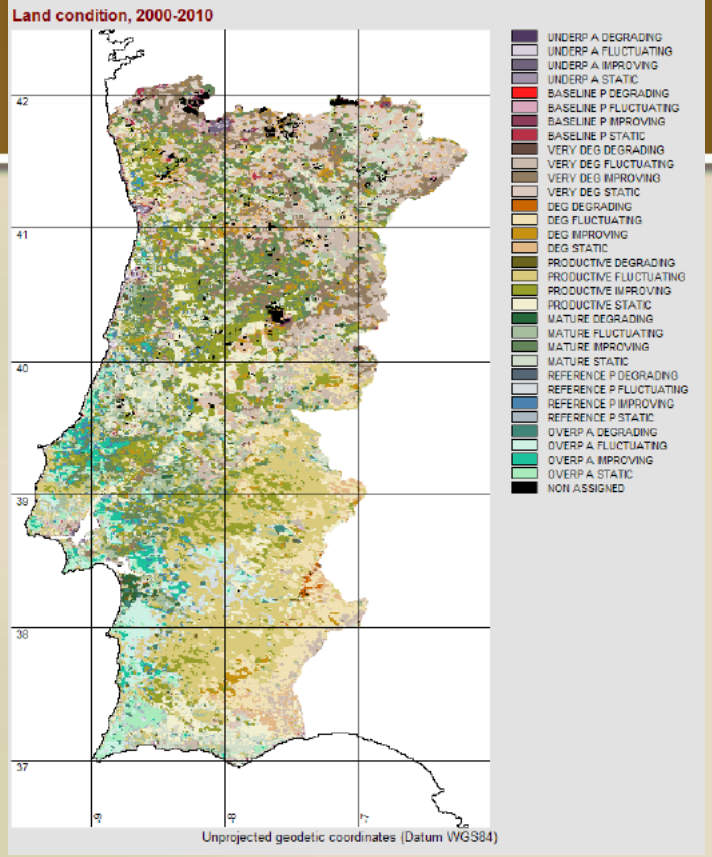
Sidi Tui example. Picture 3: mature state

MP1 Monitoring LDI-2dRUE: beyond DeSurvey

- Real application: The only option to keep new developments alive. DeSurvey actions:
  - Support UNCCD
  - Collaboration to DRAGON 2 in China
  - ESA (DesertWatch)
    - Portugal
    - Brasil
    - Mozambique

LDI-2dRUE: Portugal

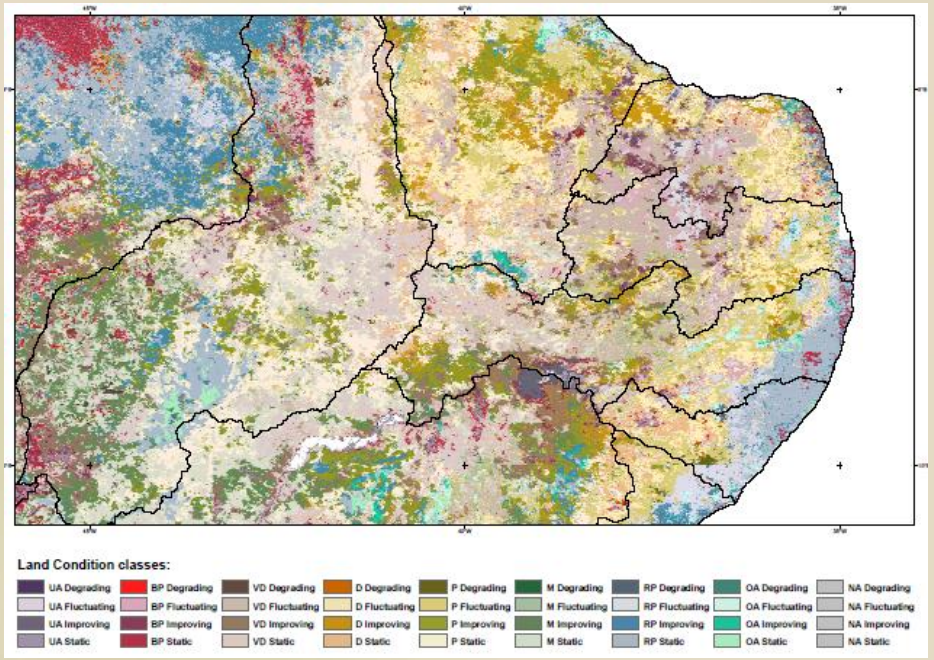
- Study period: 2000-2010
- Study area: 111850 km^2
- Resolutions: 1 km, 1 month
- Input data:
  - *SPOT VEGETATION NDVI (VITO)*
  - *Ad-hoc interpolated climate archive*
  - *CORINE LC 2006 (EEA)*
- Iberian application (PT & ES)



- Map facts:
  - *Baseline Performance + Very Degraded + Degraded = 32.6% of study area*
  - *Degrading = 1.5% of study area*
  - *Reference vegetation has low extension and is undergoing degradation*
  - *Weak land bank safety network, prevalence of land management over natural processes*
- Level of NUTS 2 & 3
  - *Deteriorated land concentrates in Norte*
  - *Degrading trends prevail in Alentejo*
  - *In Alentejo:*
    - *Baixo Alentejo and Alto Alentejo account for most of degraded land*
    - *Alentejo Litoral is particularly affected by ongoing degradation*

LDI-2dRUE: NE Brazil

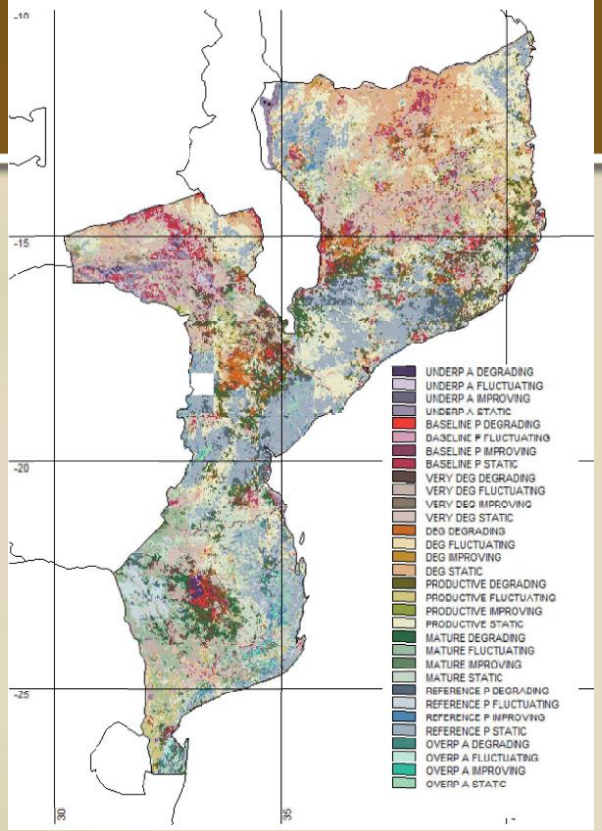
- Study period: 1998-2006
- Study area: 879238 km^2
- Resolutions: 1 km, 1 month
- Input data:
  - *SPOT VEGETATION NDVI (*VITO*)*
  - *CRUTS3.0* (UEA)
  - *Full Data Reanalysis Product* (GPCC)
  - *Land Use Systems* (LADA)
  - *Biomas e Ecorregioes do Brasil* (MMA Brazil)



- Map facts:
  - *Baseline Performance + Very Degraded + Degraded = 42% of study area*
  - *Degrading = 1.1% of study area*
  - *Positive feedback between degraded states and degrading trends*
- Level of states
  - *Land degradation especially relevant in Rio Grande do Norte, Paraiba, Pernambuco, Piaui and Ceara*
- Level of eco-regions
  - *Caatinga: Very Degraded, Degraded and Productive, and lacks Reference Performance*
  - *Cerrado: also under stress, but has Mature and Reference Performance*
  - *Maranhao bababu forests and Pernambuco forests: strong associations with Reference Performance*

LDI-2dRUE: Mozambique

- Study period: 1998-2006
- Study area: 780015 km^2
- Resolutions: 1 km, 1 month
- Input data:
  - *SPOT VEGETATION NDVI (*VITO*)*
  - *CRUTS3.0* (UEA)
  - *Full Data Reanalysis Product* (GPCC)
  - *Land Use Systems of the World* (LADA)
  - *GLC2000 (*JRC*)*



- Map facts:
  - *Baseline Performance + Very Degraded + Degraded = 42% of study area*
  - *Degrading = 19.1% of study area (largest proportion so far of 2dRUE applications)*
  - *Improving = 2.7%*
  - *Overall prevalence of land degradation, with high rates of change*
  - *Association between states and trends suggest recent and rapid desertification*
- Level of administrative units
  - *Land degradation especially relevant in Manica, Nampula, Sofala and Zambezia*
- Level of vegetation
  - *Open deciduous shrubland in terminal stage of desertification; endangered*
  - *Deciduous woodland under initial or fully developed desertification*

Conclusions

- Real transference is the only option for keeping alive Land Degradation-Research project results.
- It is a long and intricate process given users characterisrics
- Even in the EC
- A claim for consideration of this issue in Europe-2020 research strategy

THANKS FOR YOUR ATTENTION