Water solutions in drylands
Experiences from the DESIRE project

Desertification mitigation and remediation of land – A global approach for local solutions

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and the DESIRE consortium

Land degradation in drylands calls for solutions

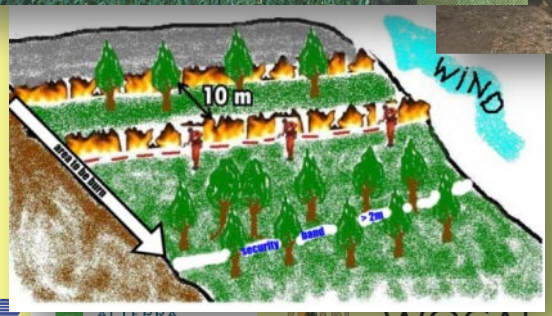
- Loss of biological or economic productivity
- Loss of ecosystem services
- Loss of livelihood

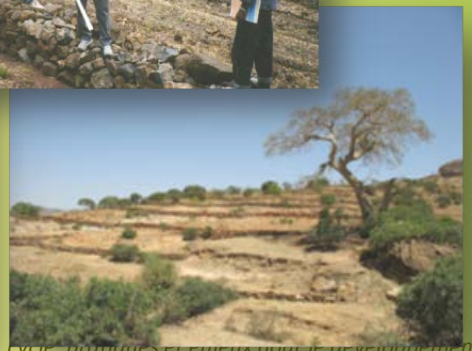
Concerns for society and thus policy interest

Sustainable Land Management strategies provide solutions

Interventions at local-regional scale aiming at:

- Increasing productivity
- Improving livelihoods
- Improving ecosystems





Why research/invest in SLM strategies ?

- Within reach of smallholder farmers
- Benefits beyond agriculture

Energy supply

water scarcity

Food security

Poverty allevation

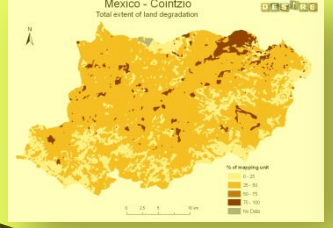
Climate change mitigation

Biodiversity conservation

Resource use efficiency

The DESIRE Approach

Status of LD and SLM and risk



Context and drivers of change

Stakeholders & their goals

Establish context and goals

Identify, evaluate & select SLM options

Identify, document and evaluate SLM options

Prioritize & select

Trial SLM options & model regional effects

Apply SLM options & monitor

Adjust

Trial SLM technologies in field experiments

Model biophysical and economic effects at regional scale

Disseminate for extension & (inter)national policy

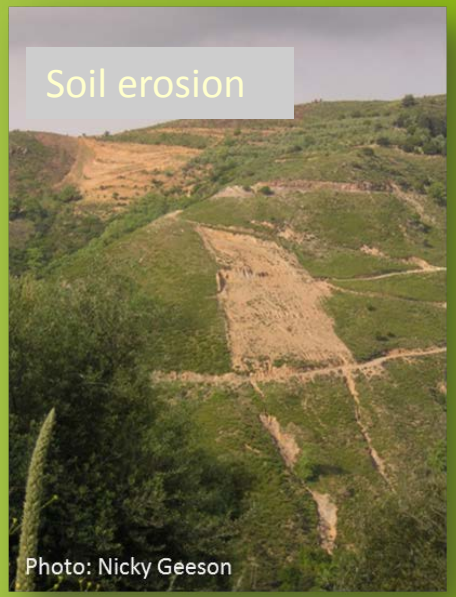
Apply in longer-term programs & monitor progress to goals

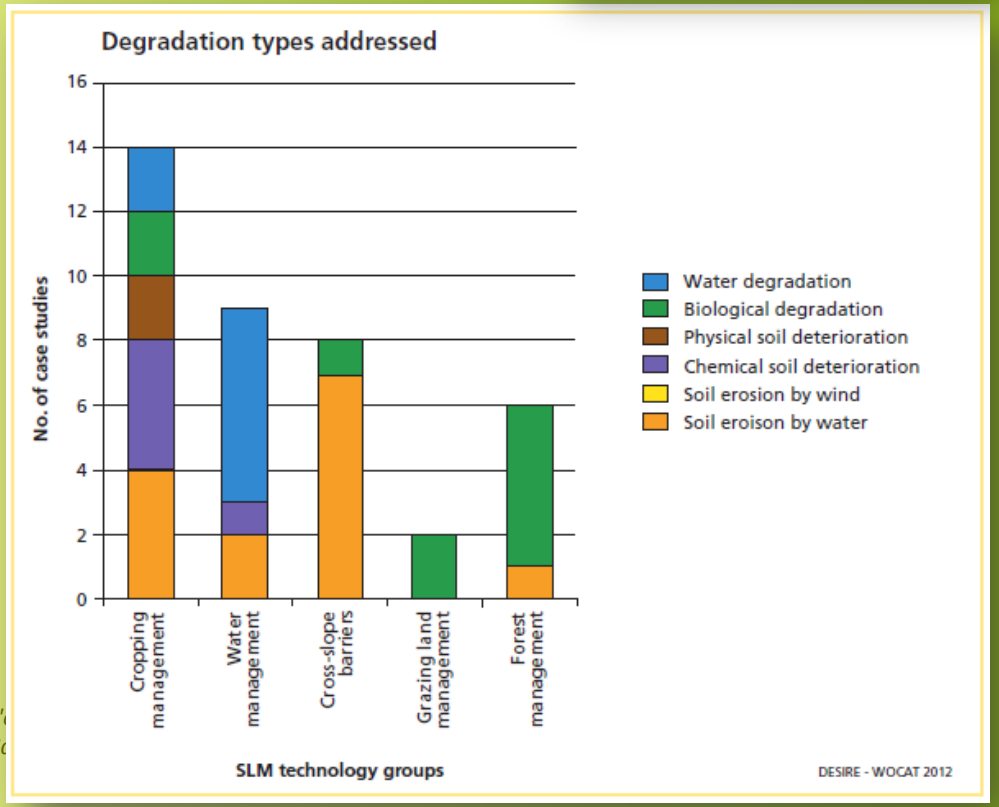

Mação, Portugal
Guadalentin, Spain
Rendina, Italy
Maggana, Greece
Crete, Greece
Saratov, Russia
Mamora, Morocco
Djanybek, Russia
Cointzio, Mexico
Santiago, Cape Verde
Loess Plateau, China
Zeuss Koutine, Tunisia
Secano Interior, Chile
Eskisehir, Turkey
Konya, Turkey
Boteti, Botswana
Soil erosion by water
Soil erosion by wind
Salinisation
Vegetation degradation
Competition for water
Forest fire
Drought
Flash floods

Aims of water-related SLM technologies

Addressing various forms of land & water degradation:

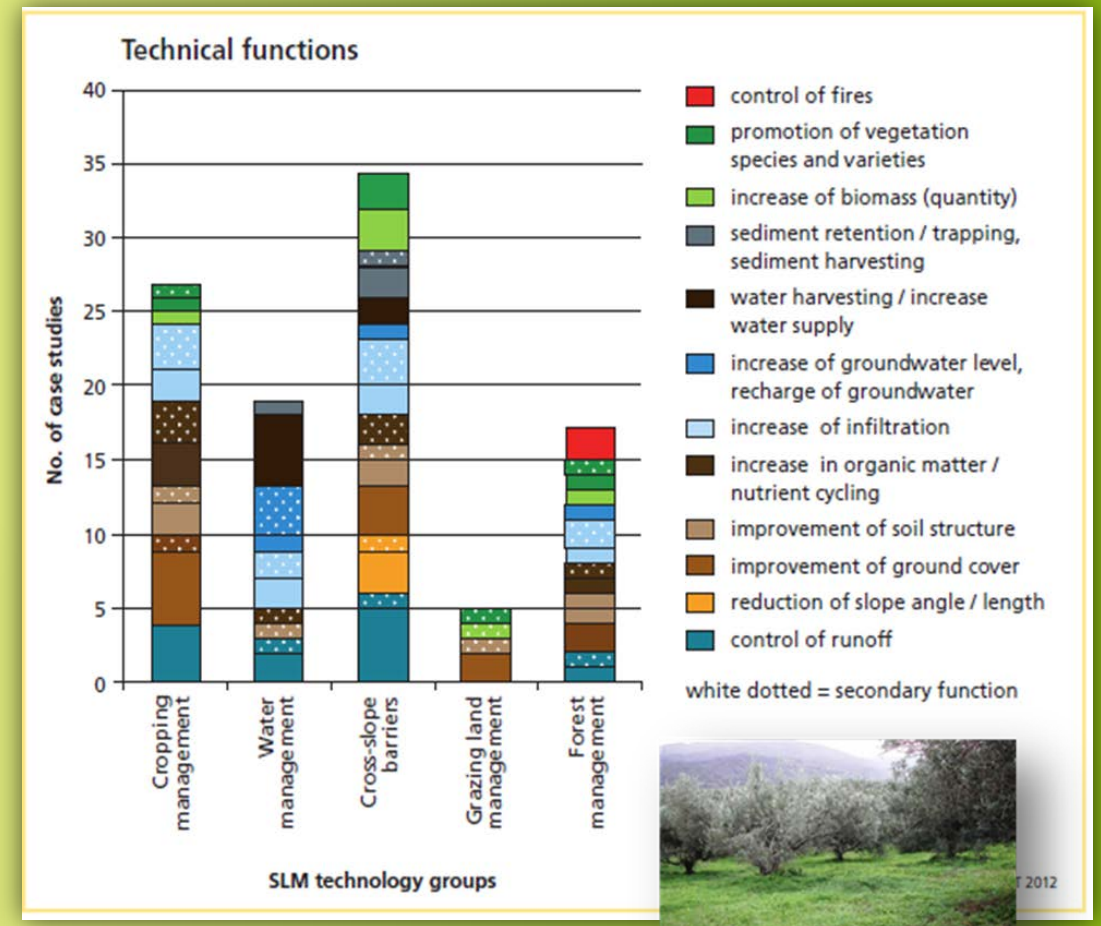
- Vegetation degradation
- Salinization
- Soil & water loss
- Fertility depletion





Technical functions of water-related SLM technologies

- Runoff control
- Increasing infiltration
- Groundwater recharge
- Water harvesting



Assessment and **selection** of SLM technologies and approaches in DESIRE using WOCAT: a 3 step process

I. Identification

II. Evaluation

III. Selection

- Intensive collaboration with stakeholders in two workshops, separated by an evaluation phase
- Stakeholders: local communities, land users, local/regional authorities, farmer's unions, water boards, land owners, researchers

Water management technologies from DESIRE

Above left: View of roof rainwater system at the *lands* in Mokoboxhane (Photo: L. Magole)
Above right: Taking dimensions for a rainwater system in Mopipi *lands* (Photo: M. Moemedi)

Roof rainwater harvesting system

Botswana - Lekidi

Roof rainwater catchment system using galvanised iron roof material, feeding an underground water tank.

A roof of galvanised iron (corrugated iron) with the dimensions 7 x 6m is constructed on a support of gum poles (see photos). The roof catches the rain. The rain water flows over the roof into pipes at the rear end of the roof (sloping side) into an underground conical water tank. The tank is made of bricks and mortar. The underground tank serves two key roles: i) it stores water for use during the dry spells or times of no rain; and ii) the tank keeps the water cool in this hot environment. The technology is most preferred for so-called *'lands'* areas, to provide household drinking water. On average, these *lands* are distant from water sources (e.g. 2-15 km). Other benefits of storing rainwater include less pressure on natural water ponds, but this would be a secondary concern.

Water is critical for human consumption and needed around the home. The cool water is effective in quenching the thirst; it reduces labour time to collect water thus freeing time to concentrate on other farm activities. The water is mainly for household drinking and household chores like washing. Some is used as drinking water for chickens and for the animals used for draught power (e.g. donkeys during ploughing). The units are for use by individual farmers and thus restricted to individual households. The owner or the farmer has exclusive rights to the use of the water. Some farmers indicated that, in times of no rain, or before the first rains, they collect water from the village in drums, and pour it into this underground water tank, thus using it as a reservoir. They especially like the persistent coolness of water stored in the underground tank.

The technology is for rainwater collection in four villages. Rainwater that flows over the roof is collected, for example, on galvanised iron roofs. The water then runs through

Location: Boteti area, in the Central District of Botswana
Region: Central District
Technology area: 0.01 km²
Conservation measure: structural
Stage of intervention: mitigation / reduction of land degradation
Origin: Externally - 10-50 years ago
Land use: Cropland, grazing land
Climate: semi-arid, subtropics
WOCAT database reference: QT BOT04

Documented in the WOCAT online Database of Technologies (www.wocat.net)

DESIRE water management technologies:

Jessour, Tunisia
An ancient runoff water harvesting technique widely practised in the arid highlands

Tabia, Tunisia
Earthen dyke for water harvesting used in the foothill and piedmont areas

Water harvesting from concentrated runoff, Spain
Water harvesting from intermittent streams to nearby fields and terraces during runoff events

Transport of freshwater from local streams, Greece
To replace the traditional form of irrigation (by pumping saline groundwater from wells)

Recharge well, Tunisia
A drilled hole used to allow the direct injection of floodwater into the aquifer.

Drip irrigation, Turkey
Minimum use of water and labour for the optimum irrigation of plants in arid and semi-arid regions

Drip Irrigation, Russia
Gradually applied water into the zone around the steam of the irrigated plant.

Roof rainwater harvesting system, Botswana
Galvanised iron roof material feeding water into an underground water tank.

Water-related SLM Approaches

Tunisia

Dryland watershed management approach

Integrated land and water management approach, including vegetative, management, and agronomic measures.

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Russia

Living together - thinking on common water

Testing and disseminating a water saving technology like drip irrigation.

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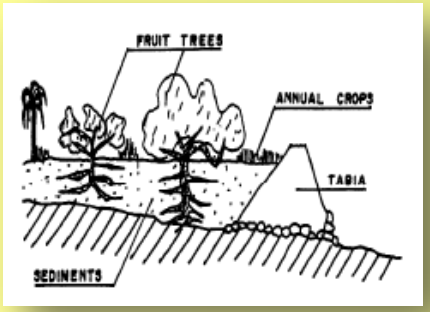
SLM Approach

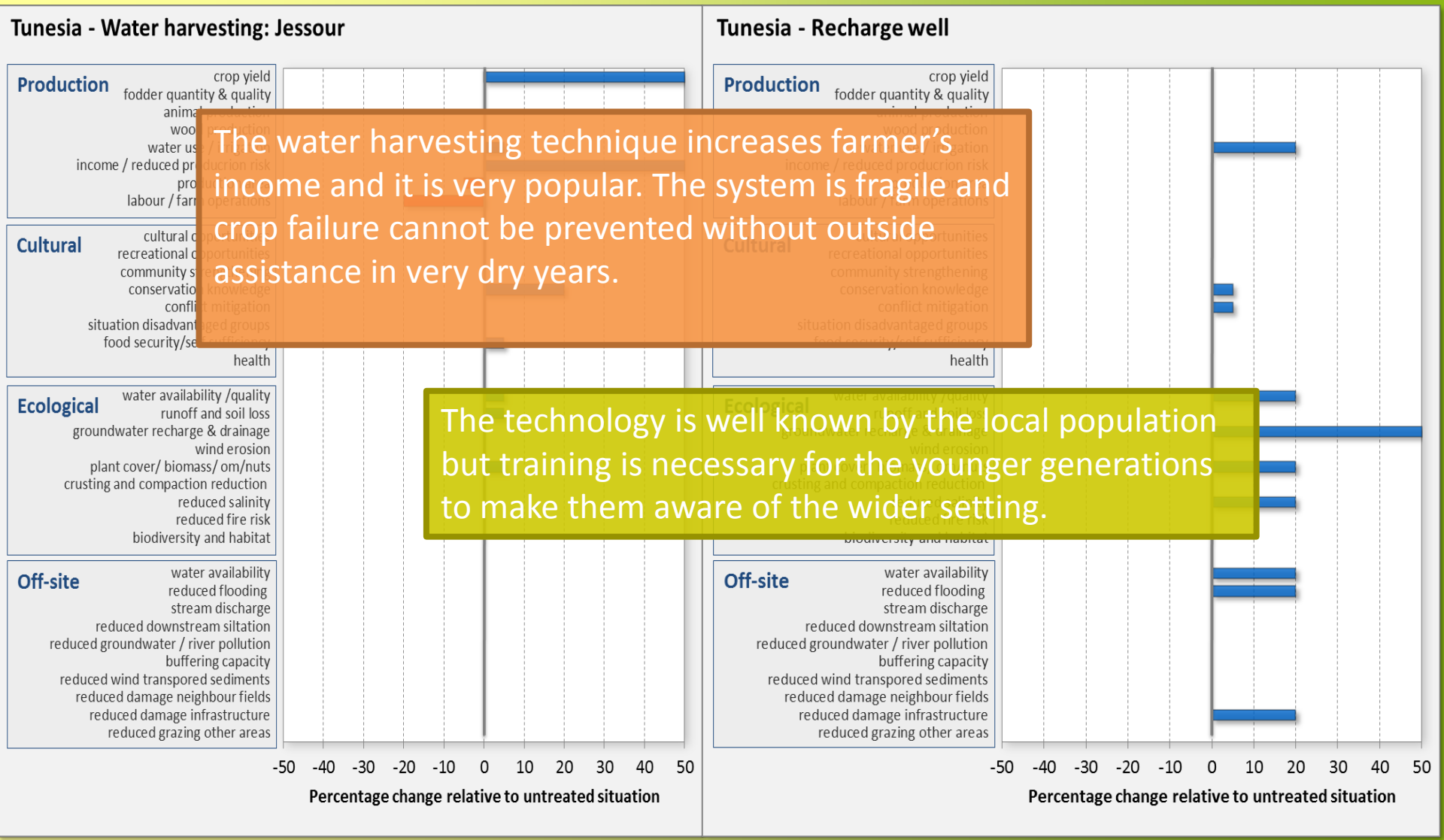
- Involves actors at all levels
- Inputs and means (financial, material, legislation, policy)
- Know-how (technical, scientific, practical)

Example: SLM options for Zeuss Koutine watershed, Tunisia

- Overexploitation of aquifers for olive culture in combination with drought periods
- Traditional water harvesting techniques for improved soil water content: Jessour and Tabias
- Recharge structures: gabion check dams and recharge wells



Results

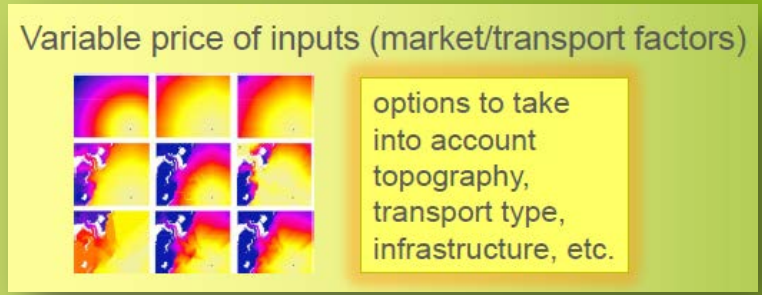


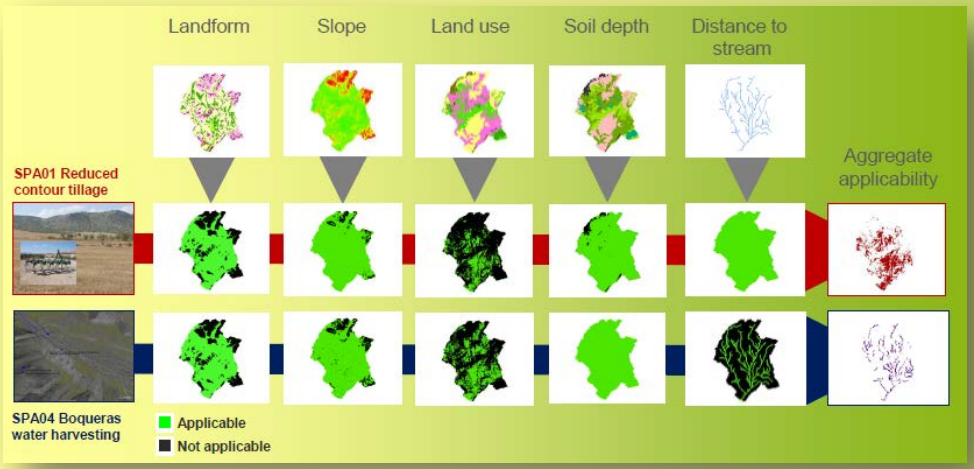
The water harvesting technique increases farmer's income and it is very popular. The system is fragile and crop failure cannot be prevented without outside assistance in very dry years.

The technology is well known by the local population but training is necessary for the younger generations to make them aware of the wider setting.

Regional assessment of local water-related SLM solutions using a biophysical-economic model

1. Define applicability limits of SLM technologies (landform, slope, distance to stream,...)
2. Consider spatial variability in investment costs





Regional assessment of local water-related SLM solutions using a biophysical-economic model

3. Construct cash flow series
4. Financial CBA for each SLM technology
5. Scenario development (technology, policy, adoption, global)

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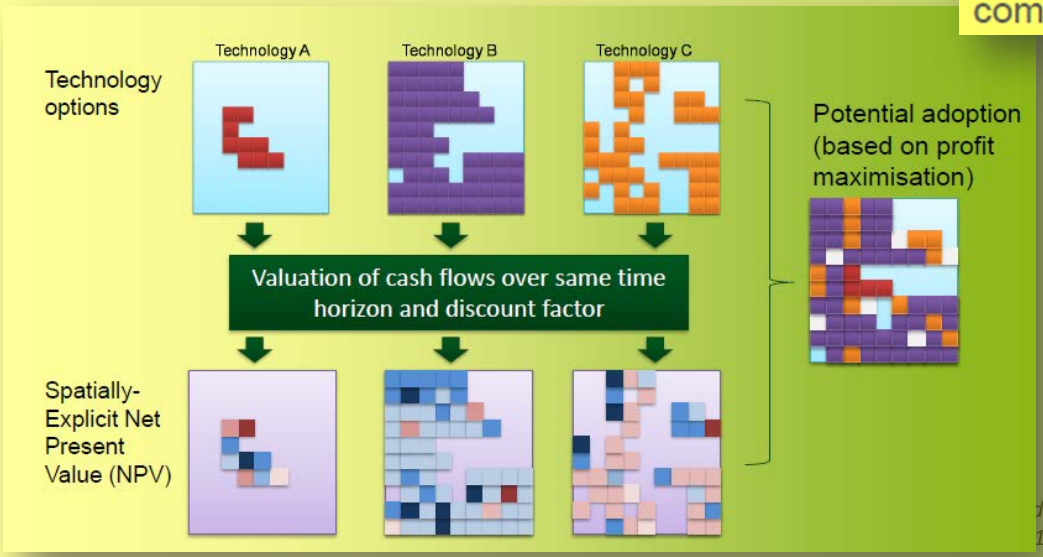
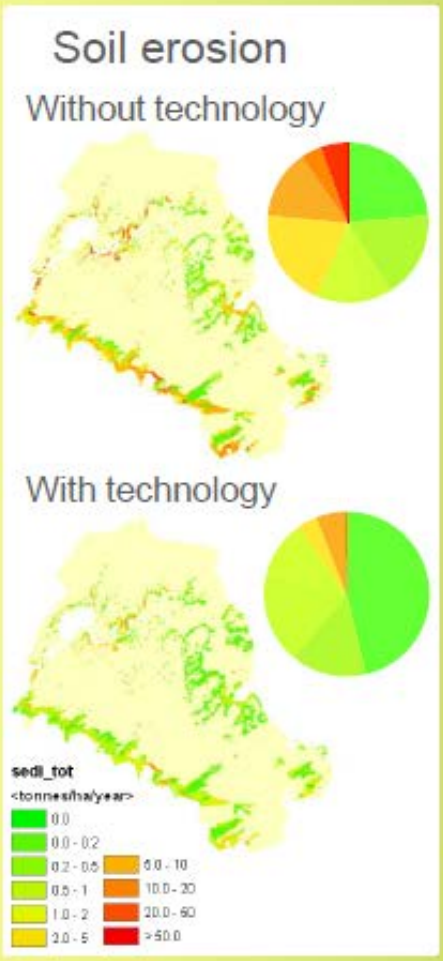
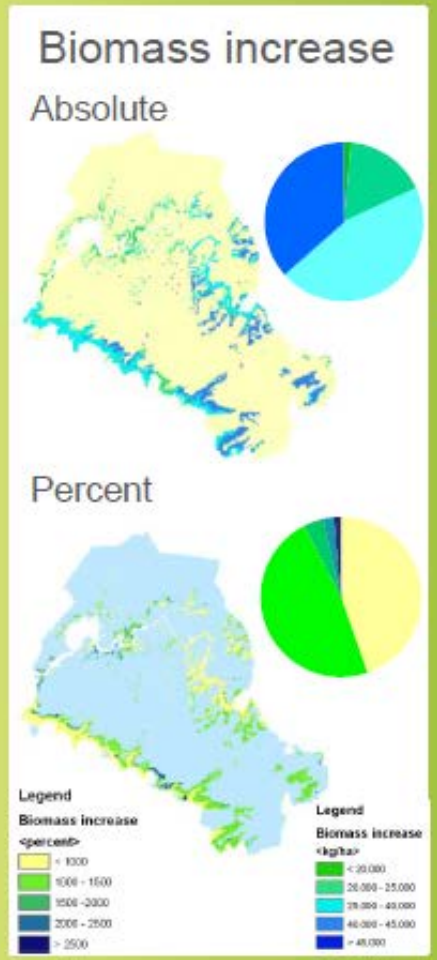
1	-	-	20	1	-	-5	0
2	-	-	20	2	-	-5	0
3	-	-	20	3	-	-5	0
4	-	-	20	4	-	-	200

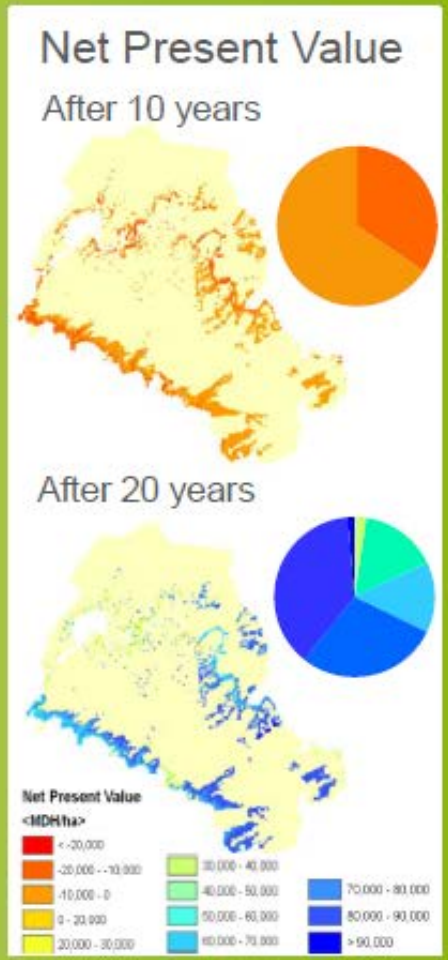
The economic life of technologies is basis for the comparison



Sehoul, Morocco – Technology scenario fencing and plantation of atriplex (MOR15)







Sehoul, Morocco – Policy, adoption and global scenarios

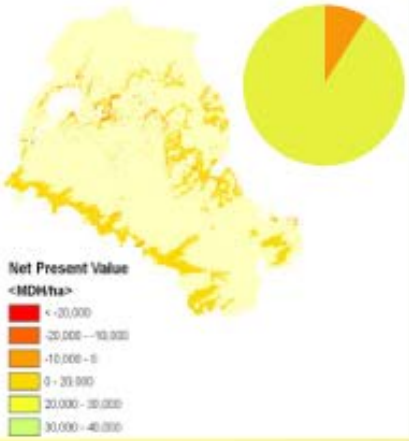
Policy MOR15

Subsidised investment

Investment cost

50%

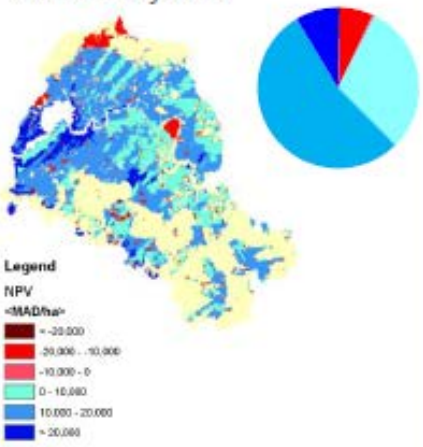
Net Present Value
After 10 years



Policy MOR 16B

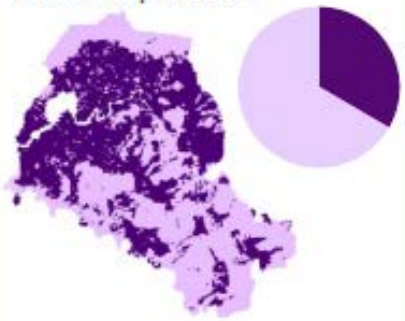
Prohibited stubble grazing

Net Present Value
After 10 years

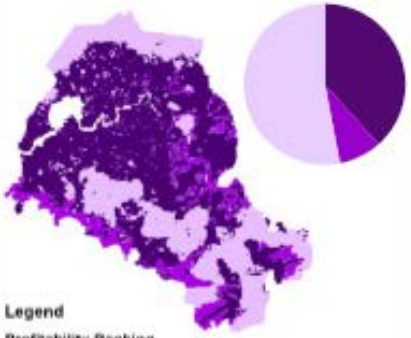


Adoption scenario

Without policies

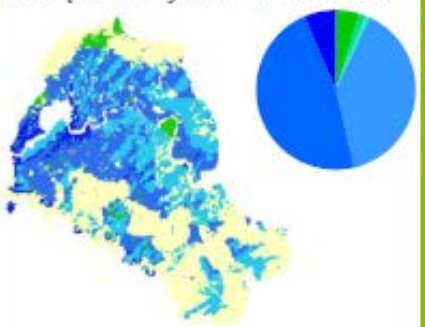


With policies

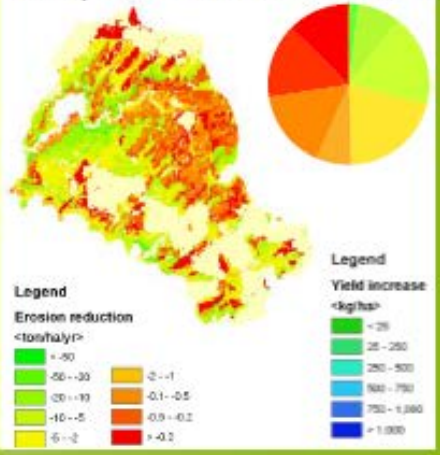


Global scenario

Scope for yield increase

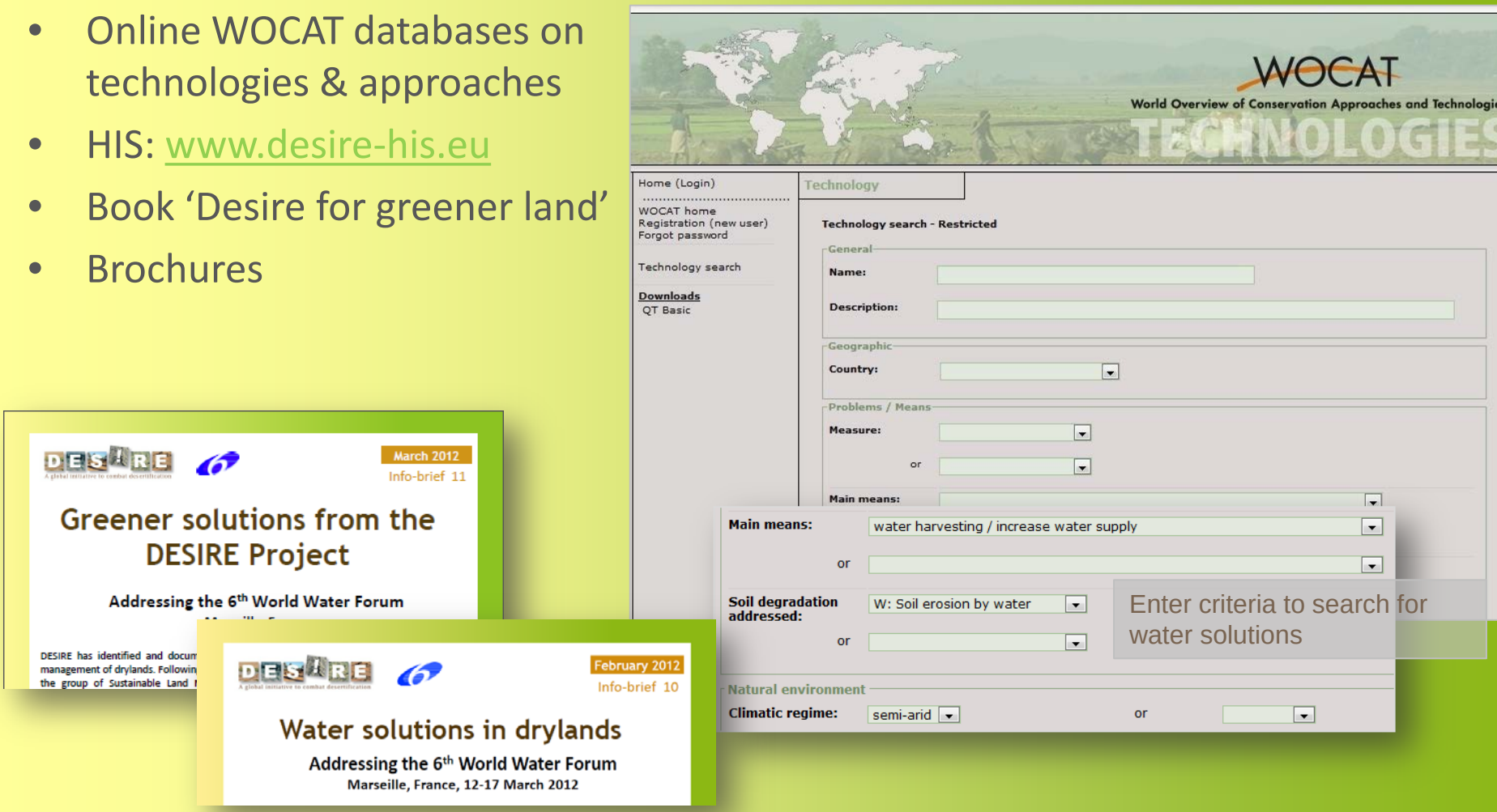


Scope for reduced erosion



Getting informed on water solutions from DESIRE

- Online WOCAT databases on technologies & approaches
- HIS: www.desire-his.eu
- Book 'Desire for greener land'
- Brochures



www.desire-his.eu

DESIRE Harmonised Information System

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- UNCCD

Desertification research

- Global collaboration
- Recent European research
- DESIRE Project

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DESIRE Project
Harmonised Information System:
providing local solutions to global sustainable land management problems

Welcome to the DESIRE Project Harmonised Desertification Information System. The HIS will comprehensively archive, document and give access to all the material developed in the DESIRE project. It will be under continuous development until the project is completed in 2012.

DESIRE HIS Editors: Jane Brandt, Nichola Geeson, Giovanni Quaranta, Rosanna Salvia, MEDES, IT

Creeping desertification around the world affects more than 250 million people.

The DESIRE research project is working to fight the phenomenon with new conservation strategies.

Funded under the EU's Sixth Framework Programme, the DESIRE project is international, bringing together 28 research institutes, non-governmental organisations and policy-makers from around the world. The aim of the project is to come up with alternative strategies for the use and protection of these vulnerable areas.

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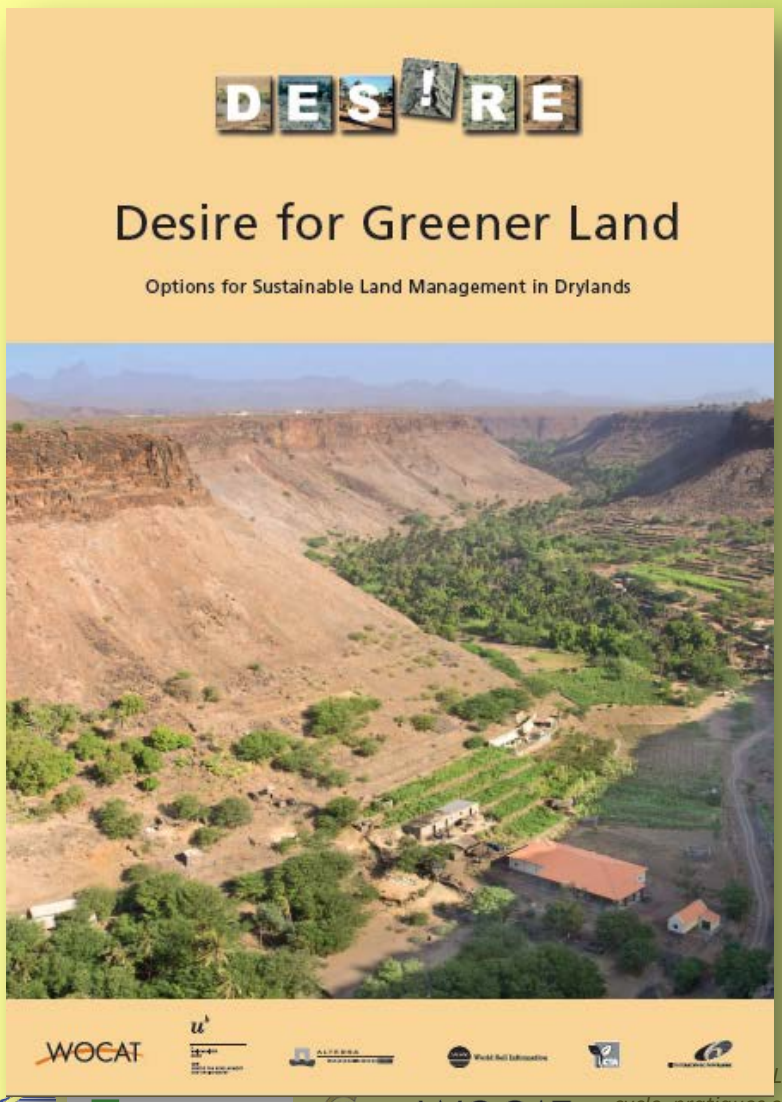
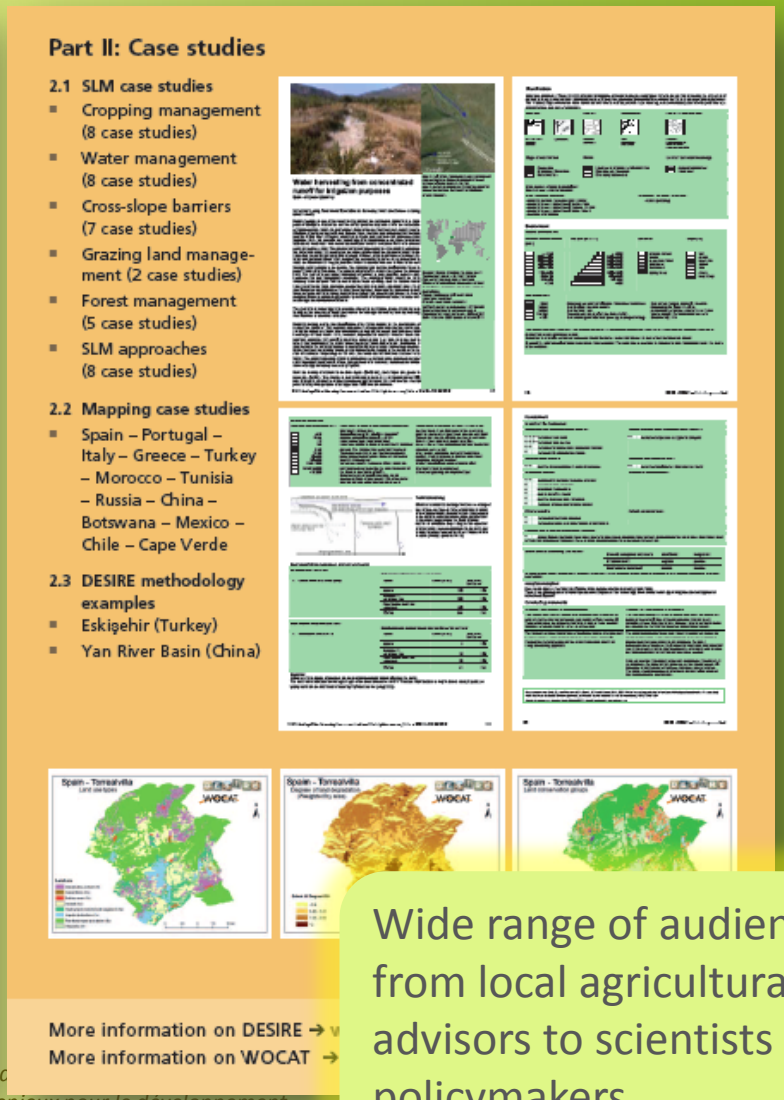
Acknowledgement

The DESIRE project is co-funded by the European Commission, Global Change and Ecosystem.

DESIRE brings together the expertise o 26 international research institutes

Book: Desire for greener land





Wide range of audiences: from local agricultural advisors to scientists and policymakers

From stakeholder-science collaboration to policy: the vital role of NGOs

DESIRE

A publication from the DESIRE project - funded by the European Union's 6th Framework Program 'Global Change and Ecosystems'

January 2012

Info-brief 13

Recommendations from the DESIRE project

DESIRE: lessons learned on science-NGO collaboration in research projects

It is often said that scientists work in an ivory tower, not able to share their research with the rest of the (non-scientific) world. This is especially so with the natural sciences, whose research topics are technical, specific and difficult to understand. However, in order to convince those who determine land use and design agricultural policies the latest cutting-edge research on these topics is needed; if only to support the 35% of the world population living in drylands facing the problems of land degradation, hunger and poverty.

DESIRE

A publication from the DESIRE project - funded by the European Union's 6th Framework Program 'Global Change and Ecosystems'

Policy Brief

Une stratégie doublement gagnante pour les éleveurs et pour le territoire : *La mise en repos des terres de parcours dans les zones arides de Tunisie*

Une expérience du site de Zeuss Koutine en Tunisie

Suite aux échecs passés pour restaurer et réhabiliter les parcours dégradés du sud tunisien, le dialogue avec les acteurs locaux et la mise en œuvre d'une pratique traditionnelle, la mise au repos des parcours, met en évidence après quatre années seulement une étonnante capacité des espèces pâturées à reconstituer le couvert végétal et à fixer les sols.

Le pâturage : une activité traditionnelle en évolution

Le pâturage a toujours été le type d'utilisation des terres le plus important dans les régions arides de Tunisie. Cependant, ces parcours ont été de plus en plus soumis à des processus de dégradation grave en raison des profonds changements socio-économiques (privatisation des terres collectives et extension des terres cultivées particulièrement l'oléiculture, accroissement du nombre de cheptels, abandon de la transhumance) ayant eu lieu depuis l'indépendance. Ils ont conduit à l'émergence de la société agro-pastorale au lieu de l'ancienne qui était essentiellement pastorale. Les systèmes de pâturage traditionnels (transhumance et nomadisme), qui avait historiquement permis des périodes de repos du pâturage et le contrôle des cheptels ont été abandonnés. Presque tous les parcours sont désormais soumis à un pâturage continu sans aucune restriction de la charge animale. Les changements des systèmes de pâturage ont en effet entraîné une détérioration quantitative et qualitative de la végétation pastorale.

Parcours dégradés en raison principalement du surpâturage, A. Ouled Belgacem

Thank you for your attention!


Photo: www.wocat.net


Photo: Erik van den Elsen

For more information, visit:

www.desire-his.eu

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