Newsletter 1. February 2009

Desertification mitigation and remediation of land – a global approach for local solution

The aim of the DESIRE Integrated Project, as funded by the European Commission, is to find promising new land use and management strategies in selected areas affected by desertification, based on a close collaboration between stakeholder groups and scientists. This collaboration helps land users to accept and try new suggestions that have a good scientific basis. If these new ways can be shown to be successful under experimental conditions, there is a good chance that they will also be successful in neighbouring areas with similar problems. DESIRE will share the evaluation of the strategies using a web-based Harmonised Information System, so that everyone can benefit from practical and cost-effective new ideas.

New strategies are being tested in all these DESIRE study sites

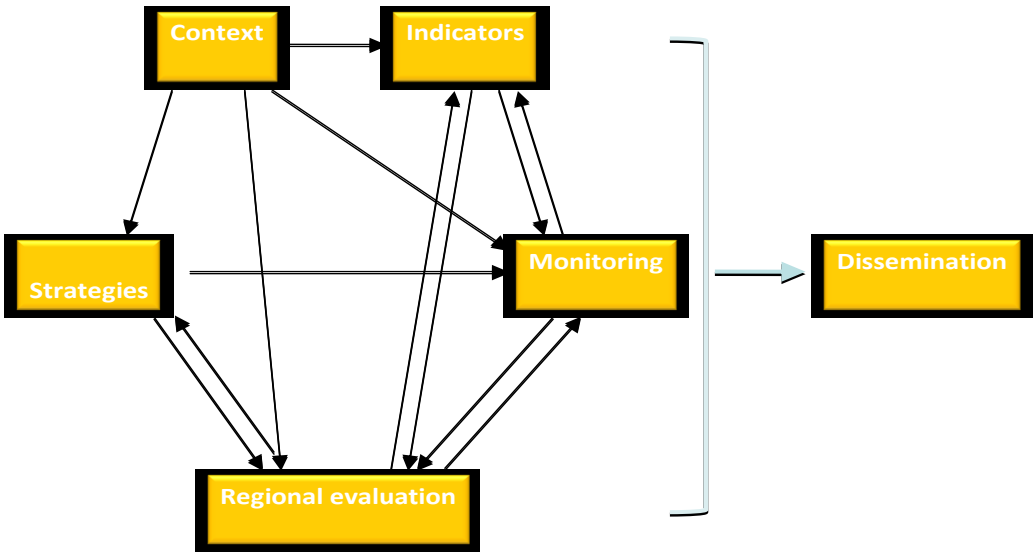
Many of the study site countries border the Mediterranean, but there are also sites in Chile, Mexico, Botswana, Cape Verde and China. The chosen sites have a wide range of problems, including soil erosion by wind or water, the effects of forest fires or overgrazing, salinisation and droughts or flash floods.

How is DESIRE contributing to a global response to desertification?

The DESIRE project is seeking solutions for desertification problems locally, but through its global distribution of study sites it will also contribute towards tackling these issues at a global scale. DESIRE is not alone in this aim. Like the United Nations Convention to Combat Climate Change, the UNCCD is a global response to the problem of land degradation and desertification that threatens the livelihoods of over 1 billion people in more than 110 countries. DESIRE will help to provide information on the scientific and technological aspects of combating desertification and mitigating the effects of drought. Environmental sustainability is also one of the United Nations Millennium Development Goals, along with ending poverty and hunger, and addressing other social crises.

How will DESIRE achieve its aims?

The DESIRE project will take a similar path in each study site, starting with the Context. This is a comprehensive description and mapping of the physical and socio-economic characteristics of the site, outlining the particular desertification problems encountered, and their drivers.



A summary of DESIRE activities, being carried out in each study site

Physical and socio-economic measurements or descriptions can be used as Indicators for understanding and monitoring desertification processes. Indicators can establish baselines, thresholds and targets, and be used to monitor the degree of success of the strategies and remedies that have been chosen, and are now being put into action.

Suggested Strategies for the prevention and mitigation of desertification have been chosen through workshops with stakeholders in the study sites, using methods and ideas including Learning for Sustainability, and the WOCAT method (World Overview of Conservation Approaches and Technologies). Once the strategies are chosen they are tried out in experimental plots. Local Monitoring will examine how the strategies are working, whether they are cost-effective, and whether they can be recommended for use in similar areas elsewhere. Regional evaluation, over a larger spatial area, will adapt existing biophysical (PESERA (Pan-European Soil Erosion Assessment) and socio-economic models, to model effects of strategies that help combat desertification at field and regional scales.

Dissemination is for spreading the good news about the results of experiments and aims at making policy recommendations locally, nationally and internationally, and developing websites, booklets, leaflets, posters, etc. relevant to different stakeholders. On the DESIRE website http://www.desire-project.eu/ you will find much more information about the project, especially on the Harmonised Information System http://www.desire-his.eu/ . See a full description of each study site, and follow the progress in choosing, trying and monitoring soil and water conservation strategies. Video-clips will illustrate the interactions between scientists and land users this project, focussing on traditional and local knowledge in the search for scientifically-supported sustainable solutions.

DESIRE scientists talk to local people about desertification problems

The desertification issues in the DESIRE study sites can be summarised as follows:

Murcia, Guadalentín basin, Spain
Here soil erosion and water shortage are common, particularly associated with tillage or land abandonment. The soil is very susceptible to erosion, so that in this semi-arid climate high intensity rain storms easily cause rills and gullies to form. Stakeholders have agreed that measures to increase infiltration and soil water content, such as minimum tillage, mulching and water harvesting structures should be tried. Runoff and erosion may be reduced by using terraces and vegetation strips or mulching. The landscape should be assessed and planned to provide a mosaic of integrated uses and there should be a shift to high quality certified products for example from ecological agriculture. Locally, the nutrient content of the soil may be increased by liquid manure from local pig farms.

Almond field with green manure in the central part of the Guadalentín basin, SE Spain (May 2007) © J. de Vente

Mação, Portugal
Mação is one of four UNCCD Pilot Areas in Portugal and has undergone severe drought periods during the past decade, catalyzed by catastrophic forest fires that destroyed most of the forest area, leading to severe degradation of vegetation and soil. The population is predominantly elderly, and younger people move away from the area, since it is difficult to earn a living. DESIRE will provide a framework that will allow a deeper insight into the degradation processes and that will assess the efficiency of the measures currently taken to reverse those degradation processes.

Góis , Portugal
Góis is a more mountainous area with a higher annual rainfall than Mação, where prescribed fire has been used for quite some time to prevent the spread of wildfires.

The Vale Torto catchment, Góis , Portugal, (in the foreground) is being instrumented to record soil loss before and after controlled fires. © R. Shakesby

Basilicata, Italy

Large areas of southern Italy are prone to erosion where the soils are formed on soft fine-grained Tertiary and Quaternary sediments. The prevailing climate is characterised by long dry periods with short intensive wet periods, mainly in early spring and late autumn. In the dry periods the soils and sediments shrink, and in the wet periods they swell. These processes reduce stability and increase the likelihood of erosion, and can result in spectacular gullies and other erosion features. Since the soils and sediments are so sensitive, rainstorms and tillage will result in erosion unless agricultural practices are carefully managed. Practices will be tested to determine the optimum policies to avoid further degradation.

Crete, Greece

Crete has been subjected to overexploitation of its natural resources for a long period. Large-scale deforestation of the sloping lands accompanied by intensive cultivation and overgrazing resulted in accelerated erosion and the formation of badlands with very shallow soils through the progressive inability for regeneration of the vegetation and soils. Based on the land desertification risk map of Greece, more than 50% of the island is characterized by high desertification risk. The high erosion rates occurring in Crete are attributed to climatic conditions, topographic characteristics and the generally poor vegetation cover. In the last decades, the availability of ground or surface water in areas with favourable soil and climatic conditions has encouraged intensive farming of the lowlands. The aquifer system has been overexploited by farming and a variety of other uses (mainly tourism) causing gradual intrusion of sea water. Soil salinization is a potential desertification threat for lands located mainly along the coast characterised by high xerothermic climatic indices.

Olive plantation, Chania, Crete. © C. Kosmas, 2008

Maggana, Greece
Maggana, in the eastern part of the Nestos river delta, is particularly affected by problems with water demand. The river was diverted and drainage systems have been built with a view to increasing cultivation, but the resulting ecological effects of draining the coastal wetlands, and the reduction of groundwater recharge were not considered. Soil salinisation is a particular problem.

Karapinar, Turkey
Wind erosion is the major problem here, on the sediments remaining from an ancient shallow lake. The main crops are cereals and sugar beet. Various soil protection and irrigation strategies have been tried in the past, some successfully and some not. Strategies will be reviewed and suggested improvements, including rotational grazing, strip cropping and drip irrigation, will be tested.

Tree colonisation of sand dunes, Karapinar, Turkey. © S. Açýkalin

Eskisehir, Turkey
There are many challenges in the Eskisehir region. The growing city of Eskisehir is attracting new economic investment and agriculture is also expanding to support the needs of the population. Erosion by water, erosion by wind, salinisation and the effects of rapid urbanization are all seen in association with land degradation, in an area with sparse natural vegetation and a trend of climate change towards increasing aridity. Strategies for sustainable development need to find a balance among competing pressures. Crop rotation, mulching and tree planting may be used to improve soil fertility, drip irrigation will limit water loss, and terraces and check dams may reduce soil erosion and water loss.

Extensive gully erosion in heavily-grazed pastures, Keskin village, Eskisehir, Turkey. © S. Açýkalin

The Sehoul plateau, Rabat region, Morocco
In the Sehoul plateau, the traditional combination of agriculture, animal husbandry and forestry, with minimal human pressure, is now threatened by increasing pressures and the land use change. The degradation of the natural cork oak forest, the intensification of traditional land uses such as the reduction of fallow and the overgrazing on poor and fragile soils explain the high erosion rates and the trend to desertification. There is also increased competition for water between the natural vegetation, agriculture, urbanisation and tourism.
Remediation strategies will include the experiments for cork oak forests regeneration, the production of fodder for livestock, and a range of rotation schemes for rainfed agriculture and fruit production.

Zeuss Koutine, Tunisia
The problems of land degradation here are the result of historical changes in land use. The former tribal lands that were used for grazing were privatised and exploited mainly for irrigated crops and rainfed agriculture , especially fruit trees. Competition for natural resources, particularly water, increased. There are new schemes for soil and water conservation, and rehabilitation of rangelands. Strategies will be tested and evaluated, particularly to determine which strategies will be acceptable to local stakeholders.

Rangelands in Zeuss Koutine, Tunisia (January 2009) © M. Ouessar

Dzhanybek, Russia

This area is a plain almost lacking in drainage and with soils prone to salinisation. Large state enterprises have exploited the land for agricultural crops and cattle-breeding, but productivity has declined, leading to unemployment and migration away from the area. Strategies may include ideas for ecosystem conservation, and diversification to provide a living for the remaining population.

Novy, Russia

In the 1990s, the area of the irrigated lands in the Saratov region was cut almost by half. On the remained fields irrigating rates have been reduced, which has led to changes in the water balance. Now, 3 % of the irrigated lands suffer from salinity, plus salinity on some lands where the irrigation was stopped. It is important to determine which soils can be farmed sustainably, using a range of techniques to improve soil properties and recharge of groundwater.

Loess Plateau, China

Soil erosion on the loess sediments is the prevailing desertification problem**,** and every year about 0.01 to 2 cm topsoil is washed away. New ways to prevent soil erosion and improve soil stability and fertility will be investigated.

Erosion patterns on the loess plateau, China © Wang Fei

Boteti, Botswana
Subsistence agro-pastoralism persists in the area against the backdrop of a semi-arid climate. The droughts in Boteti are endemic, with an estimated recurrence interval of 10-18 years, and the area is recognized as a hotspot of land degradation driven by overgrazing and dry season wind erosion. In order to safeguard land-based livelihoods, since 2002 joint efforts by the Government and the United Nations Environment Programme have been promoting community-based conservation of the land and indigenous vegetation. Mitigation strategies contributing to livelihood diversification and poverty alleviation will include water harvesting, harnessing of solar power, game ranching and biogas production and utilization. The communities have picked biogas production for piloting because of its potential to conserve vegetation and to promote small-scale bakery businesses.

Grazing in the Boteti region, Botswana (February 2008) © R. Chanda and J. Atlhopheng

Cointzio, Mexico
The Cointzio catchment experiences soil erosion, deforestation, grazing, etc., which also affect water quantity and quality. There are steep slopes and some highly erodible soils. The local customs that encourage overgrazing, as well the removal of crop residues for use as animal food, and burning of remaining residues, have tended to make erosion worse. The benefits of conservation tillage, and a global approach to conservation practices, will be demonstrated and tested.

Secano Interior, Chile
The traditional agricultural system combines livestock activities with the production of cereals, but inappropriate practices have resulted in about two thirds of the soils becoming badly eroded, with reduced soil organic matter and microbial biomass. Rain falls in the winter but summers are very dry. The original forest has been removed and there have been consequent invasions of plant species with little nutritional value to livestock. New techniques to avoid further erosion will be introduced.

Santiago, Cape Verde
With less than 300mm annual rainfall and about 23 000 ha of arable land with steep slopes, the natural resources of the largest agricultural island - Santiago, (off the west coast of Africa), have to be used judiciously. Investment in soil and water conservation has been essential to support food production for the more than half of the country's population. The arid hillsides are terraced wherever possible, to grow maize and different beans (and peas), supported on the maize stalks, as staple foods for the islanders. In 2000, 30% of the country's population was below the poverty line so effective water use is under constant scrutiny.

Terraces for maize, supporting peas and beans, Santiago Island, Cape Verde (January 2008) © E. van den Elsen

In the next DESIRE Newsletter:

- A round up of the soil and water conservation strategies for combating desertification that are being tested in the study sites

The DESIRE project (2007-2012) has been funded by the **European Commission DG Research-Environment Programme**, Unit of Management of Natural Resources • Head of Unit *Pierre Mathy*, Project officer *Maria Yeroyanni.* It brings together the expertise of 26 international research institutes and non-governmental organisations (NGOs), in collaboration with stakeholders local to the study sites.
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