

## Evaluation of remediation recommendations: Stakeholder Workshop 3 Sehoul, Morocco

### 1. Introduction

In the Sehoul area of Morocco, the main desertification problem consists of vegetation retreat, soil chemical degradation, and soil erosion, including incision of channels at the expenses of former colluviums and alluviums. Priority remediation strategies, as selected in the WB3 workshop, were designed to restore degraded pastures (particularly those incised by badlands) and to improve the productivity of annual cultivations. The remediation strategies that were selected and trialed were:

- **Protection of pastures affected by gullies and rills**, by fencing and the plantation of fodder shrubs (atriplex). The objective is to demonstrate that the grazing areas can be more productive (with a higher biodiversity) and at the same time less eroded if the soil cover is protected and improved. By September 2011, 2.5 years after plantation, the plot has obtained a really new landscape, compared to the fallows surrounding, even there where the gullies are not developed (Figure 1). Comparison between the behavior of 3 plots, 2010-11, the natural matorral, the eucalyptus plantation and the atriplex + fencing plot: The atriplex plot shows the best results in term of land cover by herbs, namely the permanent ones, and the less bare soil.
- **Fencing and minimum tillage:**
  - Conservation, after harvest, of the crop residues in summer and autumn, before the first rains to reduce evaporation and the soil disturbance by animal grazing; and
  - Minimum tillage to improve the soil on quite steep slopes devoted to annual cultivations.

These strategies were selected primarily because they constitute a continuation of the traditional way of life in the area. Additional criteria used to evaluate the strategies were agreed by both technicians and farmers during both the initial WB3 workshop and the final workshop.



**Figure 1:** Recovering of the land after two years of management in Sehoul, Morocco. The rill inside the plot recovered, while the one outside is wider; the color of the surface changed in the planted plot, due to grass growth

## 2. Priority Remediation Strategies

In response to field trial and model results, workshop participants concluded that:

- It becomes evident that the fruit trees, like olive trees represent a possible sustainable future for agriculture in many regions in Morocco;
- The grazing areas represent an important resource, if the land is better managed and the yield of fodder improved
  - The economic criteria of yield and income, already used in the WB3 workshop, was evaluated as more important than any others
  - The debate also raised the question of representativeness of the research led by the team, in particular the experiments. These concerning plots limited in extension and lasted only a reduced time. Besides the problem is to transfer what produces the research in the field of the application on the ground. The various offered alternatives are not quite practicable by the average developer and even less by the small farmers, what means the difficulty of scattering of experiments, even if they showed their abilities in the plots of some farmers.

As a consequence, the rank order of remediation strategies changed between the initial WB3 workshop and the final workshop, as shown in Table 1.

**Table 1:** Ranking of remediation options before and after field trials and modelling in Morocco

Rank	Technologies ranked in WB3 workshop	Technologies ranked in WB4-5 workshop
1	The improved system based on cereal cropping with rotation, plus grass strips	The cereal/leguminous system mixed with olive trees, figs trees; cactus opuntia and runoff water harvesting, in order to improve the production and restore the lands fertility
2	The improved system based on grazing and cereal cropping with control of the gullies	The protection of existing grazing lands, forests and former cultivated areas
3	The cereal/leguminous system mixed with olive trees and runoff water harvesting	The improved system based on grazing and cereal cropping with control of the gullies

### 3. How can we enable priority remediation options to be adopted?

Workshop participants made the following suggestions:

- The strategy of the farmers is influenced by the two main traditional activities, annual crops for food production and livestock for immediate income
- The farmers are more concerned by their immediate income than by sustainability and by the long term effects; it is then necessary to alleviate their level of conscience and at the same time make the remediation techniques profitable and have a real effect on their income
- The selected actions must be simple and easy to reproduce, in order to facilitate their gradual adoption by other farmers
- The coordination of Agriculture and Forests is a requirement, because of the very strong links between the 2 domains, state forest domain but on used in spite of the law and the private lands, used for the agricultural production and for grazing
- The choice for a better management of the cropped areas and the improve of the cover of the degraded pastures seems to be less costly and more immediately productive than deep changes in term of traditions
- Incentives to land users are recommended to exclude grazing and to plant fodder shrubs in order to prevent soil erosion and stabilize gully formation
- Bold political decisions are needed to reverse the trend and challenge of natural resource degradation and desertification
- It is also urgent to identify new legal contexts that can enable effective implementation of reforms and improvements



**Figure 2:** Workshop participants listening to results from field trials and models in Morocco

#### **4. Feedback from participants**

The following feedback was elicited from workshop participants:

- The technicians and engineers adopted easily the methodology and were able to lead deep discussions and a real debate about the questions posed by the moderator, while the local farmers didn't appreciate the method of participation
- The Engineers didn't appreciate a lot the research protocol and were suspicious with some of the results

#### **5. Next steps**

The following next steps were agreed:

- Agreement with the Regional service of Agriculture to meet in autumn for the follow up of the workshop.
- Agreement with the stakeholders to prepare a communal project of development for the territory, integrating sustainable land management vision