



## DESIRE: Monitoring the implemented Water and soil conservation techniques in the Sehoul region

The Sehoul commune, located on the Bouregreg and Grou valleys north of the " Plateau Central », suffers from both poverty and land degradation, characterized by high variability of the production and chronic shortage in natural resources.



Many partners institutions are involved in this work :

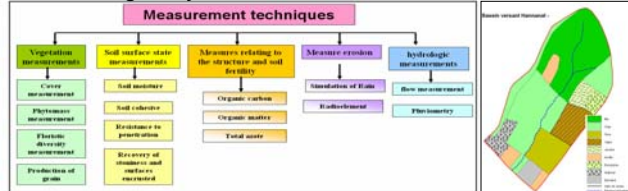
UNESCO-GN - FLSH  
ARDF, CRF, S/CDF, INRA, CNESTEN, Chair

The aim of this work is to monitor the efficiency of implemented techniques for preserving soil and water in the framework of long term evaluation of the strategies proposed during the participatory workshops by farmers and groups of actors

New strategies introduced  
 ▶ Atriplex plantation to restore degraded land and namely the gullied areas.  
 ▶ Mulching associated with minimum tillage to protect the soil against splash and to restore the quality of the soil.

### METHODOLOGY

#### Monitoring the dynamics of soil and water in Hannanet catchment



The monitoring of soil, vegetation and dynamics of water, in various plots in the catchment, cumulated with the hydrologic follow-up at the outlet will allow to run a model in order to obtain a spatial functioning of the catchment and to determine the hot spots inside it (the plots responsible of delivering runoff and erosion).

#### Monitoring new WSC techniques

Two types of land use are considered:

- Annual cultivations
  - Grazing in pastures
- Two types of processes are responsible of land degradation:
- overland flow
  - Gullies

Two kinds of intervention:

- In a cereal plot, Mulching, followed by minimum tillage, for the reconstitution of the biological mechanisms in the soil,
- in a gullied area, plantation of Atriplex to restore the land and prevent extension of the gullies.

Two modes of monitoring:

- In the cultivated plot, soil and vegetation measurements
- In the gullied area, micro-topography follow up and vegetation measurements



#### Existing Techniques in the area

- Rotation cereals / fallow
- Rotation cereals / leguminous
- Trees plantation

Techniques recently introduced to mitigate soil degradation

- ▶ Gullies correction by atriplex plantation
- ▶ Atriplex plantation in 2009
- ▶ Monitoring for 3 years of atriplex by different measurement techniques
- ▶ Mulching and minimum tillage
- ▶ Use of mulching in barley fenced plot
- ▶ Minimum tillage (5 cm)
- ▶ Monitoring for 3 years by different measurement techniques

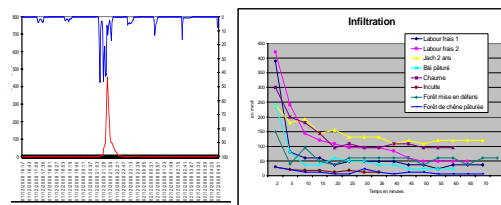
#### Global Monitoring



The Hannanet catchment

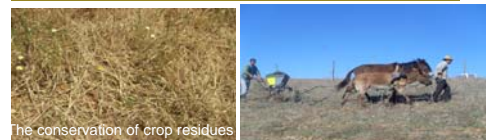
#### Water balance at the micro catchment scale in 2008-09:

Total rainfall 726,7mm; Total rainfall volume : 122 600 m<sup>3</sup>  
 Total runoff : 12 191 m<sup>3</sup>; Runoff coefficient : 10%



Rain intensity and discharge measurement  
 Follow up of the infiltration in various plots of the catchment

#### Monitoring the implemented WSC techniques



The conservation of crop residues



The use of an herbicide before seeding

#### Monitoring the plot with mulch and minimum tillage

- Permanent installation of sets of TDR at 5, 15 and 30 cm depth to monitor the soil
- Repeated measurements of the crops during the vegetative cycle
- Measuring the yield in and outside the mulch field
- Observations on the soil behavior after rains



Gullies in phase of retreat upstream / extension



Plantation of atriplex to restore the land



Strips of atriplex in autumn 2009

#### Monitoring the effects of the atriplex plantation

- Follow-up of the surface and of the vegetation cover (the atriplex, the herbs, the soil surface) by comparison between the planted field and the other gullies
- Micro-topographic monitoring of two gullies, one in the planted field and the other outside.

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V nodge and limnigraph with data logger

#### Monitoring the various types of land use in the catchment : (follow up of the soil surface and its characteristics, Technology and approach assessment)



Crops Rotation ; cereals and fallow



Crops Rotation ; cereals and Leguminous



Vineyard, Eucalyptus plantation

<sup>7</sup>Be measurements (Results 2009)

Cultivation	Vineyard	Bean	barley
Mean erosion (kgm <sup>-2</sup> )	0.78	2.16	3.03

**Perspective : Modeling the catchment dynamics and the spatial contribution of the various plots to runoff and erosion to determine the effectiveness of the techniques introduced**