

Implementation and monitoring of soil and water conservation measures in the Guadalentin (Spain)

In close collaboration with stakeholders during a series of two workshops in 2008, a selection was made of the most appropriate and feasible soil and water conservation measures to be implemented and monitored in DESIRE. Here we present the first implementation and monitoring results.

Directly following the DESIRE WB3 stakeholder workshops in 2008, the design, implementation and monitoring of the soil and water conservation measures selected by the stakeholders present at the workshops was started. In total 5 measures were selected that were all implemented on the land of the DESIRE experimental farm 'Los Alhagüeces'. Three field sites were selected with either almonds or cereals production (see Figure 1). The conservation measures are monitored according to ecologic-, economic-, and social criteria. Here we present the main implementation and monitoring activities, including some preliminary results.

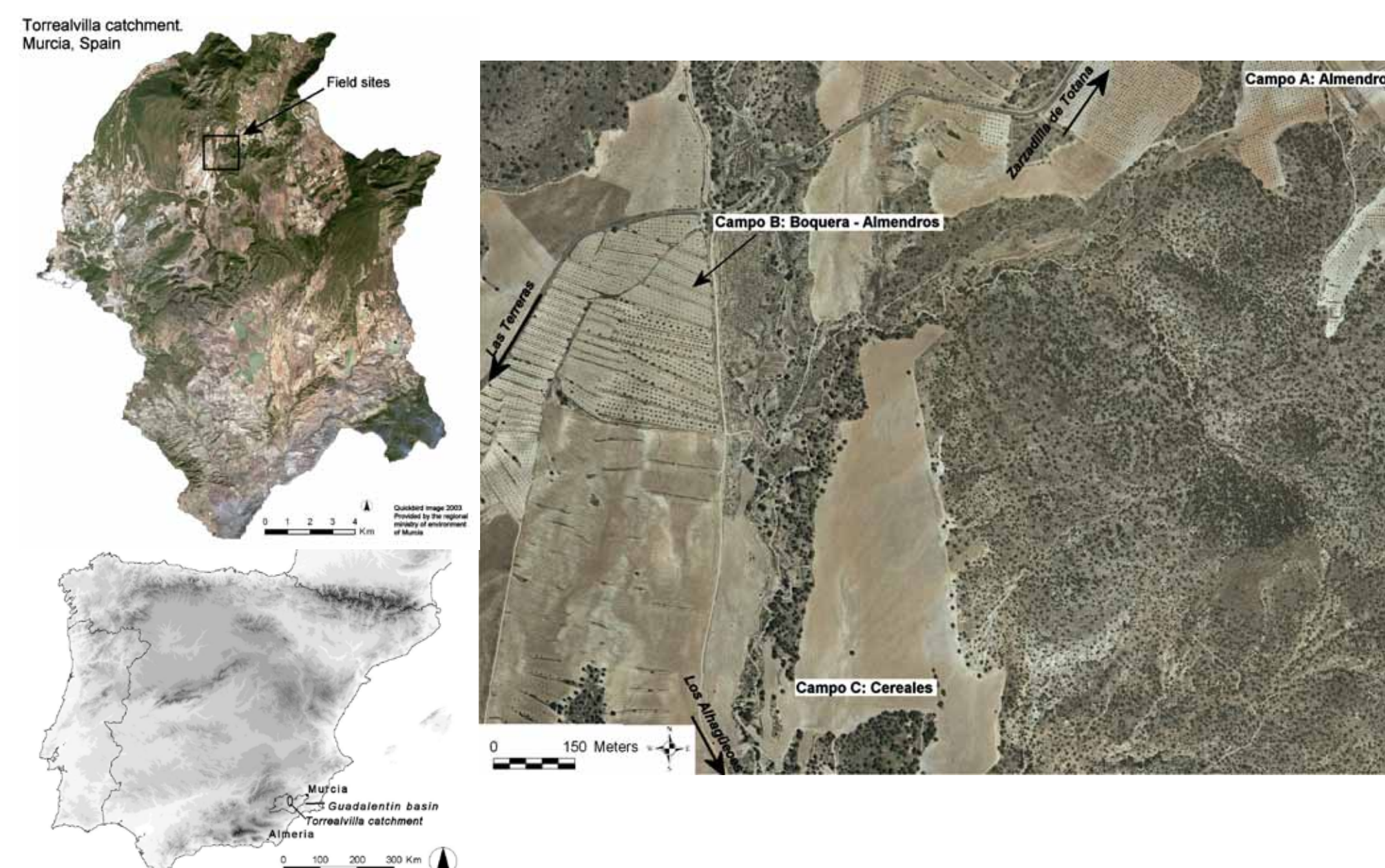


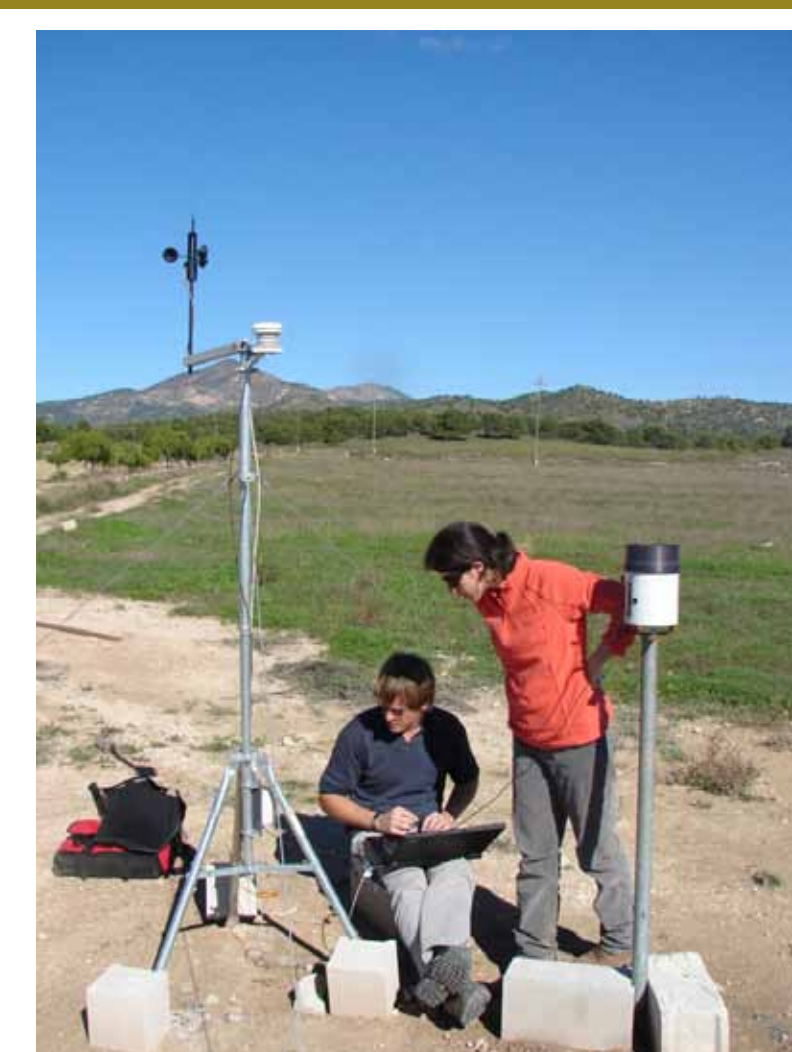
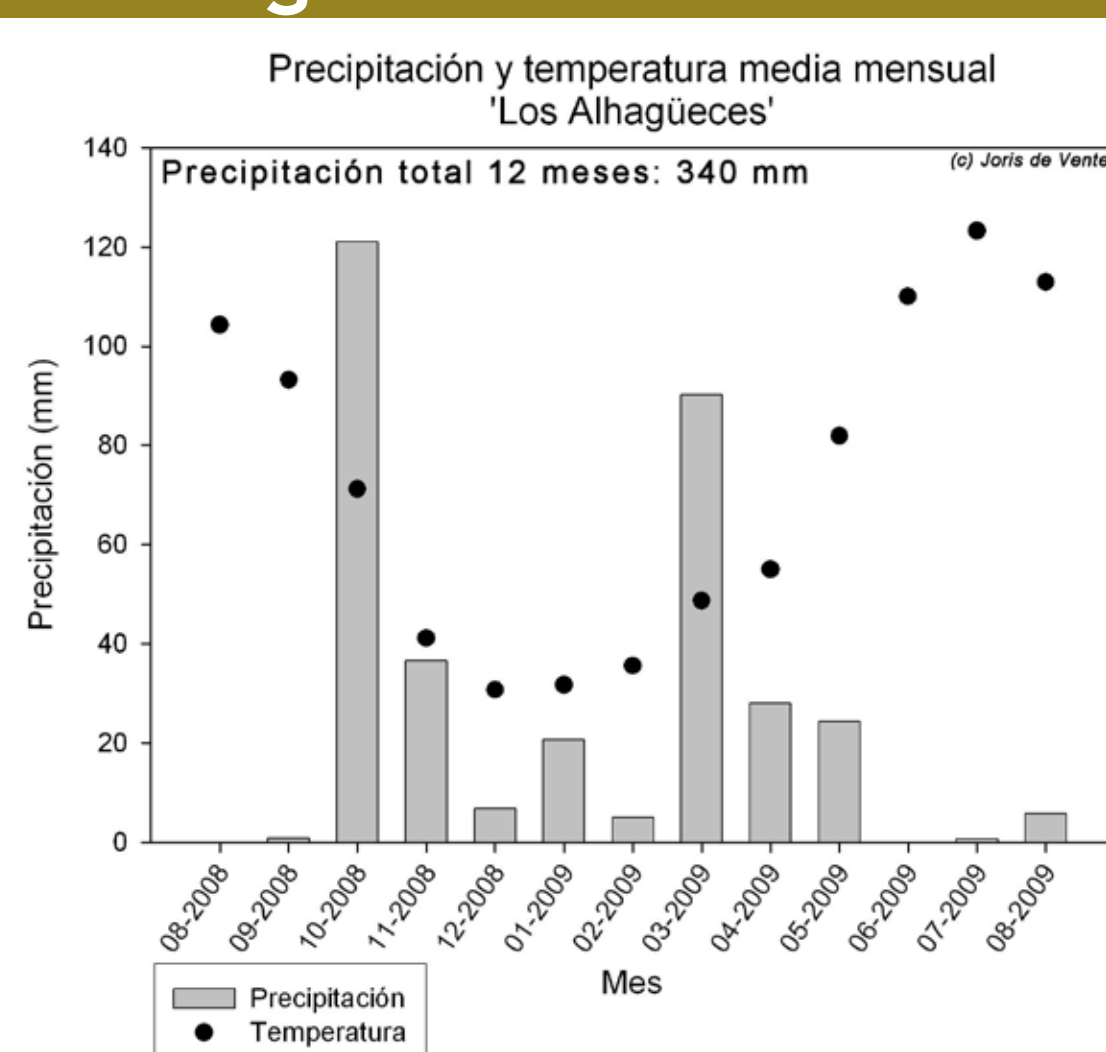
Figure 1: Location of the study sites within the Torrealvilla catchment.

Meteorological station 'Los Alhagüeces'

Since August 2008 a meteorological station was installed near the field sites to monitor rainfall, temperature, wind direction and speed at a 5 minute interval. Figure 2 presents the mean monthly temperature and rainfall for the period of measurement.

The total annual rainfall of 340 mm is equal to the long term average. A maximum 5 minute rainfall intensity (I_{max}) of 108 mm/h was registered in May 2009.

Figure 2: Overview of the mean monthly rainfall and temperature at the meteorological station 'Los Alhagüeces', 2008-2009.



DESIRE experimental farm 'Los Alhagüeces'

Field Site A



Installing Gertlach plots

Green manure (a mixture of cereals and Vicia sativa) was seeded under the almond trees in October 2008. After mowing, the residue was ploughed into the soil in spring.

Green manure

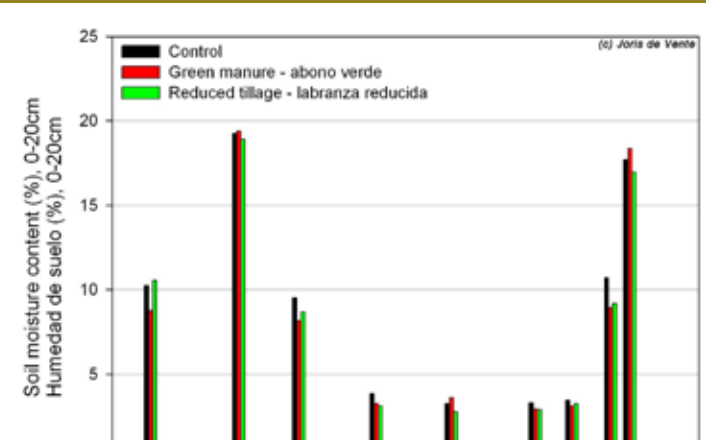


Runoff and erosion plots

The reduced tillage field is ploughed twice a year with a cultivator or disc-plough, as compared to the 3-5 times of conventional ploughing in the study area.

In each of the production schemes, 3 replica erosion and runoff plots were installed to measure soil- and water loss. Soil moisture content is monitored at two depths (0-20cm and 30-35cm).

Reading out moisture data



Collecting runoff, sediment and almonds

The highest harvest was found in the green manure field.

| Almond harvest | Kg/tree |
|-----------------|---------|
| Green manure | 12 |
| Reduced tillage | 8 |
| Control | 9 |



Field Site B



Straw mulch under almonds

Field site B consists of a series of almond terraces where the effectiveness of reduced water loss through an organic mulch is compared with the additional supply of water by water harvesting through a traditional Boquera-Acequia system.

Soil moisture content is monitored at two depths (0-20cm and 30-35cm) in a field with a mulch, a field with additional inflow from the boquera and a control field. The 2009 harvest showed a distinct higher production per tree in the Boquera field as compared to the other two.

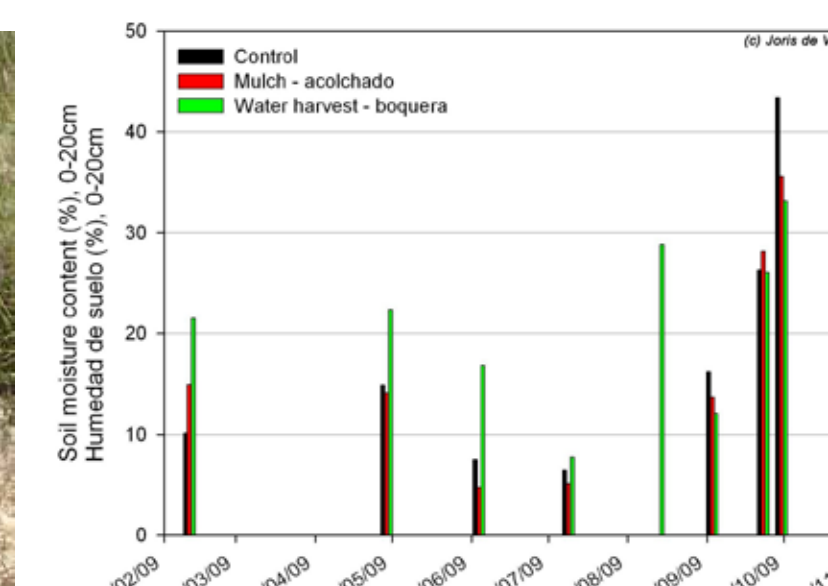
Installing soil moisture sensor



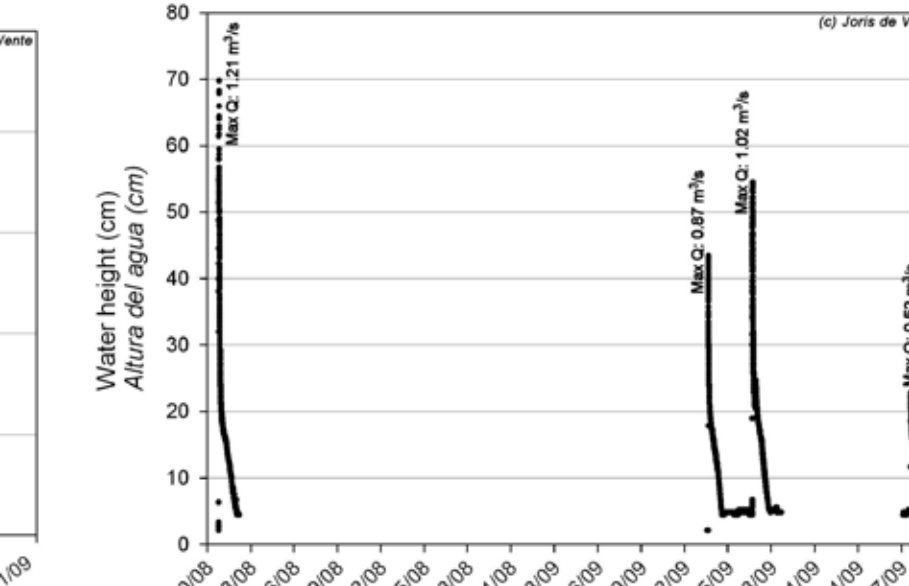
Boquera entrance with sensor

Water height at the inlet of the 'boquera' field is continuously registered in a section. Between August and September 2009 five events with water inflow were recorded.

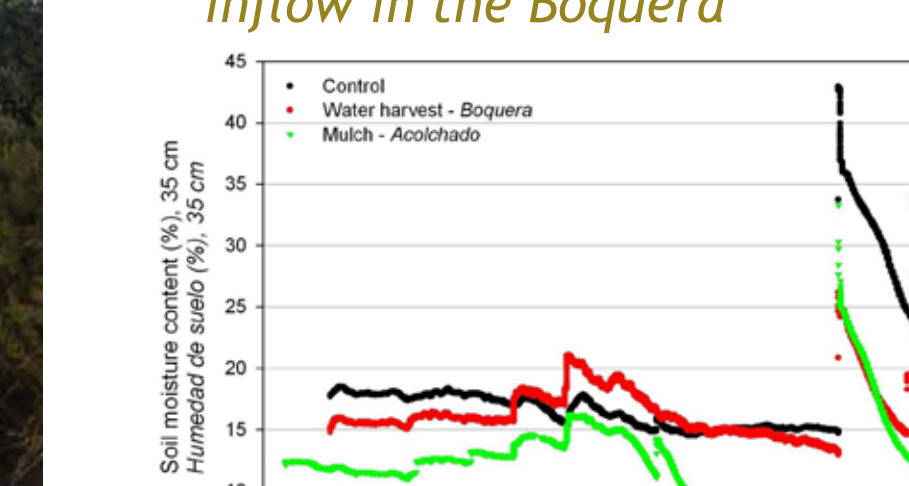
| Almond harvest | Kg/tree |
|----------------|---------|
| Boquera | 15 |
| Mulch | 7 |
| Control | 8 |



Water entering through the Boquera



Registered events of water inflow in the Boquera



Soil moisture content (%) at 0-20cm and 30-35cm

Dissemination activities to inform and involve stakeholders:

- Farmer logbook where all activities and related costs are registered by the farmer.
- Photo-logbook on the HIS with illustrations of the installations and monitoring in the field (<http://alturl.com/uppn>).
- Newsletter series (Noticias del Campo) with site-specific and global DESIRE project information.
- Organisation of a field demonstration day of the experiments for all interested stakeholders (30th October 2009).
- Site-visit with stakeholders and the regional ministry of agriculture to a farm that receives subsidies for installation of vegetated strips.

Field Site C



Construction of runoff storage tanks

Field site C is a cereal field where conventional mouldboard tillage is compared to reduced tillage with a disc-plough. Under both tillage regimes 3 replica erosion and runoff plots were installed to measure soil- and water loss. A fallow year follows harvest in both schemes. Last August the plots were seriously threatened by forest fire, but not affected.



(c) Joris de Vente



Runoff and erosion plots under cereal



Installing runoff and erosion plots under cereal