

Reduced tillage can bring down soil and water loss by 60% .



Traditional water harvesting systems (Boquera) can double the Almond harvest .

Next steps and more information

Although the DESIRE project will finish early 2012, the field trials at the experimental farm 'Los Alhagüeces' will continue as part of a new research project funded by the Spanish Ministry of Science and Innovation. Therefore, from our side we will do all possible to keep you informed and continue organizing meetings with those who are interested in order to continue improving and disseminating optimal SLM measures that help us maintaining or improving productivity and protecting our natural resources.



More information:

- ▶ More information about DESIRE: www.desire-project.eu
- ▶ More photos of the field implementation: <http://alturl.com/uppn>
- ▶ Stakeholder workshop reports: <http://alturl.com/oeoe>
<http://alturl.com/e5zd>
- ▶ Global database of SLM measures: www.wocat.org

Contact in Spain: Albert Solé: +34 950 281 045; albert@eeza.csic.es / Joris de Vente: +34 968 396371; Joris@eeza.csic.es
Consejo Superior de Investigaciones Científicas • EEZA-CSIC, Ctra. de Sacramento s/n, 04120, La Cañada de San Urbano, Almería, Spain. www.eeza.csic.es; www.desire-project.eu

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A global initiative to combat desertification



A global initiative to combat desertification

Newsletter Spain

DESIRE is a research project that establishes and evaluates promising alternative land use and management strategies in 18 study sites around the world in close collaboration between scientists and other stakeholder groups. DESIRE is a global project for local solutions.

DESIRE is now completing 5 years of testing methodology to choose and trial Sustainable Land Management (SLM) approaches and technologies. In this this newsletter we present the results of monitoring SLM measures in the field, that were selected by participants of stakeholder workshops in the Guadalentín study site (Spain). After two years of field trials in the experimental farm 'Los Alhagüeces', we now have detailed information to further evaluate the advantages and limitations of the selected SLM measures. This new information and insights are shared with all stakeholders in order to continue the evaluation and prioritize which SLM measures best fit the local conditions. Together with stakeholders we will decide which measures should be recommended for wider application in the Guadalentín and other regions with similar conditions, and how we can all help to achieve their wider application.

▶After a detailed evaluation in previous DESIRE workshops, participants selected the SLM measures they expected to be most feasible and effective under local conditions of the Guadalentín basin. Following these workshops, scientific field experiments were designed and implemented to test the impacts of these SLM measures according economic, ecological and sociocultural criteria. This Newsletter is a first attempt towards a wider dissemination of the monitoring results.



The last annual DESIRE meeting with scientists from over 28 countries will take place in Almería from 3 to 7 Octobre 2011

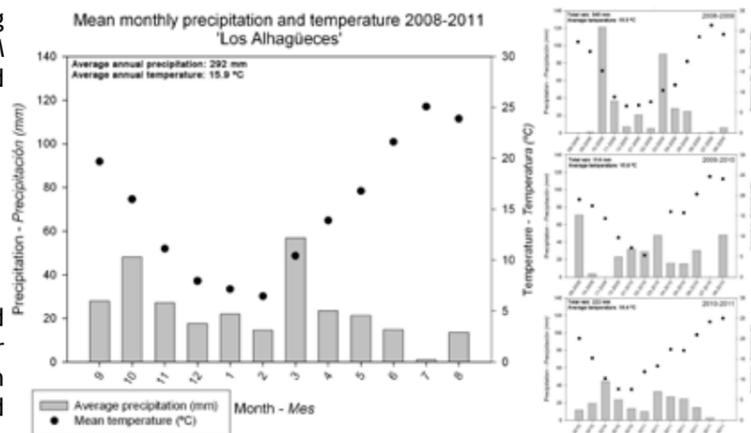


Implementation at experimental farm 'Los Alhagüeces'

Following the recommendations made during the DESIRE stakeholder workshops, five SLM measures were implemented and monitored at the experimental farm 'Los Alhagüeces':

1. Reduced tillage of cereal fields
2. Organic mulch under Almonds
3. Traditional water harvesting (Boquera) in an Almond orchard
4. Green manure in an Almond orchard
5. Reduced tillage of an Almond orchard.

There still remain data to be analysed and we intend to continue monitoring at longer term, but after two years of data collection we consider it a good moment to present and evaluate the first results.



Summary of climatological data collected at the 'los Alhagüeces' station

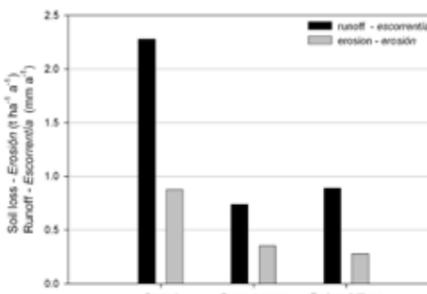
Reduce soil and water loss in Almond orchards

In an ecologically produced Almond orchard we implemented a treatment of **green manure** and a treatment with **reduced tillage**. We seeded the green manure (mixture of Barley and *Vicia Sativa*) in autumn, and incorporated this in the soil by ploughing in spring. In this field, and in the field with reduced tillage, we ploughed twice a year, whereas in

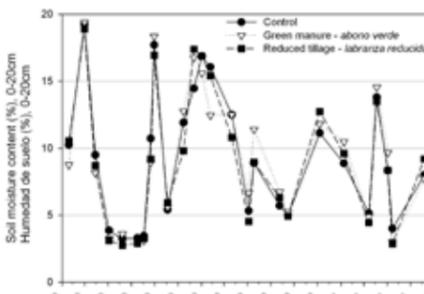
the control plot with conventional almond production, we ploughed 3-5 times a year. We compared soil moisture content, soil and water loss by erosion, harvest and all costs and benefits related to each treatment. The results are illustrated in the graphics of this section.



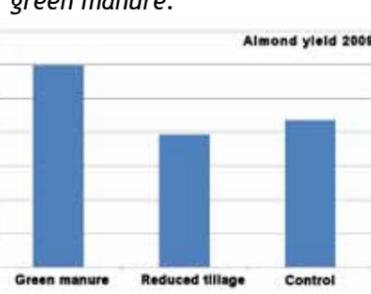
Recently ploughed field with green manure.



Soil and water loss.



Soil water content



Almond harvest

Soil and water loss by runoff and erosion in the field with green manure and in the field with reduced tillage were about **60% lower than soil and water loss under conventional tillage conditions.**

No consistent differences were observed in superficial soil moisture content (0-20cm) between the different treatments. Due to frost in spring of 2010 and hail in late summer 2011, we only obtained

data on the almond harvest for 2009. These data point towards an increased almond yield in the field with green manure compared to the other two treatments.

	€/ha/a	Green manure	Reduced tillage	Control
Income	Yield	€1927,-	€1268,-	€1404,-
Costs	Ploughing	€60,-	€60,-	€120,-
	Seeding	€70,-		
Gross benefit		€1797,-	€1208,-	€1284,-

Summary of costs and benefits without taking account of costs common to all treatments.

The summary of costs and benefits indicates that while **green manure results in more benefits**, with reduced tillage the benefit is similar to the benefit under conventional tillage.

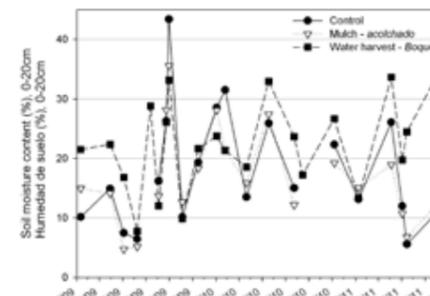
Increase available water in Almond orchards

We installed two different measures aiming to **increase the water available for Almonds** in a terraced field. In one terrace we monitored a traditional water harvesting system (Boquera) that was already in place, while in the other terrace we applied a **straw mulch below the trees** just before summer to **reduce water losses by evaporation**. In a third

terrace we installed a control plot without additional water from the Boquera and without mulch. In the Boquera field we ploughed 3-5 times a year and measured the volume of water collected by the Boquera. In the Mulch field we ploughed twice a year, and we compared soil moisture, almond yield, costs and benefits between the 3 treatments.

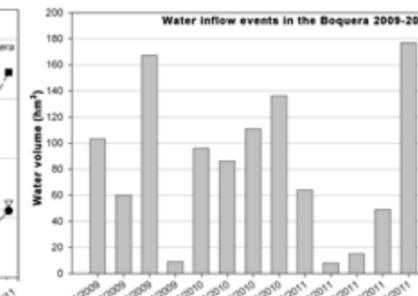


Water running through the Boquera system



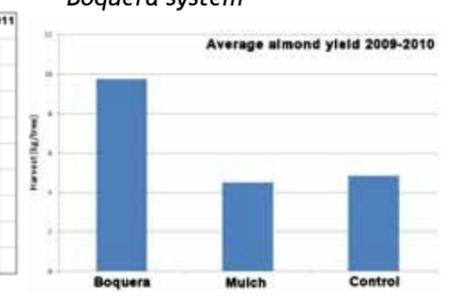
Soil moisture content

In the Boquera terrace an increase in superficial soil moisture content (22.3%) was observed as compared to the control terrace (18.0%). No consistent differences in soil moisture were found at greater depth and neither between the



Registered events in the Boquera

terrace with mulch and the control terrace. A total of 13 events with water entering through the Boquera were registered in 2 years. Annually, the Boquera provided over 550 mm of additional water to a field of 10 hectares. Due to



Almond yield

damage by hail in late summer 2011, we only obtained almond yield data for 2009 and 2010. These data indicate that the **harvest in the Boquera doubles the harvest under conventional conditions** and in the Mulch terrace.

The summary of costs and benefits indicates that the **Boquera increases the benefits enormously**, while mulching is not profitable compared to conventional procedures since it does not increase the yield.

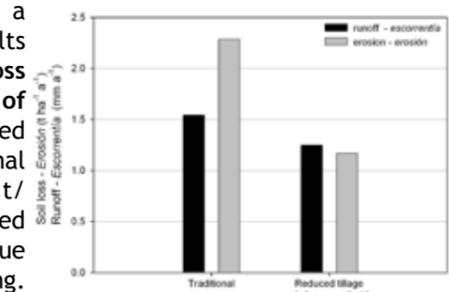
	€/ha/a	Boquera	Mulch	Control
Income	Yield	€2368,-	€1393,-	€1368,-
Costs	Ploughing	€120,-	€60,-	€120,-
	Initial-maintenance	€350,-	€520,-	
Gross benefit		€1898,-	€813,-	€1248,-

Summary of costs and benefits without taking account of costs common to all treatments.

Reduce soil and water loss in a Cereal field

We compared soil and water loss by runoff and erosion, cereal yield, and the costs and benefits in a cereal field with conventional tillage with a field with **reduced tillage**. In the field with conventional tillage we ploughed 5 times in 2 years, of which once with a mouldboard plough. In the field with reduced tillage we ploughed three times

in two years and never with a mouldboard plough. The results indicate a **reduction in soil loss of 56%** and a **reduction of 30% of runoff** in the field with reduced tillage compared to conventional tillage. With an average yield of 3 t/ha in both treatments, the reduced tillage results in a **higher profit** due to a reduction in costs for ploughing.



Soil and water loss.



Conventional tillage

	€/ha/a	Reduced tillage	Conventional tillage
Income	Yield	€315,-	€315,-
Costs	Ploughing	€45,-	€75,-
Gross benefit		€270,-	€240,-

Summary of costs and benefits without taking account of costs common to all treatments.