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FOCUS ON MINIMUM TILLAGE, CROP ROTATION AND RESIDUE MANAGEMENT (CONSERVATION AGRICULTURE)

Name	Juan Ramón Alonso García		
	and Carlos Garrachon		
Region	Valladolid and Palencia,		
	Castilla-León, Spain		
Farm type	Arable (cereal, legumes, sunflowers)		
Farm size	150-200 ha each		



#### Tell us about your farm?

*Juan Ramón*: I have been farming around 14 years. I farm about 200ha of land, which I manage and undertake all the work on.

*Carlos*: : I have been farming for 25 years. I also farm around 200ha of land, but hire in contractors to undertake the operations.

# Why did you decide to implement the practice(s)?

Juan Ramón: We both implemented conservation agriculture about 14 years ago. We both belong to the Association of Conservation Agriculture of Valladolid (AVAC), so part of it was personal conviction. However, we both want to be cuttingedge farmers and reduce our costs.

*Carlos*: We have the Mediterranean weather influences here with irregular precipitation which makes water a limiting factor.

### How have you incorporated the practices into your rotations?

*Carlos*: We usually rotate crops including about 50% cereal – 25% legume – 25% oleaginous. For example, 100ha with 50ha of wheat or barley and 50ha of vetch and sunflower or alfalfa. We mainly apply minimum tillage. However we need to use the decompactor every 5 to 8 years, especially when we are going to cultivate sunflower as the clay soils can become tight making root system development more difficult.

#### How did you make the change?

Juan Ramón: To start with I adopted the practices in only a few fields, as I wanted to test their effectiveness. After about two years I adopted the practices across the whole farm.

*Carlos*: I started implementing the practices on most, if not all, of the farm from the beginning. I felt quite confident as I went to farmer training Andalusia promoted by the Spanish Association of Conservation Agriculture.



### What has been the biggest challenge? And how have you overcome it?

*Carlos*: At the beginning the main barrier was concern about the effectiveness of this management and the change of mentality needed. It is something unknown for you and you have to take responsibility. However after the first production year your confidence is multiplied several times. The new machinery is also a barrier. You have to learn how to use and calibrate the new machinery for direct seeding. The machinery is expensive and is not adapted to local conditions (e.g. different soil types) and I had to make some modifications to it.

## How has the soil benefited from this change?

*Carlos*: These practices increase soil organic matter and enhance soil structure with more workability, less erosion, decrease of run-off and leaching and more worms which naturally till the soil. These practices also reduce the pH of our alkaline soils releasing phosphate and potash.

#### Estimated impact on soil carbon (tC/ha/yr)

Crop Rotation	0,23
No tillage	0,28
Residue management	0,62
Total	1,13

# How have the yields been affected by this change?

Juan Ramón: The yield is usually equal to surrounding farms in conventional management but higher than them during water scarcity periods. This is due to the residues which improve soil water retention and reduce the evapotranspiration.

#### For further information about these practices see the SmartSOIL toolbox: http://smartsoil.eu/smartsoil-toolbox/about/

**Photos** | P.1, top: © Gunnar Assmy/Fotolia.com; P. 1, below: © Ana Iglesias; P.2: © Berta Sanchez

### Farm specific economic analysis for the combined measures ( $(\not\in/ha)$

#### Cost savings: €47,8/ha

Costs (€/ha)	With measure	Without measure	Result
Seed	45	45	0
Fertiliser	150	200	-50
Crop protection	50	50	0
Fuel	30,5	45,7	-15,2
Investment	17,4	0	+17,4
Total	292,9	340,7	-47,8

#### Change in Gross margin: €90,5/ha

(€/ha)	With measure	Without measure
Outputs	426,9	384,2
Costs	292,9	340,7
Gross margin	134	43,5

# How has the farm business benefited from this change?

Juan Ramón: The impact of the practices is most noticeable in the net margin (increases about 30%) and in the short term (about 3 years), especially fuel and fertiliser cost reductions. From the fifth year, production is clearly increased and the costs are reduced. The cost of machinery is also reduced since the machines work fewer hours than in conventional tillage, the life span of the equipment is longer, there are fewer breakdowns and reduced needs for tractor oil. We also had worse years in the past due to fungal diseases and weeds but they were overcome.

### Where did you get advice and support to make the change?

*Carlos*: We got support and information from the AVAC, from literature in other regions, websites and other farmers and friends, who had specific information and proven positive results.

