



Profitability, work rate and fuel use in crops rotations in Conservation Agriculture vs Conventional Tillage in Mediterranean climate

F.M. Sánchez-Ruiz¹ (fsanchez@agriculturadeconservacion.org) , M.R. Gómez-Ariza¹, R.J. Gómez-Ariza¹ , A.M Conde-López¹, O. Veroz-González¹, J. Román-Vázquez² , E.J. González-Sánchez^{1,2,3}

1. Asociación Española Agricultura de Conservación. Suelos Vivos (AEACSV) / IFAPA Centro Alameda del Obispo, Avda. Menéndez Pidal s/n. Córdoba
2. European Conservation Agriculture Federation (ECAF)
3. Escuela Técnica Superior de Ingenieros Agrónomos y Montes (ETSIAM), Universidad de Córdoba / Campus Universitario de Rabanales, Córdoba

Introduction

One of the most important aspect to be considered to spread Conservation Agriculture in arid or semiarid regions is the profitability of the agricultural systems. Agriculture based on tillage is decreasing farms profitability, putting at risk the continuity of agriculture in the Mediterranean area. Identifying the potential benefits of introducing sustainable agricultural practices like Conservation Agriculture, can contribute to enhance the rural development. In this sense, this study, carried out by the Spanish Conservation Agriculture Association (AEACSV) and the European Conservation Agriculture Federation (ECAF) in collaboration with Syngenta under the framework of the Good Growth Plan, tries to show a solid vision of the opportunities that crop rotations in Conservation Agriculture offers versus Conventional Tillage in a Mediterranean climate.

Methodology


To evaluate and compare the economical benefit of adopting Conservation Agriculture, this study has defined three types of agricultural systems in two fields located in the south of Spain.

The profitability of each system has been calculated based on: Economics benefits, Hourly Ratios and Fuel Consumption.

Table. Types of agricultural System used


Sustainability ranking	System	Details
	Sustainable system 2 (S2)	No tillage, straw retained, adjusted adjusted Crop Protection , N and seed.
	Sustainable system 1 (S1)	Tillage - straw removed, adjusted adjusted Crop Protection , N and seed.
	Conventional system (CS)	Tillage - straw removed, standard adjusted Crop Protection , N and seed

Farm 1



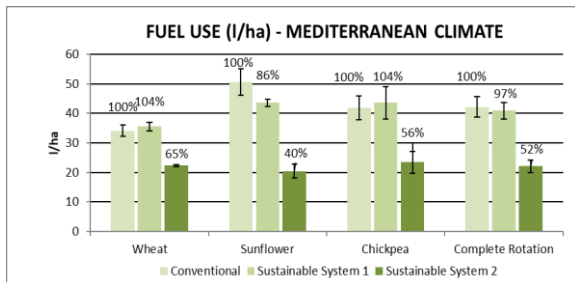
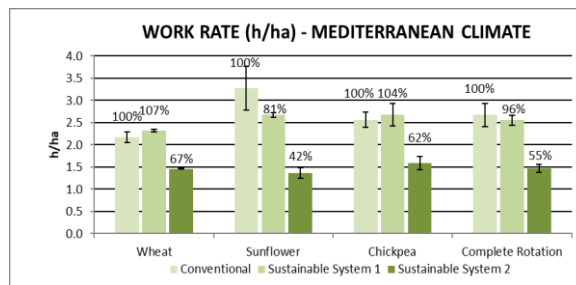
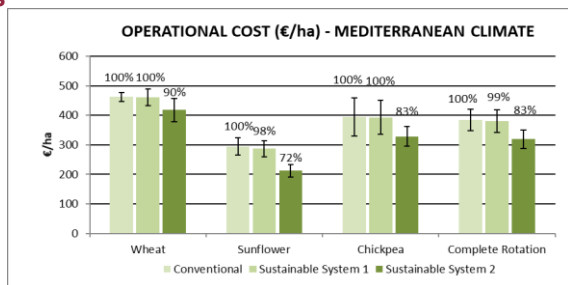
Crop Rotation: Chickpea – Durum Wheat – Sunflower.
All plots cultivated every year: 9 plots.
Plot size: 5 ha / plot (45 ha per pilot farm).
Every year the full rotation is grown in the field.

Farm 2



Crop Rotation: Chickpea – Durum Wheat – Sunflower.
All plots cultivated every year: 9 plots.
Plot size: 5 ha / plot (45 ha per pilot farm).
Every year the full rotation is grown in the field.

Results



- System based on Conservation Agriculture (S2) shows an operational cost saving of 17% versus systems based on tillage (CA & S1).
- Fuel consumption is 48% higher in Conventional Tillage (CS) than Conservation Agriculture(S2)
- Sustainable systems based (S1) on tillage has no significant differences than conventional system in terms of fuel use.
- Work rate (h/ha) is considerably lower in S2 reducing work time by 45% compared to CS in full rotation.

Conclusions

- This study highlights the benefits of adopting Conservation Agriculture in Mediterranean areas in terms of profitability. Establishing typically Mediterranean crop rotation under Conservation Agriculture reduces the use of energy and operational costs and requires less work time for farmers. This improvement in the Mediterranean farmers economy should help to keep the rural population in these areas.