

Precision agriculture to improve the production and quality of winter cereals and their environmental sustainability.

Summary

Technical advice increasingly requires tools that can integrate and take into account variability between and within agricultural plots and facilitate decision-making by specialist advisers. Increasingly highly developed precision farming techniques can provide a tool to assist with this advice, but they need to be developed and adapted to Catalonia's scientific, technical and social environment; and transferred and presented to specialists and farmers in order to increase their use. The application of the new Decree 153/2019, which establishes the need to reduce the P and K content of soil when it exceeds stipulated levels creates a need to study plots where livestock manure has historically been applied, in order to characterise them using precision agriculture, and provide a response for those working in the sector in the form of a strategy and a guide to advise them.

Objectives

The main goal of the project is to create a **new management methodology** for croplands using precision agriculture equipment, and to produce guidelines for the agricultural sector. The management methodology has three aims:

- Reduced environmental impact.
- Improved yields from croplands.
- Improved resource efficiency.

Description of the measures planned in the project

The project includes five general initiatives:

- Characterise the fertility and the productive potential of plots of interest to improve their management.
- Establish fertilisation strategies to obtain winter cereals with superior production and quality.
- Reduce phosphorus (P) and potassium (K) levels in plots with a high nutrient content.
- Define the use of NIR+GPS technologies in the management of livestock manure using precision agriculture.
- Technical advice on winter cereal production.

Expected results and practical recommendations

- Obtain knowledge of the different characteristics of each plot, using electrical conductivity sensors in the soil and output monitors equipped with GPS positioning and satellite images in order to obtain maps of vegetation and harvests.
- Improve plot management by means of thorough knowledge of precision agriculture tools.
- Carry out various field tests with plots in the group the leader belongs to, and with farmers who supply it with the raw material in order to advise them.
- Determine the strategies that can have the greatest positive impact on reducing levels of P and K nutrients in the soil, in line with the new Decree 153/2019.

- Obtain a Guide for reducing P and K content in agricultural soils of extensive croplands that is useful for various groups (government, farmers, etc.).
- Carry out a strategy for the application of livestock manure, using GPS+NIR as efficiently as possible. The technology applied will enable the nutrients required in each part of the plot to be precisely defined.

Leader of the Operational Group

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Other members of the Operational Group (not recipients of the grant)

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Subject area(s) of application

- Agricultural production system
- Agricultural practice
- Agricultural equipment and machinery
- Livestock farming and animal welfare
- Vegetable production and horticulture
- Landscape / Territorial management
- Pest and disease control
- Fertilisation and nutrient management
- Soil management
- Genetic resources
- Forestry
- Water management
- Climate and Climate Change
- Energy management
- Waste and by-product management
- Biodiversity and environmental management
- Food quality/processing and nutrition
- Supply chain, marketing and consumption
- Competitiveness and agricultural and forestry diversification

Geographical area(s) of application

PROVINCE(S)	REGION(S)
Barcelona	Osona / Bages
Girona	Gironès / Empordà

Dissemination of the project (publications, conferences, multimedia...)

The presentation of the new ideas and results of the project is scheduled to take place over two days. There will be one day of field work aimed at the production sector, and another for the presentation of the results. The guide obtained by all members participating in the project (for reducing P and K content in extensive croplands) will be distributed.

Finally, the two subcontracted research centres (BETA-UVicUCC and IRTA) will take an active part in disseminating the results through the centre and the scientific and technological platforms which it is involved in. The results of this project will be published in specialist journals.

Project website

The project's profile will be raised through the website of the ESPORC company and the participating centres (BETA-UVicUCC and IRTA), with a brief description of the project and the objectives and results obtained. The financial aid received from the European Union will also be emphasised.

More information on the project

PROJECT DATES	TOTAL BUDGET
Start date (month-year): July 2020	Total budget: €174,394.00
Completion date (month-year): September 2022	DARP funding: €69,583.21
Current status: Underway	EU funding: €52,492.59
	Own funding: €52,318.20

With funding from:

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Order ARP/133/2017 of 21 June, approving the regulatory bases for grants for cooperation for innovation by promoting the creation of European Association for Innovation operational groups in the areas of agricultural productivity and sustainability and the execution of innovative pilot projects by those groups, and Resolution ARP/1531/2019, of 28 May, announcing the call for the grant.

