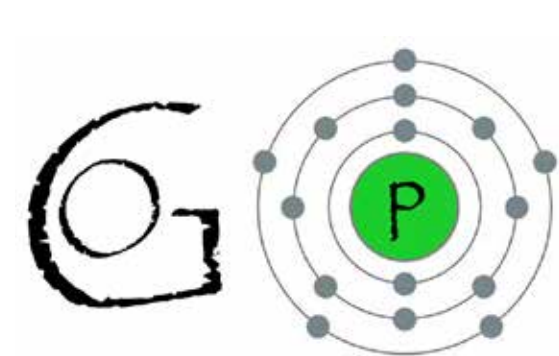




Plant nutrition



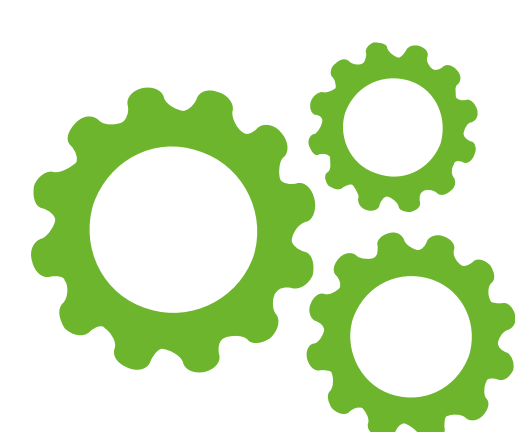
AGRI
Innovation summit 2019



Operational Group

Increasing the viability of sown biodiverse pastures through optimization of phosphate fertilization

Viabilização de pastagens semeadas biodiversas através da otimização da fertilização fosfatada



Practical problem

Frequently, Portuguese farmers invest in sown biodiverse pastures. However their economic viability is threatened by phosphate fertilisers costs.



Partners

Terraprima; Univ. de Évora; ACBRA; Hd. dos Grous; FEA; Hd. dos Padres; ZEA; Tap. Dos Números; Inst. Sup. de Agronomia; Hd. do Azinhal



Calendar

Start: 01/01/2017
End: 01/01/2021



Budget

Total amount:
€503,033.46

Objectives of the project

The project objectives are:

1. Implement tech-based low-cost methods for evaluating real phosphorus needs by using remotely sensed data;
2. Optimise the use of phosphate fertilisers in sown biodiverse pastures using Variable Rate Technology for fertiliser distribution;
3. Demonstrate positive impacts on yield and environmental benefits;
4. Disseminate results to farmers and consultants and provide fine-tuned recommendations for efficient phosphate fertilisation;

Main activities

In 8 farms we performed the following activities:

1. Obtaining the altimetry of 25 ha plots, producing 3D model using drones and RTK GPS;
2. Performing spectral measurements ("OptRx", "Grassmaster II" and ASD FieldSpec3);
3. Measuring soil electrical conductivity ("Veris 2000 XA");
4. Soil and vegetation systematic sampling;
5. Producing vegetation indices maps, using satellite and drone images;
6. Obtaining a correlation model between: field-drone-satellite;
7. Obtaining soil capacity maps for phosphorus;
8. Obtaining prescription maps for phosphorus;
9. Assess conventional fertilisation vs. differential fertilisation using Variable Rate Technology;
10. Pasture assessment and spectral measurements.

Expected results

The project aims to develop a technological method for obtaining high-resolution phosphate fertilisation prescription maps. These prescriptions will be obtained using low-cost inputs, for example satellite imagery. With the obtained phosphate prescriptions, we will use Variable Rate Technology in order to apply the phosphate fertilisers at the desired rate. This method should optimise pasture productivity and reduce production costs. At the end of the project, the obtained results will be incorporated in a service to farmers, to improve the economic viability of sown biodiverse pastures.

Results so far/first lessons

A network of 8 farms and 3 research entities has been established. Incorporating 8 farms enables comparison between different setups (in terms of practices, pasture and soil characteristics and weather variability). About 50 exclusion cages were installed, preventing animals from grazing. Biomass sampling is done 4 times per year, in order to calculate primary productivity, pasture intake and estimate pasture quality (fibre, protein). More than 90 drone flights have collected images in RGB and NIR, and relevant satellite data (Sentinel 2) have been retrieved. We applied artificial neural networks in order to estimate pasture yield, soil carbon and fertilisation needs, with promising results.

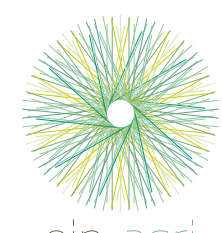
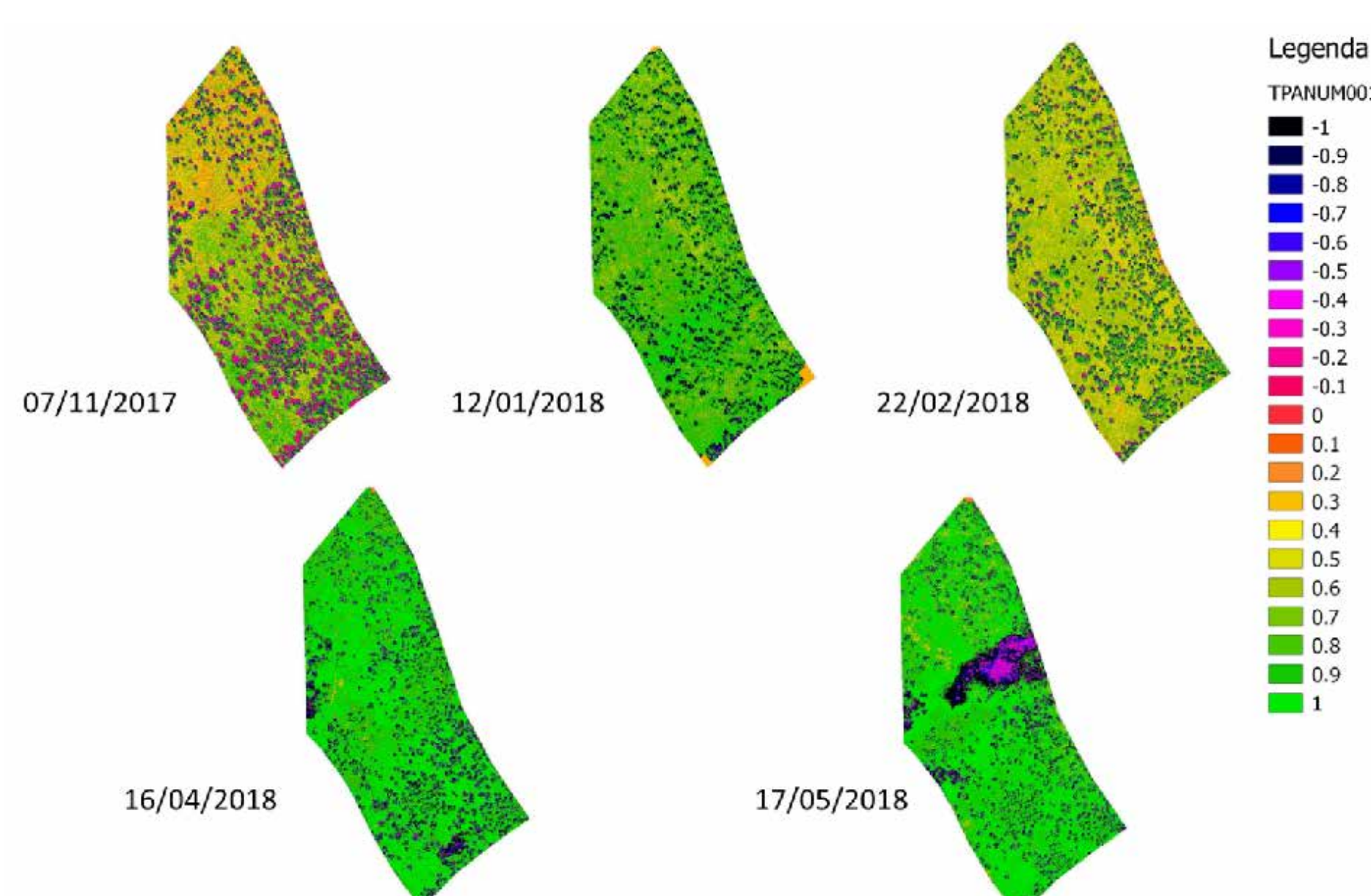
Who will benefit

Farmers will benefit from optimising pasture fertilisation, improving its productivity and decreasing production costs.

Supported by:



Contact: Nuno Ribeiro Rodrigues
Mail: nuno.rodrigues@terraprima.pt



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