



## EDITORIAL

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The Risk-AquaSoil project ends with some frustration but also with many hopes and solutions. Frustration because of COVID19 which prevented us from meeting at a final conference but which allowed more than 300 people to participate online and follow our presentations on Thursday, November 19, 2020. Thank you to the Chamber of Agriculture and to Grupo Dex for this successful communication with two live TV channels.

Working on the consequences of climate change in rural areas and proposing local and sustainable solutions was our ambition whilst also integrating sociological and economic considerations into the project. This is a success thanks to the work of university partners from Galway in Ireland and Coimbra in Portugal. They examined farmers' views on climate change adaptation and they showed us that the media must base their arguments on what is happening locally so that everyone feels concerned by the challenge and understands the urgency of our actions. We must adapt to the changes that are accelerating: more heatwaves, more droughts and therefore more fires, but also more floods and therefore more soil erosion and, the most dangerous, the faster than predicted rise of ocean waters as a result of accelerating glacier melting.

To reduce the risk of erosion, which is now regularly mapped, practical solutions exist but it has been shown that only correct selling prices for their productions allow farmers to apply them. A new solution to inject biochar into soils has been developed during Risk-AquaSoil and should develop in the near future at least in the South-West of France where pyrolyzed green waste will be applied in plots most at risk. This will also help to sequester part of the atmospheric CO<sub>2</sub> and increase the soil water reserve.

As planned, low-cost measurement means have been developed by WRT (England) and ACMG (France) to alert local communities in real time to the risks of flooding and pollution in small catchments that are generally not well equipped to deal with these problems. The objective of monitoring the flow has been achieved, that of quality is still

being investigated in applied research.

To help farmers adapt their production to climate change, the Dordogne Chamber of Agriculture has developed support software to optimize the technical and economic solutions of the transition that is available. They also played on the Brexit situation to communicate through "BreakSLIP" on the potential of soils to degrade beautiful cotton underpants, combining humor and science to make us think about the agronomic potential of our soils.

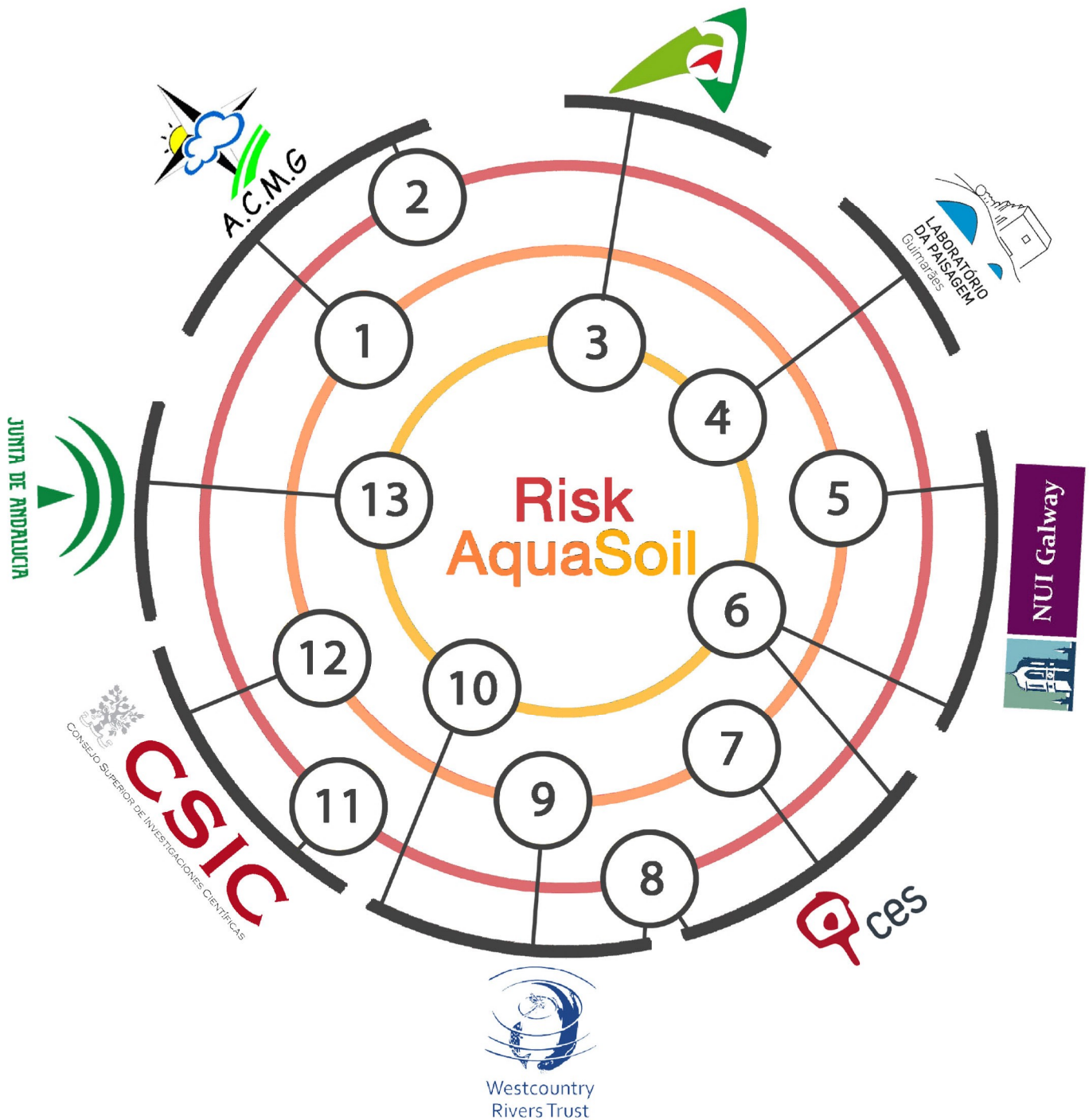
In Andalusia, which reflects what the whole of southern Europe will experience climatically speaking over the coming decades, it has been shown that ancient pines are at immediate risk of losing their ecological niche. We also understood that the development works of the Arab period, which allowed thousands of people to live and landscapes to be built by making the best use of the meltwater of the glaciers of the Sierra Nevada, would be impossible to build today because "outside the law". This moved us very much and we believe that the future European Water Framework Directive will have to take our comments into consideration.

Finally, after almost two years of administrative delays, our colleagues from the landscape laboratory in Guimarães (Portugal) have been able to set up communication tools for schoolchildren and the general public and to disseminate our results through the website [www.riskaquasoil.eu](http://www.riskaquasoil.eu). This site will continue to publish our work and results and we are all at your disposal to discuss and help you build your solutions. These should be to be implemented immediately and urgently to address risks that communities face.

To conclude and after having congratulated all Risk-AquaSoil partners, I would like to thank the administrative team of Interreg Atlantic which, despite many difficulties, has always responded kindly and constructively to our requests. Thank you to Europe for being able to share cultures, climates, soils and experiences to build an intelligent and sustainable tomorrow!

**Dr. Jean François Berthoumieu**  
(ACMG, Project Leader)

## WHERE DID WE CAME



1: Agrometeorology; 2: Climatology; 3: Rural Development; 4: Education for Sustainability; 5: Economic Analysis; 6: Public Policies; 7: Communication Studies; 8: Water Monitoring; 9: Water Management; 10: Water Restoration & Protection; 11: Remote Sensing; 12: Soil Management; 13: Environmental Management.



## SOILS IN PARTNERSHIP

Health soils are vital to society as they are not only allow food to be grown with optimal water and nutrient inputs but also they are home to a vast array of biological organisms as well as sequestering carbon, slowing and purifying water. However, in the South West of England over a third of our soils are severely degraded and leading to a suite of problems from flooding within our towns and cities, polluting our drinking and bathing water as well as smothering river habitats, releasing carbon dioxide and so contributing to climate change and drying out rapidly leading to summer droughts. Prevention of this degradation is preferable and in several locations we have worked in partnership with advisors, regulators and businesses to improve soil health but this is not always possible due to complex ownership so curative options are also employed such as holding water back in certain locations. The work through the RiskAquaSoil project has shown that both prevention and cure approaches are vital to deliver the ecosystem services society wants to see but even more so is the need to do this in partnership so we can all play to our collective strengths.

Author: Laurence Couldrick

## EXPLORING FARMER PREFERENCES FOR INSURANCE AGAINST EXTREME WEATHER EVENTS: RESULTS FROM A DISCRETE CHOICE EXPERIMENT STUDY

Agriculture represents one of the most vulnerable sectors to extreme weather events that are projected to increase with climate change. Insurance has been advocated as a more efficient means to ensure financial security to farmers, than post-disaster aid. A potential drawback of insurance however, is that unless carefully designed it could dis-incentivise farmers to engage in wider farm adaptation measures or lead to more risk-taking behaviour. This paper analyses the attractiveness of a publicly-backed climate risk insurance offerings to farmers and explores their preferences for elements of insurance schemes that does not disincentivise wider farm adaptation.

Specifically, a discrete choice experiment is used to reveal Irish farmers' preferences for multi-annual insurance contracts and weather-indexed versus traditional indemnity insurance and cost. Results indicate that a large majority of farmers are willing to buy publicly-backed insurance for protection from extreme weather events. With respect to the design of insurance schemes, farmers prefer multi-annual coverage versus annual renewal. They also prefer indexed-insurance and have a strong preference for cheaper coverage. Given the important role that insurance could play in protecting farms financially from damage caused by extreme weather events new evidence on farmer preferences and intended behaviours is therefore critical to inform policy in this area.

Authors: Edel Doherty, Sinead Mellett, Daniel Norton, Thomas K.J. McDermott, Denis O' Hora, Mary Ryan

## RISK AQUASOIL: TOWARDS TO A RESILIENT TO THE RISK OF CLIMATE CHANGE TERRITORY

The Dordogne Chamber of Agriculture has been involved for more than 10 years in European projects on the theme of climate change, and has been able to use its experience from successful projects such as Adaptaclima to carry out two main actions within the framework of Riskaquasoil:

- 1) Riskaquasoil model: Sketching pedagogical and viable models of agricultural transitions in situations of uncertainty.

2)

### Methodology

- Simulation of an annual water balance, which is translated into water allocation by agronomic period. This water availability is translated into yield (or yield variation).
- Consideration of large-scale climatic accidents if they occur at significant frequencies and intensities.

Design of future production systems and transition trajectories in order to quantify the transition risks and the most interesting trajectories.

- 2) The #BreakSLIP: a brazen communication operation.

The Chamber of Agriculture has implemented in April 2019 the operation #BreakSLIP.

This communication operation enabled the implementation of an experimental and scientific protocol on different soil types in vineyard, tree and field crop plots in order to raise awareness among farmers, communities and the general public on the role of soil in a context of climate change. To carry out the #Breakslip operation, OLLY brand panties were buried for 2 months. The result is proving to be a real tool for determining technical itineraries.

A clear message could thus be massively deployed: A living soil will better resist to climate change, so it is up to each one to adapt these methods and practices to have a strong ally in case of hazards.

Author: Nicolas Fedou





## FRAMING PUBLIC POLICIES TO ENHANCE COMMUNITIES' RESILIENCE TO CLIMATE CHANGE

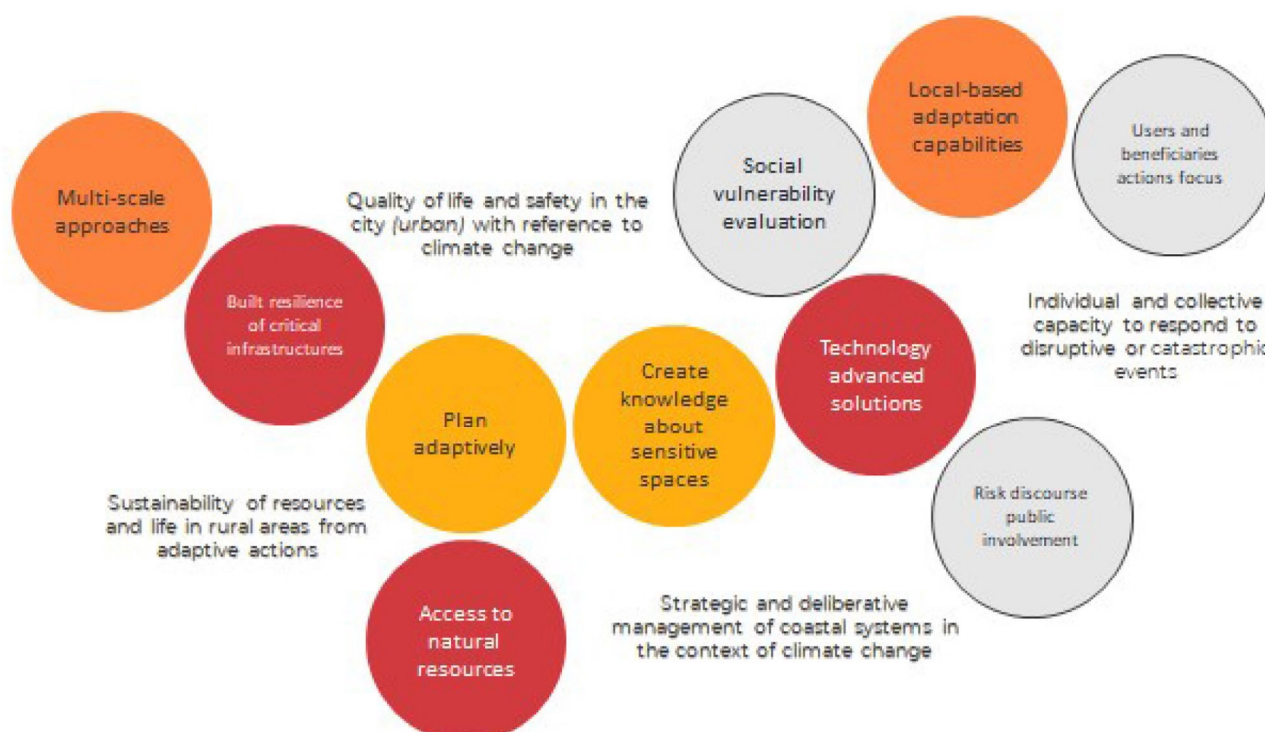
The EU Adaptation Strategy on Climate Change, EU/COM 2013, highlights the need for adaptation measures, through anticipated, planned and coordinated actions, by enhancing supply chain interruptions or access to goods and resources, energy and food and the construction of coherent and coordinated strategies. In addition the World Economic Forum 2018 Report states that there is no margin of complacency for the challenges of adaptation and structural actions associated with climate change and the continued degradation of global environmental resources. In complementary way the 2017 EU-EC/DRMKC policies framework advocates for effective interaction policies between decision - makers, researchers and operational actors, focusing on the needs of users and beneficiaries, which can strengthen the acceptance and feasibility of public policy.

Recent advances on public policies in the context of climate change emphasize the focus on three main goals:

- A - Quality of life and safety in urban areas, in accessing resources with quality and quantity, such as air, water and food, or in exposure to harmful biotic agents or extreme weather events;
- B - Strategic and deliberative management of coastal systems and land or sea use, associated with the sea level rise, the extreme weather and marine events, or the degradation of environmental and biotic resources;
- C - Sustainability of resources and life in rural areas through adaptive actions, maintaining soil quality, access to water, sustainable food production, and biodiversity and provide ecosystem services.

A large number of critical statements point some critical factors and condition that should be mastermind for the enhancing of public policies related with adaptation to climate change and the associated dynamics and impacts, namely:

Author: Alexandre O. Tavares



## OUTPUTS

### Videos



### Conferences



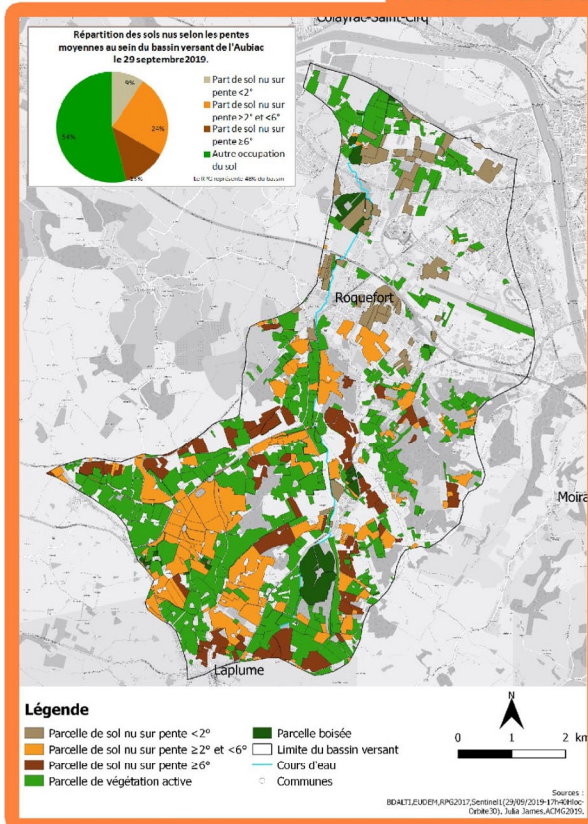
### Diagnosis



### Scientific Articles



### Pilot actions



Check all of the project's outputs on the Risk AquaSoil website at  
<https://www.riskaquasoil.eu/>



## SOIL MANAGEMENT STRATEGIES TO MITIGATE SOIL EROSION RISKS IN ATLANTIC VINEYARDS

Water erosion is a severe threat to soil resources, especially on cultivated lands, such as vineyards, which are extremely susceptible to soil losses. In this context, management practices aiming at reducing erosion risks must be favored. The study presented aimed at estimating soil losses in two vineyards under Atlantic climatic conditions (Galicia, NW Spain). The capacity of two management practices for reducing soil erosion was tested and compared with tilled soil in the inter-rows: (i) application of mulching, and (ii) maintaining native vegetation. Soil losses were assessed using erosion pins and micro-plots. Soil loss rates in one of the vineyards were lower when soil was managed under mulching ( $0.36 \text{ Mg ha}^{-1}$ ) and native vegetation ( $0.42 \text{ Mg ha}^{-1}$ ) compared to tilled soil ( $0.84 \text{ Mg ha}^{-1}$ ). In both vineyards, soil loss rates were lower than those registered in Mediterranean vineyards and were below the limit for sustainable erosion in Europe. Nevertheless, soil management practices alternative to tillage in the inter-row might reduce soil erosion risks under Atlantic climate conditions.

Author: Diego Intrigliolo



*Soil mulching applied in the demonstrative vineyard*



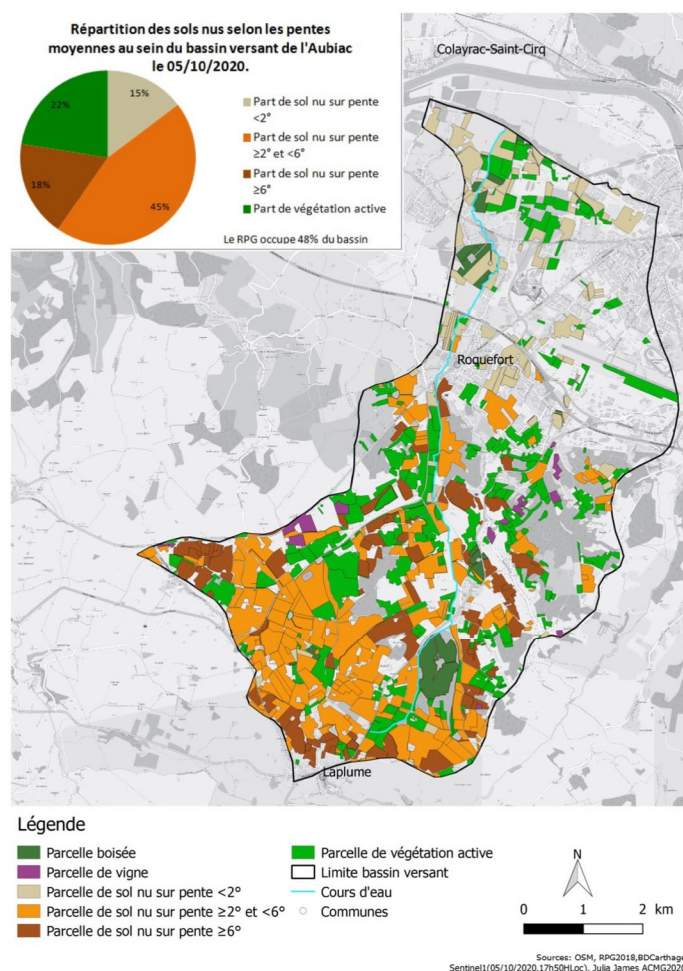
*Natural vegetation (cover crop) in the vineyard alleyway as compared with soil tillage*

## RISK AQUASOIL: A SOURCE FOR CLIMATE ADAPTATION OF RURAL AREAS

The Lot et Garonne is marked by soil and water deterioration due to runoff and flooding during intense climatic events: episodes of drought, intense thunderstorms, long periods of rain. During the project, the ACMG identified and assessed the erosion risk through monthly or bi-monthly mapping of the soil occupation (bare soil, active vegetation, vine, forest) of agricultural plots using Sentinel 1 radar satellite images. They allow observation under cloud cover, a real asset for risk surveillance. These maps are now used by water management syndicates and local authorities. In order to prevent the risk of flooding, water level sensors have been developed and installed; they are reasonably priced to enable generalised adaptation. In order to propose solutions in accordance with local needs and to establish a new risk culture, socio-economic surveys were conducted among farmers and mayors. Adapted solutions are now proposed: adding biochar to agricultural plots to improve water retention by the soil, re-vegetating river banks, creating new generation lakes (filtering), recharging the water table.

The objective is to propose solutions that link the interests of the different actors in the territory. ACMG's work has been multidisciplinary in order to carry out a complete risk management.

Author: Julia James





## RISK AQUASOIL COMMUNICATION STRATEGY & COMMUNITY ENGAGEMENT

The development and implementation of the communication strategy and the environmental awareness and education of communities for good soil and water management practices were the key actions of the Landscape Laboratory (LdP) in the RiskAquaSoil project. The project website and social networking services proved to be powerful methods for exchanging and spreading information about the project objectives, events, and results. LdP organised two training actions targeting farmers (28 participants) which included clarifications regarding the definition of soil pollution and erosion, its causes and consequences to the environment, biodiversity and human health, as well as prevention measures. LdP also organised several activities with different target groups such as schools, enterprises, sports clubs, scouts, and green brigades including:

- i) 11 afforestation activities (1308 participants);
- ii) 6 cleaning actions in Guimarães river banks (401 participants);
- iii) 21 activities to promote sustainable farming and healthy eating (1293 participants).

LdP celebrated three info-days at the beginning of the project to promote it, and one final workshop and two final exhibitions (an exhibition presenting the results of the project partners and a photographic exhibition of one of the main fertile plains of Guimarães called Veiga de Creixomil). LdP co-organised the International Conference "Climate Change: Local Resilience & Global Scenarios" (Guimarães, Oct/2018) which included an in situ-visit to Pedrogão Grande. This visit allowed to improve the understanding of technical solutions and management practices developed in the pilot actions and strengthen communities resilience to climate change impacts.

Author: Carolina Rodrigues



## HIGHLIGHTS



## Project website

<https://www.riskaquasoil.eu/>