Società Italiana di Agronomia
52° Convegno Nazionale

La ricerca agronomica per la transizione verde

Portici, 25-27 settembre 2023

Coupling IoT Technologies, Blockchain and Modelling to Enhance Crop Production and Farmers' Financial Resilience Under Extreme Climatic Events: the RESTORATION Project

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Introduction

Extreme climatic events pose a significant threat to agriculture, straining both public intervention and insurance companies. In this context, innovative tools (crop modelling, sensors, IoT and blockchain) may provide effective solutions for adaptation from farmers and for control from insurance companies. RESTORATION project activities (2022-2025) are hereby presented, in the framework of SYSTEMIC project.

Objectives

The RESTORATION key objectives include: **i)** providing farmers with effective adaptation practices to cope with the expected climatic extreme events; **ii)** enabling insurance companies to establish economic incentives for adopting risk mitigation measures; **iii)** alleviating the burden of public intervention for agricultural losses; **iv)** creating an insurance toolbox to support adaptation in Tuscany Region.

Materials and Methods

The framework of the activities (Fig.2):

1-2) Starting from a literature review, the probability of occurrence in crop yield (olive, vine and wheat) due to projected extreme climatic events will be assessed by crop modelling approaches;

3) Stakeholders consultation (questionnaire) to identify adaptation strategies currently adopted by farmers;

4) Setting of a monitoring system (based on sensors, IoT and blockchain) in a pilot vineyard farm, "Azienda San Felice" (Fig.1);

5) New insurance contract formulas enriched by legal investigation.

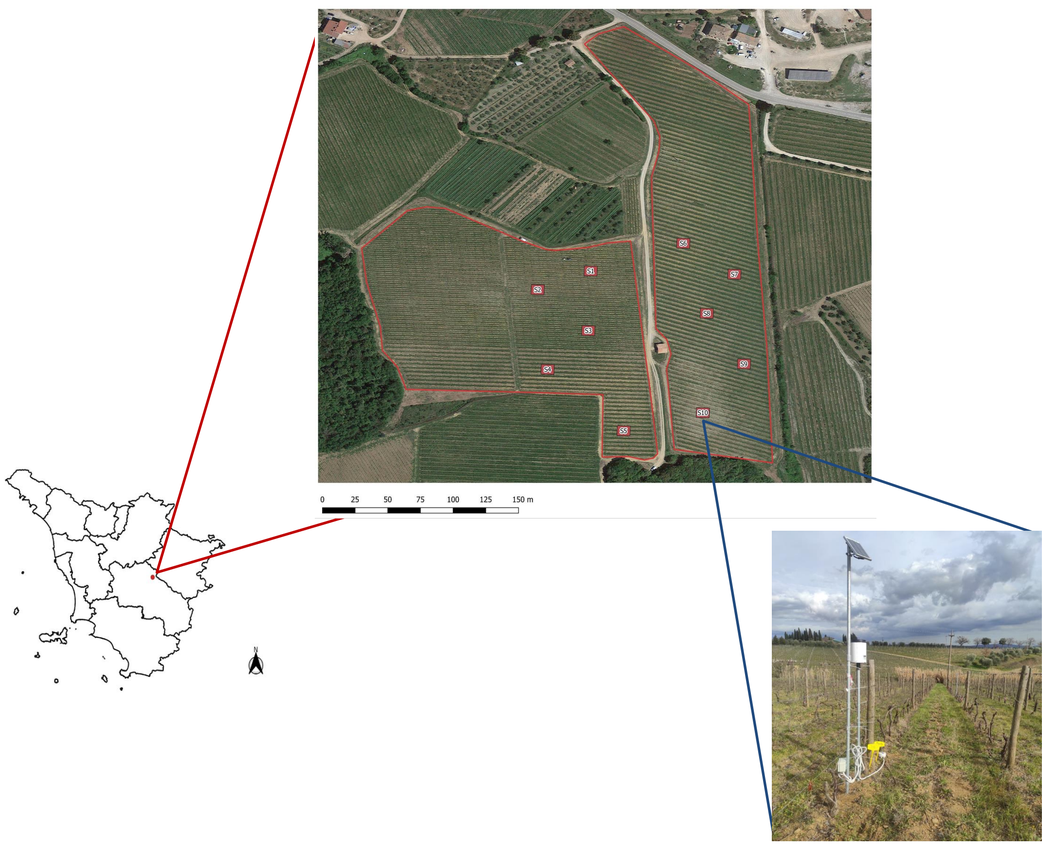

Fig. 1 Pilot Farm based in the Chianti Region with an example of a soil-weather station installed in the field (6.8 ha; 43°22'59.3"N 11°29'14.9"E, WGS84).

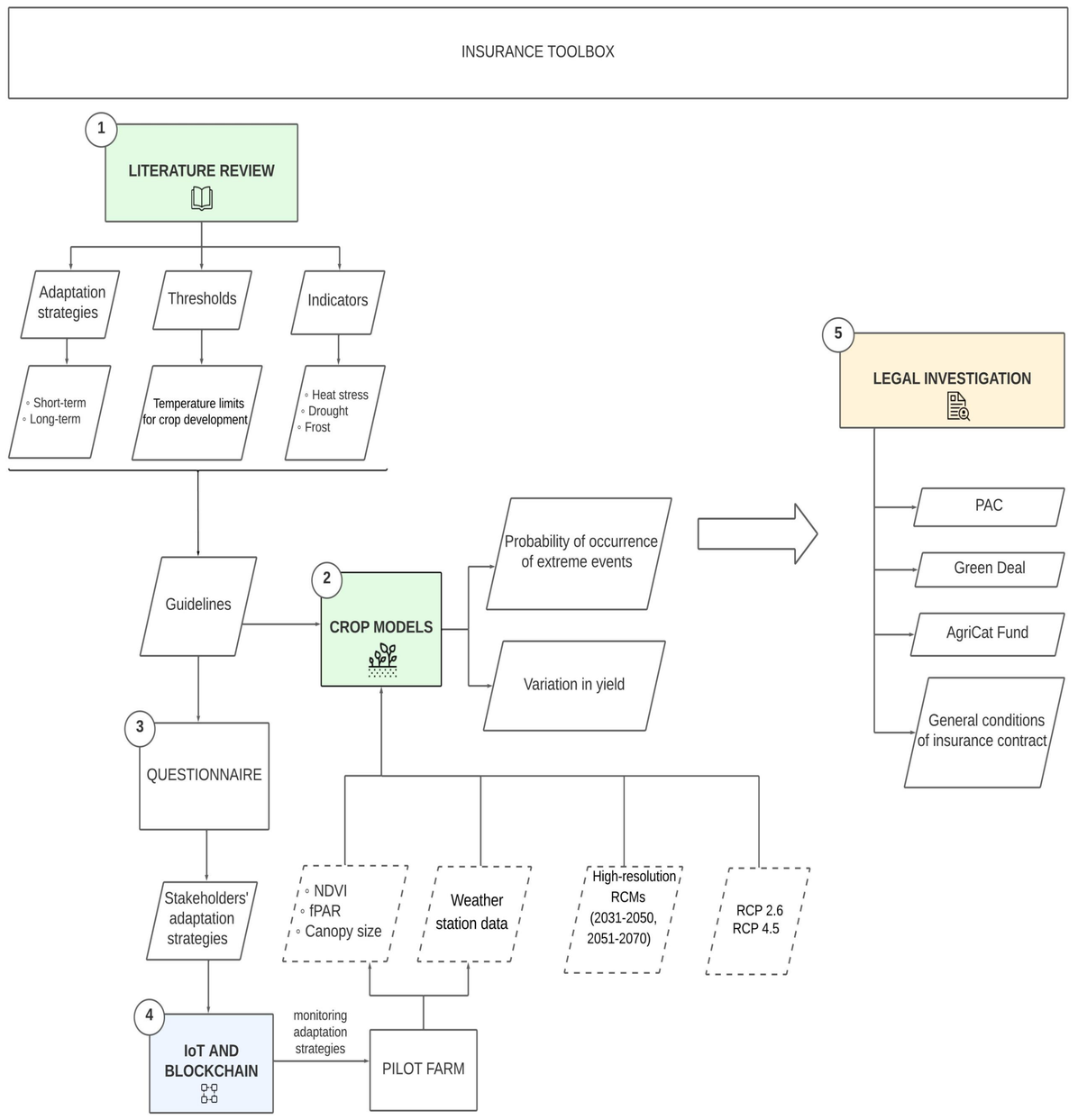

Fig. 2 Framework of RESTORATION activities.

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Results

The RESTORATION project will provide the following expected results: **i)** probability of occurrence of extreme climatic and impacts on yield through modelling applications; **ii)** a list of best adaptation measures; **iii)** the effectiveness and applicability of innovative means; **iv)** new insurance contracts and business models under a changing climate scenario.

Conclusions

The RESTORATION project applies interdisciplinary and innovative approaches to risk management in agriculture, these will be translated into new insurance contracts and insurance policies. Applications of innovative tools will allow to test the efficacy of new instruments to support farmers and insurance companies.

Acknowledgments:

The authors would like to gratefully the RESTORATION "InsuRancEs SoluTiOns to enhance crop production Resilience to extreme climATIc events by means of blOckchaiN and IoT technologies" DM 737, CUP B55F21007810001, project funded by the NextGenerationEU programme, and SYSTEMIC project, joint action of JPI HDHL,JPI OCEANS and FACCE JPI launched under the ERA NET ERA HDHL (n 696295).