



PROJECT SUMMARY

Main sector	<i>Viticulture</i>
Title	<i>ADAPtation to climate change: study of Multifunctional irrigation for viticulture</i>
Acronym	<i>ADAM</i>
Project synthesis	<p><i>The project aims to represent a synthesis point between three factors: i) the recent evolution of the Lombard wine sector ii) the local effect of the global climate change iii) the innovation of the irrigation practices and of the soil-plant monitoring systems.</i></p> <p><i>The Lombardy region has an important wine production that shown clear evolution signal toward high quality and marginality products (DOC and IGT wines represent 90% of the production for more that 1.200,000 hl in the 2016), especially in the sparkling and “ready to drink” wine category. The security to obtain grape in adequate quantity and of high quality continuously, reducing the uncertainty linked with the effect of the variability of the meteorological phenomenon, has become fundamental in order to reinforce the sector companies and allow them to continue to follow the trend linked to production as well as the economical and occupational impact.</i></p> <p><i>The summer stresses, linked with heat waves (days with maximum daily temperature and minimum night temperature particularly high) during the grape ripening, together with the late spring frosts, cause Lombard vineyard productivity losses as well as grape quality decrease. The meteorological data of the las years as well and the most credited climate change scenarios Indicate that the heat waves are following a growing trend in terms of intensity and frequency.</i></p> <p><i>At the same time, in the legal production guidelines of the Italian DOC and DOCG the possibility to use emergency irrigation has been introduced.</i></p> <p><i>The introduction of this fundamental productive factor opens great scenarios for the innovative management of irrigation.</i></p> <p><i>The project tends to satisfy the emerging need of vineyard protection against heat waves through the experimentation and dissemination of irrigation techniques and multifunctional management, able to combine traditional hydric stress defense features with the thermal stress defense.</i></p> <p><i>The introduction of the multifunctional irrigation obviously requires an adequate experiment support and a scientific research to individuate the irrigation methods and its management protocols to reach high quality grape ripening performances, while minimizing the hydric and energetic uses.</i></p> <p><i>Four treatments, combination between the installations and management types, will be taken into consideration:</i></p> <ol style="list-style-type: none"> <i>1) no irrigation</i> <i>2) drip irrigation with management aiming to regulated the grape ripening ;</i> <i>3) controlled drip irrigation aiming at the thermo-radiation-based stresses protection and to improve the grape ripening;</i> <i>4) controlled drip irrigation with mini sprinkler aiming at the protection against thermo-radiation-based stresses and late frosts as well as grape ripening improvement;</i> <p><i>Treatment 1 represents the main situation that can be found in Lombardy in the viticulture sector, being late in comparison to other countries in their vision toward the role of irrigation of the productive process.</i></p> <p><i>The experiments will be conducted during 3 seasons in a company of the Colli Morenici del Garda area suitable for sparkling and easy to drink white wines, realizing an installation with:</i></p>



	<p><i>Eight parcels equipped with an autonomous control of the irrigation, two per treatments.</i></p> <p><i>In parallel to experimentation of the 4 treatments, on the same parcel, an experimental monitoring will be conducted in order to verify the potentialities of the sensor's vis-NIR for the economical measurements of the hydric status of the plant. The success of this experiment will amplify the potentialities of the multifunctional irrigation use.</i></p> <p><i>Finally, the results of the experiment will provide the elements to assess the sustainability of the irrigation introduction at company scale.</i></p> <p><i>Some preliminary analysis of technical-economical sustainability will be widen at irrigation district level assessing, in collaboration with the Consortium Garda- Chiese technicians the compatibility of the irrigation needs requested by multifunctional irrigation with the availability of hydric resources taking in consideration existing installations.</i></p> <p><i>Definitely, the project aims to obtain:</i></p> <ul style="list-style-type: none"> <i>• the definition of protocols for the management of protocols for the multifunctional irrigation in the productive context of sparkling and withe ready to drink white wines;</i> <i>• the definition of a spectral index for the quick and economic field monitoring of the hydric status of the plant based on the use of optical sensors;</i> <i>• the check of the sustainability of the multifunctional irrigation at company and at irrigation district scale;</i> <i>• the dissemination of the objectives, the status of the action and the final results of the research activities to a vast audience of stakeholders including the national and international community</i>
Project duration (months)	36 months
Project responsible	Prof. Claudio Gandolfi
Scientific responsible	Prof. Claudio Gandolfi
Link with other projects	<p><i>Project VARIVI – “Valorisation of Hydric Resource for Viticulture of the Ischia island”. Founded by Campania Region (Program 124 ‘Cooperation for the development of new products, processes and technologies in the agriculture and food sector and in the forest sector – Health Check’,)</i></p> <p><i>Project NUTRIPRECISO – “Precision fertilization and irrigation technics in fructi-viticulture and horticulture”. Founded by Lombardy Regione, (Program PSR Operation 1.2.01“Demo project and information action”)</i></p> <p><i>Project “SO-QUIC, Optical Systems for the Quality of Italian and Chilean grapes”. Founded by Lombardy region and international cooperation programs.</i></p> <p><i>Project SmartOptic - “Engineering and experimentation of a prototype of an compact with few waves length optical system integrable with a smartphone for the quick and non destructive analysis of the ripening of fruit and vegetables”. Milan University, Research founding plan.</i></p> <p><i>Project Tergeo. Unione Italiana Vini</i></p> <p><i>Project WATPAD – “WATer impacts of PADdy environment”, Fondazione Cariplo</i></p> <p><i>Project “Integrated and Stand Alone Grape Maturation and Vine Hydric stress Monitoring System”. H2020-ICT-2016-2017, Topic: ICT-03-2016</i></p>