Conventional agricultural practices and greenhouse gasses emission for the main Mediterranean crops

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It is well known that conventional cultivation practices of large inputs and non-rational use of
natural resources and energy, cause environmental degradation and high greenhouse gases (GHGs) emissions. Especially in Mediterranean farming systems and under the threat of climate change, the implications of conventional agriculture for food production and conservation of natural resources are expected to be significant.

Agriculture produces considerable quantities of GHGs from soil respiration, the use of nitrogen fertilizers, the management of organic materials (e.g. manure, slurries), the use of fuel for agricultural machinery and also electricity.

This work has been carried out in the framework of the EU co-funded LIFE project "Innovative technologies for climate change mitigation by Mediterranean agricultural sector-LIFE ClimaMed", which has as main targets (1) the development and construction of an innovative GHGs measurement system by using LIDAR technology, (2) the evaluation of GHGs emissions from agricultural sector in relation to the practices applied and (3) the development of proposals for reducing emissions through incentives for producers.

In order to study GHGs emissions from the Mediterranean farming systems, five typical Mediterranean cultivations were selected in Greece in three replicates - a total of 15 pilot fields, in which olives, grapes, vegetables, cereals and nuts (pistachios) are grown. Pilot fields were selected in such a way that each crop will be studied in three different climatic conditions across north to south of Greece, while special attention was given to include different cases, as for example intensively cultivated crops (use of chemical fertilizers), organic farming, coexistence of livestock and agriculture.

For the determination of GHGs emissions due to currently applied practices, a detailed recording of the practices applied in each pilot field as well as fields’ history of the past 20 years, has been made. Furthermore, soil sampling and chemical analyses were conducted to investigate whether inputs are appropriate in order to develop management plans for the Hellenic Ministry of Rural Development and Food, aiming to control GHGs emissions at field level by using the LIDAR measurement system and to provide incentives to farmers for further reducing.
The first LIDAR system was installed in one of the pilot fields and is already fully operational collecting measurements.

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