The project “HelpSoil” (LIFE12 ENV/IT/000578) is aimed at testing and demonstrating innovative solutions and soil management practices that enhance and adapt agricultural systems to the impact of climate change. Leading partner of the project is the Lombardy Region (DG Agriculture) and associated beneficiaries are: the Regions of Piedmont, Veneto, Emilia Romagna and Friuli Venezia Giulia; the technical agencies: Veneto Agricoltura, CRPA and ERSAF. The project actions will concern the whole Po Plain and the bordering foot-hill Alpine and Apennine margin (46,000 km²). The project started on 1st July 2013 and will conclude on 30th June 2017. A number of communication and dissemination initiatives are planned (website, field days, newsletters, seminars and conferences), to reach stakeholders (farmers, technicians, researchers, citizens, institutions...), in particular during the EXPO 2015 event in Milan.

PROJECT OBJECTIVES

1. Implementing Conservation Agriculture practices to improve soil ecological functions (organic carbon sequestration, increase of fertility and edaphic biodiversity, protection against erosion) and increase sustainability and competitiveness of agriculture in 20 demonstrative farms.
2. Integrating conservation practices with innovative techniques to:
   - increase the water use efficiency for crops irrigation;
   - improve the fertilization efficiency, in particular livestock manure;
   - reduce the use of plant protection products for the control of pests and diseases.
3. Monitoring indicators of soil ecosystem functions and related to the innovative techniques to assess the environmental benefits provided by the implemented practices;
4. Sharing experiences between farmers and technicians and promoting demonstration actions to support the dissemination of improved practices as wide as possible;
5. Delivering guidelines for the application and dissemination of Conservation Agriculture practices, that could identify Best Available Techniques for an agriculture durable and capable to produce larger ecosystem services.

EXPECTED OUTPUT

It is expected that the introduction of farm management practices addressed to the principles of Conservation Agriculture will achieve the following results:

- increase of the soil organic carbon content up to 0.2-0.7 t/ha/year;
- enhancement of the soil biological fertility;
- reduction of soil erosion;
- decrease of greenhouse gases and ammonia emissions;
- more efficient use of irrigation water and fertilizers;
- sustainable use of plant protection products;
- reduction of fossil fuel consumption for soil works of about 60/70%;
- enhanced adaptation to climate change of agricultural systems;
- higher eco-efficiency and competitiveness of agricultural systems;
- higher stability in crop yields, in spite of an increased climatic variability.

The project results will highlight the strengths and weaknesses of the application of conservation techniques in order to identify viable alternative solutions and optimize environment benefits in each specific local situation.

To this purpose, technical guidelines adapted to the different climatic conditions and cropping systems will be identified, comparing the environmental and agronomic performance of improved and conventional management practices applied in the demonstrative farms and actively involving farmers and “stakeholders” in this process.

CONCLUSION

The management of agricultural soils in accordance with the principles of Conservation Agriculture allows a reduction of mechanization (fewer hours of machinery use and lower power of tractors), and therefore of fuel consumption (with an estimated decrease up to 70%).

The most important outcome, however, is given by the protection and development of soil functionality; in fact, such practices lead to the conservation and incorporation of organic matter into the soil, thus contributing to the reduction of CO₂ emissions and the mitigation of climate change. In the Po plain the organic carbon stock currently stored in soils varies from 34 to 60 t/ha and a potential for further uptake in the presence of appropriate soil management can be estimated at least 12.8 t/ha of CO₂ equivalent. Conversely, there are several evidences of close relationship between the intensification of agricultural production and greenhouse gas emission, and in particular between intensive soil tillage and release of carbon dioxide. Furthermore, the increase of the organic matter improves the physical and chemical qualities of soils, enhancing fertility and assimilability of water and nutrients, thereby ensuring greater resistance at the environmental stresses and stability to agricultural production, reduces erosion and soil susceptibility to compaction, improves the ability to filter and buffer pollutants, helps soil biodiversity. In this way, the conservation agriculture practices can therefore contribute significantly to increase the resilience and adaptation of terrestrial ecosystems to climate change.