

Preserving soil organic matter and protecting water sources

Nuno Marques, a Portuguese farmer (beef, cereal and forestry), has developed a new land and soil management strategy for Mediterranean soil and climatic conditions. His project achieved a sustainable intensification of the production system by improving soil fertility, water and land productivity and the efficiency of external inputs. These findings could be extended to other similar farms in comparable agro-ecological zones.

ELO Land and Soil Management Award

"The ELO launched its Land and Soil Management Award in 2008 as we believe that sustainable land and soil management is central to improve our food systems, maintain a healthy environment and foster European rural development. With this award we recognise the great value of the farmers' work, by promoting the winning project as a good practice at the EU level. Also, we aim to enhance the visibility of such ways of farming at the local, national as well as European scale and to encourage farmers, land managers and land owners to further develop their work in a sustainable path." Julianna Nagy, ELO Award Coordinator

Nuno Marques recently won the ELO's **2015-2016 Land and Soil award** for a project based on conservation agriculture (no-till, crop rotation and residues management including animal manure). The project aims to improve sustainable intensification of agriculture in the Mediterranean region. His strategy helps to find the best combination in terms of farm economic viability and maintaining healthy soils, preserving soil organic matter and reducing sediment in water to reduce risks of flooding and water contamination.



Mediterranean conditions

The concentration of rainfall in the Mediterranean region from October to April creates waterlogging problems during the winter and water stress in spring and summer. Soils generally have low fertility due to erosion and low organic matter content. Furthermore, during dry periods, irrigation is crucial for forage to feed the animals, but water is scarce.

A collaborative project

Nuno Marques' project was carried out in collaboration with the research institute ICAAM – Instituto de Ciências Agrárias e Ambientais Mediterrânicas. Young graduates as well as veterinarian and irrigation services were also contracted by the farm to develop technologies on beef and irrigated crops production.

The priority of the project was to find ways to sustainably intensify agriculture, to simultaneously improve land productivity and reduce environmental impacts by reducing the use of energy, fertilisers and pesticides. The project, which began in 2002, had the following objectives:

- Improving irrigation to compensate for the annual rainfall variability.
- Improving soil fertility, and controlling erosion in order to increase land productivity and reduce fertiliser inputs by soil and water conservation and increasing soil organic matter.
- Improve biodiversity in order to balance the species presence in the farm.
- Reduce environmental impact from agriculture, forestry and beef production.



Nuno says “we had several contributions from long term relationships, like the one we have with Professor Mário Carvalho from ICAAM, with farmers in Uruguay where no-till is widely used, and also from our informal group of no-till farmers in Portugal learning and changing our good and bad experiences, but always with the goal of a continuous improvement for our activities.”

Developing solutions

Thanks to the collaboration between the farmer, research institute and others in the project they were able to reach these objectives by putting in place a specific strategy. This strategy included elements such as:

- A change from spring to autumn sown irrigated crops, to reduce irrigation during the dry period and improve soil drainage.
- A combination of no-till and irrigated forage (ryegrass and clovers) to improve drainage: irrigation is stopped at the end of May to allow the soil to crack to let the roots grow deep so the crop can use water from deeper soil layers.
- Timely field operations like seeding, application of fertilisers and crop protection means that grazing period can be increased and the need for conserved forage reduced.

Over several years of trials, Nuno Marques and his collaborators developed the optimal combination of measures for his farm. They have found that it has led to a wide range of improvements and advantages. The no-till approach has also led to a better soil organic matter content, resulting in improved crop yields and reduced fertiliser application. Soil drainage has improved to an extent that allows the grazing of the animals during the autumn and part of the winter. The timely application of fertilisers and herbicides helped to maintain winter cereal yields even in extremely wet years. Water productivity has been improved. Greater forage and grain production and quality (protein content also increased) led to an increased animal production. This also led to more animal manure to return to the fields. The farm has significantly reduced its energy consumption, including transport, due the fact that all animal feed is now produced on-farm. Pesticide use was reduced and also plant species diversity in the pasture has significantly increased.

It has also had secondary effects: reducing fertilisers and pesticides leaks into water courses has improved water quality and reducing sediment (clay, sand, loam) which on a larger scale could mean less river silting and flooding.

Spreading the results

The results have already been disseminated to other farmers of the Mediterranean region by open days and events.

"In the last years this farm has become a regional centre for the demonstration of an ecologically and economically successful and sustainable agricultural land management in Southern Portugal and neighbouring regions. Also students from neighbouring universities, such as of Évora are being trained on this farm. [...] This project has an important outreach function and a high multiplicatory effect for this region." - President of the Land and Soil Management Award Jury Professor Winfried E.H. Blum (University of Natural Resources and Life Sciences (BOKU), Vienna).

Contacts

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The next Land and Soil Management Award call will be launched in September. More information:

www.europeanlandowners.org

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Photos: Nuno Marques