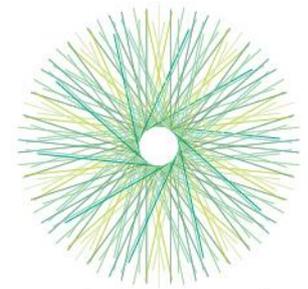


# Inspirational ideas

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## Talking Chestnuts

**An Operational Group from Italy is developing new techniques for monitoring chestnut trees with regards to carbon balance and healthy development of the trees, both for wood and fruit production. The project is testing techniques for chestnut restoration and is assessing the carbon footprint of different methods of chestnut management in terms of carbon fixation and sequestration in the soil-plant system, water use and land cover. The monitoring uses the innovative TreeTalker® system which collects data directly from the trees.**



Roberto Ranieri from the project leader Open Fields (SME) says "In most of the Italian Apennines, the chestnut groves are currently undergoing a process of re-naturalisation – which is linked to the abandonment of mountain areas by their inhabitants – and evolving towards mixed forests but still with a significant number of *Castanea sativa* Mill. (sweet chestnut)." The groves currently lack the structural characteristics necessary for the traditional production of the fruit, "but they are now increasingly recognised locally as an important resource for the mountain economy and as a characterising element of the landscape and tradition" continues Ranieri. Restoration of the chestnut groves is therefore underway, however, this needs to be carefully managed so as to ensure healthy trees and to balance the impact on the environment. 'Talking Chestnuts' Operational Group is therefore supporting this process by developing monitoring tools to facilitate a sustainable return to the cultivation of sweet chestnuts in this area and other suitable ones.

This research is being carried out at the demonstration chestnut grove of Granaglione (Alto Reno Terme – Bologna) owned by the Carisbo Foundation. The chestnut trees from four areas of the grove which have different ecological and pedological conditions are being managed with different methods to compare their effectiveness. They are continuously being monitored using the TreeTalker® technology, which allows to receive data relating to their health in real time. Data are used for monitoring but also for studying the relationship between the health of the chestnut trees, the environmental impact of their restoration and variables related to the location of each tree, its management and climate conditions. "A TreeTalker® equipment," explains Ilaria Mazzoli, also from Open Fields "is a kit of sensors allowing the monitoring of several elements such as air temperature and humidity, water transport inside the plant, diameter and canopy growth and colour, and variations in tree inclination to evaluate its stability. CO2 sequestration can also be measured through monitored data by species-specific algorithms."



The University of Bologna – DISTAL Department regarding forests and soil is supporting the benchmarking and monitoring of the experimental areas. This includes consideration of Copernicus data (e.g. slope, exposure, altitude), mapping to quantify density and competition, soil profiling, use of sensors to measure soil respiration, moisture, temperature and soil CO2 emissions. "Data analysis will lead to a



deeper understanding of the relationship between the health of the plant, climatic context, environmental impact and human intervention” Says Roberto Ranieri.

The idea is to develop a methodology which can be used by others in similar restorations. The innovative, low-cost techniques will allow chestnut growers to verify site suitability (Land Suitability Analysis) for the identification of areas potentially suited to recovery in the current situation. They will also enable the monitoring of environmental impact as well as the response of the trees to climate change and different management techniques.

In order to raise awareness on environmental issues and to contribute to the enrichment of skills in chestnut grove management, the project’s methodology will be made accessible to forest operators, experts and students through training programmes, meetings, conferences and the project’s website.

The TreeTalker® technology is not only for forest owners, it is also becoming an educational tool. Anybody can download an app (named “Castagni Parlanti”, talking chestnuts) and follow the data (each of the trees in the current experiment has been given the name of a famous scientist). The project is therefore also producing resources for schools, that can have access to guided visits of the chestnut groves to raise awareness about this production and the efforts being made to protect the environment. Ilaria Mazzoli adds: “Involving local people and children and families in this way is very important because the respect and improvement of the environment cannot be achieved without the participation and approval of all citizens. Sometimes, it may also require sacrifices, or at least the adoption of a different behaviour, which can be triggered and enhanced by the knowledge and love for trees. This is why the trees have been given a human name for the duration of the project.”



#### Sources:

- [www.castagniparlanti.it](http://www.castagniparlanti.it)
- <https://ec.europa.eu/eip/agriculture/en/find-connect/projects/nuove-tecniche-di-monitoraggio-del-bilancio-del>

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**Photos:** Open Fields

*The TreeTalker® technology is provided by the Italian company Nature 4.0, and was developed by Riccardo Valentini (CMCC – Euro Mediterranean Center for Climate Change; full professor of Forest Ecology at the University of Tuscia, Italy, Nobel Prize for Peace as member of the IPCC board).*