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## **Anthropic interventions for increasing orchard cultivation areas in rocky calcareous shallow soils of Apulia Region in South-eastern Italy**

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Located in the southeastern part of Italy, the Apulia region is the nation's largest producer and exporter of fresh grapes. Other fruit trees include almonds, cherries and peaches. Olive groves are also very extensive especially in the central and southern parts of the region. The peculiarities of the Apulian landscapes and the favourable climate conditions have pushed land users to expand drastically fruit trees and grape's cultivation also in very shallow calcareous rocky soils often less than 20 cm deep. Breaking and grinding the topsoil using heavy machinery did this. The purpose was to increase soil depth and establish the whole for future plantations. Over the last 20 years such process expanded in an estimated area of more than 20,000 hectares, especially in the surroundings of Bari, the capital city of Apulia.

Experience shows that when such a process is applied in flat topography areas, erosion is not a problem and such man-made soils (or Anthrosols according to the World Reference Base for Soil Resources WRB) are quite suitable for production. The benefits of

“grinding” calcareous rocks are two-fold i) increased rooting zone, and ii) release of available calcium. These last is necessary for the calcium “hungry” grapes and makes them more resistant to transport due to high concentration of Ca in the grape’s grain skin. This gives them also the so-called “*crocante*” sensation that is also an indicator of freshness for the fruit. This is so true that farmers add boulders of calcareous rocks before intervening even in the areas where naturally these rocks are scarce.

All new plantations are under drip irrigation systems. Fertigation is also applied, but to a lesser extent. Water comes mainly from groundwater that often could be found as deep as 400 metres. There are two ways of providing water supply: i) the National Aqueduct and ii) private wells. These last are often illegal and this has created problems with lowering even further of the groundwater due to uncontrolled pumping or even over-pumping.

There have been subsidies for such expansion of grape cultivation, but this was not always the case. The business was very profitable until a few years ago; hence, farmers and land user invested their own financial resources to grind (in Italian *frantumazione*) all over the place. Unfortunately, when such a process expanded also in sloping lands for the cultivation of cereals, especially the EU subsidised *durum wheat*, severe erosion problems were encountered followed also by landslides in some cases. This intensified a strong reaction from environmental groups that were worried for the loss of natural pastures being converted to crop lands, despite the cereal yields were far less than the region’s average. For worst, there is not a monitoring system in place to check all the physical, chemical and biological characteristics and status of such soils. The process almost halted in 2007.