Towards a regenerative bioeconomy: agroforestry and applications from ecofriendly circular nanotechnologies

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Agroforestry is a land-use system that integrates trees with crops and/or livestock to provide multiple ecosystem services. In the Mediterranean region, tree cultivation is considered a 'noble' act, associated with notions of 'paradise' and aesthetically desirable landscapes. The region is also one of the 36 global biodiversity hotspot centres, accounting for 20% of the world's flowering plant and fern species, of which 50% are endemic. Agroforestry system, as part of the mosaic of forest, agricultural and grazing landscapes in the region, became an increasingly important land use system in the region for productive, symbolic and environmental reasons.

Also cotton was a well-known and practiced agricultural crop in Mediterranean Europe and one of the most used fibre in many parts of the world. Cotton consumption, cultivation and production were practiced all over the Mediterranean Basin. However, cotton production in Italy declined in the last half of the XX century owing to decline price with emergence of syntenic fibre, and high input costs of cotton framing. In effect, European Forest Institute under Circular Bioeconomy Alliance (CBA) has initiated the 5 years cotton regenerative agroforestry project experiment in the CREA-AA Experimental Farm in Rutigliano (BA), Southern Italy as a show case for the Mediterranean region, with the overall objective to restore and scientifically assess regenerative agroforestry-based cotton production systems in Italy. Specifically, objectives of the study are: (1) to test alternative agroforestry and regenerative farming practices to produce sustainable cotton; (2) to apply precision agricultural techniques to match irrigation and soil fertility in cotton crop management; and (3) to monitor the provision of agroforestry ecosystem services.

The study will be further continued to validate the production impacts of regenerative cotton production system in the study region. Also, a certification scheme for regenerative agroforestry will be applied.

Key words: Cotton, Regenerative agroforestry, Soil fertility, Biostimulants