CONFÉRENCE

P K R Nair, Distinguished Professor (*Emeritus*)
The University of Florida, Gainesville, Florida 32611, USA

Agroforestry and Climate-Resilient Land Use: A Global Perspective

LE JEUDI 21 juillet 2022 À 10H 30
Pavillon Kruger, salle 2230

Vous pouvez maintenant assister à la conférence via Zoom en cliquant sur ce lien : Accéder à la vidéoconférence (*pour une expérience plus agréable, préférez l'installation de l'application Zoom à l'utilisation du navigateur*). >> *Instructions pour la configuration de l'audio* <<

Climate-Resilient Land Use refers to the sustainable use of existing natural resources for crop and livestock production systems to mitigate the impacts of climate change and achieve higher productivity in the long term. **Agroforestry** is a land management system in which trees or shrubs are grown in association with crops or on pastureland.

Agroforestry systems (AFS) can contribute to climate resilience in multiple ways, directly and indirectly**.** The major direct benefit is carbon (C) sequestration in biomass and soils, and the various indirect benefits are represented by the broad term, ecosystem services.

Sequestering carbon in biomass and soils: Photosynthetic C captured by trees and its long-term storage in plant biomass such as wood that is not frequently harvested is an effective strategy for limiting the rise of atmospheric CO_2 concentrations across the globe. Soils contain about 2,200 Pg C (three times the atmospheric pool of 770 Pg, and 3.8 times the vegetation pool of 610 Pg).

Compared with treeless land-use systems, AFS have higher C seq. potential because of their higher plant diversity, larger biomass volume per unit area of land, and ability to store C in the biomass and soils for longer periods. The extent of C seq. in AFS is assessed by direct measurement or estimation using formulas and computer models of C present above and belowground in both biomass and soils. The aboveground C sequestration rates in AFS around the world vary from 0.3 to 15.0 t ha^{-1} yr^{-1}, and the soil C stock is in the range of 30 to 300 t ha^{-1}. The best-bet estimates of the ranges of soil C seq. are 5–10 kg C ha^{-1} in about 25 years in extensive tree-intercropping systems in drylands arid to 100–250 kg C ha^{-1} in about ten years in species-intensive multi-strata shaded perennial systems and the homegardens of humid tropics.

Experimental results of studies at 10 different locations in five continents by the author and his associates during the past two decades as well as Meta-analyses show that overall AFS increased the SOC stocks up to 100 cm soil depth in the tropics, but not always in the temperate regions. Thus, the potential role of AFS in climate change mitigation through SOC improvement could be more relevant in the tropical regions than in the C-saturated temperate soils.

Ecosystem Services of Agroforestry and Climate-change Mitigation

Over the years, Ecosystem Services (ES) as applied to agroforestry have come to embrace a wide variety of services. Two prominent ones are climate-change mitigation and biodiversity conservation. Agroforestry systems also play significant roles in realizing such services based on hydrological processes (e.g., higher soil water storage, enhanced infiltration rates, and reduced runoff losses.

The extent to which these benefits can be realized depends on several site-specific and management conditions. The manifestation of the advantages is a slow process, and its impact will be felt only gradually, which could be a disincentive to those expecting a rapid turnaround

Hôte : P. Khasa Damase

Responsable : Christian Landry
Christian.landry@bio.ulaval.ca