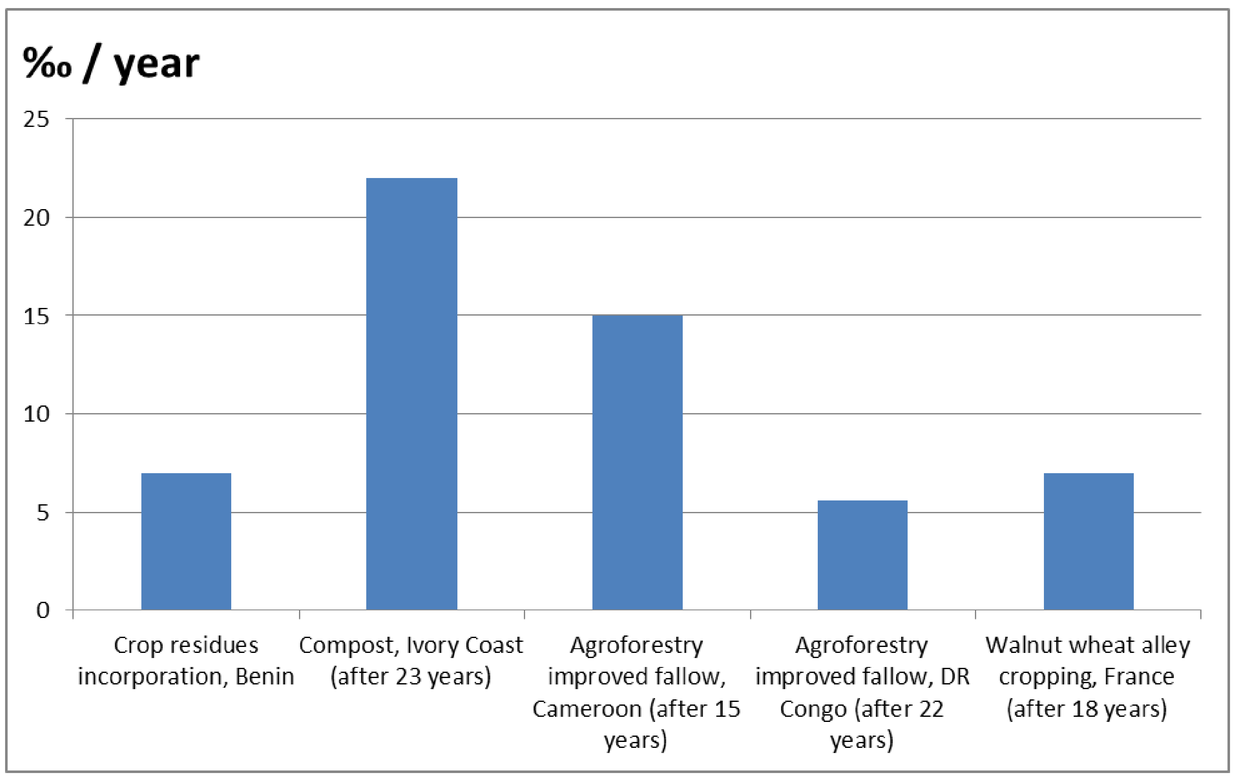
Fostering Mitigation-Adaptation Synergy in Tropical Agriculture

Mitigation needs Adaptation

Climate change mitigation through soil carbon sequestration needs to bring co-benefits in terms of adaptation. This is particularly important in developing countries, which are vulnerable to climate change, and where mitigation is not perceived as a priority.

To foster synergy between mitigation and adaptation, innovative practices with a positive feedback of mitigation on adaptation or vice-versa, are required. We present a few research results towards this aim.

❑ Soil carbon sequestration rates in different practices



A carbon sequestration rate of 4‰ year^{-1} or more is achievable through different practices: crop residues incorporation, compost, agroforestry, no fire, no overgrazing of pastures.

<u>Feedback of adaptation on mitigation:</u> Innovative practices for soil fertility management lead to increased soil organic carbon and a reduction in N_2O emissions linked to a lower fertilizer use.

<u>Feedback of mitigation on adaptation:</u> Soil carbon sequestration leads to benefits in terms of soil properties and greater resilience to climatic stress, resulting in improved farmers' livelihoods.

❑ A permanent soil cover, with trees, cover crops or grasses is key to maximize soil carbon sequestration

A literature review of soil organic carbon storage in Sub-Saharan Africa showed that 79 and 63% of the observations had rates that were larger than 4‰ yr^{-1} in agroforestry and conservation agriculture respectively. Highest rates were observed in fallows or multistrata agroforestry (photos).

Climate change mitigation in agroforestry is a positive feedback of resilient, adapted cropping systems.

In Amazonia, tropical pastures under appropriate practices can store 1.27 t C ha^{-1} yr^{-1} in humus or soil (0.2 to 1 m), contributing to soil fertility and resilience.

❑ Example: Roots of Sesbania improved fallows in Zambia bring 0.6 to 1 ton of carbon per hectare after 2 years + fuelwood for farmers

❑ Example: Multistrata agroforestry with coconuts, Gliricidia and vanilla in The Seychelles protects the soil + farmers' income diversified

data from Kenne et al. 2016; D'Andouss Kissi et al. 2013; Bisiaux et al. 2009; Gond et al. 2016; Cardinael et al. 2015a, b; 2017; Torquebiau and Kwesiga, 1996; Corbeels et al. submitted; Stahl and al., 2016

Key message: "If adaptation is well done, mitigation will result"

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