Potential use of coffee agroforestry systems to adaptation-mitigation synergies for climate change

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Introduction
Mitigation and adaptation have been proposed by the international community as the main strategies to face the climate change, but its integration is taking more relevance.

Materials and methods
This study estimated the mitigation-adaptation synergy (MAS) in the three most dominant coffee production systems in Libano, Tolima – Colombia: agroforestry system (AFS) with Cordia alliodora (AFS-C), AFS with plantain (AFS-P) and monoculture (M) (Andrade et al., 2014). Carbon footprint and diversity of ants were estimated as mitigation and adaptation indicators, respectively.

Results
The inclusion of trees in coffee production systems changed from negative to positive the carbon footprint: 12.8 vs -3.0 vs -6.4 Mg CO₂e/ha/year for AFS-C, AFS-P and M, respectively (Figure 1). In the same way, AFS-C had the highest richness of ants according to Margalef index (1.3) than AFS-P and M (0.6); in contrast, no differences between systems were detected in Shannon-Wiener and Simpson Index (Figure 1). The genus Cephalotes, Dorymyrmex, Hypoponera, Pachycondyla, Octostruma and Proceratium were exclusively found in AFS-C due to its requirement of high biomass and necromass.

Conclusions
The AFS that includes native trees, can be an acceptable strategy for mitigation-adaptation to climate change, due to its advantages in improving carbon footprint and hosting a high diversity of ants. The AFS-C have characteristics more similar to natural forests which allow to generate more services as carbon sequestration and those derived from biodiversity conservation.

References