## 11:45 Smallholders' coffee and cocoa agroforestry systems; examples of climate-smart agriculture

Vaast Philippe[1], Harmand Jean-Michel[2], Somarriba Eduardo[3]

[1]*CIRAD, UMR Eco&Sols, ICRAF United Nations Avenue POBOX 30677, Nairobi Kenya*

[2]*CIRAD, UMR Eco&Sols, 2 Place Viala (Bat. 12), 34060 Montpellier cedex 2, France*

[3]*CATIE, 7170, Cartago, Turrialba 30501, Costa Rica*

Agroforestry is an agricultural practice that integrates trees on cropping systems, farms and landscapes to diversify and sustain production. Agroforestry is one key management option for climate-smart agriculture as it combines sustainable production, adaptation and mitigation of climate change, as well as food and income security through tree-crop diversification. Trees in cocoa and coffee systems have been documented to improve crop production, provide timber, fruits and other products and ecosystem services, thereby enhancing food, nutrition and income security of smallholders that produce over 80% of world cocoa and coffee. There is increasing evidence that trees, through microclimatic amelioration, enhance the resilience of cocoa and coffee systems to climate change which is threatening the livelihood of rural communities globally. Nevertheless, intensification of the production of both coffee and cacao is currently promoted mainly via improved germplasm and use of agrochemicals in monoculture, and hence removal of shade trees which decreases smallholders' ability to cope with price volatility of coffee and cacao, pests and diseases outbreaks and climate change. Agroforestry systems are well suited for risk-averse smallholders.
To promote successfully an intensification of cocoa and coffee systems including agroforestry practices, two scientific approaches are currently combined: 1) participatory research taking into account local knowledge of rural communities on tree species compatibility with the main crop and suitability to match ecological niches, livelihood requirements of farmers while providing a range of ecosystem services; and 2) development of tools and models that evaluate the trade-offs or synergies in terms of resource capture and competition / facilitation between trees and the main crop in order to optimize tree species arrangement and shade management according to local conditions *e.g.* soil fertility, microclimate, elevation or solar radiation.