

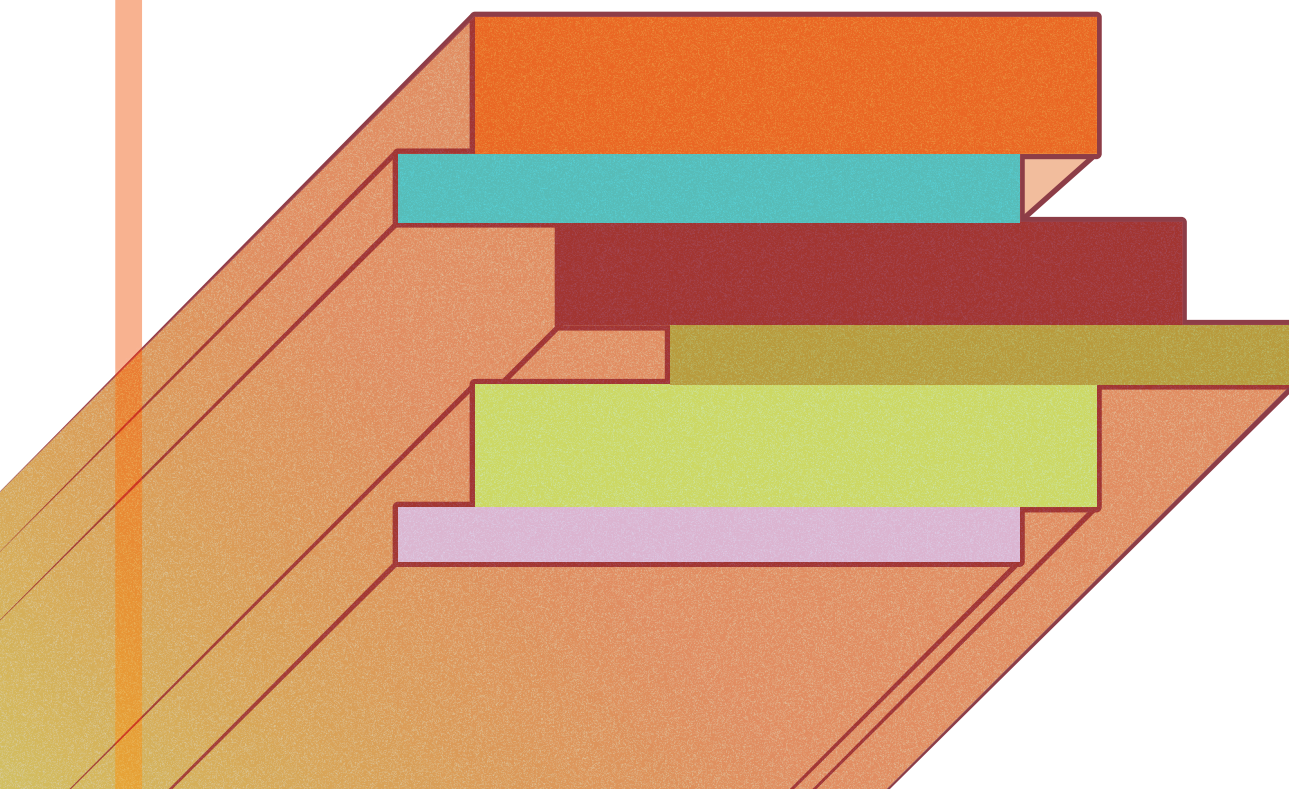


RESEARCH  
PROGRAM ON  
Forests, Trees and  
Agroforestry

# FTA 2020 Science Conference

Forests, trees and agroforestry  
science for transformational change

**14-18 | 21-25**  
September 2020



## Book of Abstracts

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CGIAR Research Program on Forests, Trees and Agroforestry  
CIFOR Headquarters  
Jalan CIFOR  
Situ Gede, Sindang Barang  
Bogor Barat 16115  
Indonesia

T +62-251-8622-622  
E [cgiaforestsandtrees@cgiar.org](mailto:cgiaforestsandtrees@cgiar.org)

[foreststreesagroforestry.org](http://foreststreesagroforestry.org)

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## AUTHORS

Clement Rigal<sup>†‡</sup> XU Jianchu<sup>§</sup> VAAST Philippe<sup>†Δ</sup>

## E-MAIL ADDRESS OF PRESENTER

clement.rigal@cirad.fr

## ORGANIZATIONS

† ICRAF, Hanoi, Vietnam

‡ UMR System, CIRAD, Montpellier, France

§ ICRAF, Kunming, China

| KIB, Kunming, China

Δ UMR Eco&Sols, CIRAD, Montpellier, France

# Young shade tree provision of ecosystem services: First lessons from a large-scale conversion from coffee monoculture to agroforestry in Yunnan Province, China

Local governments in south Yunnan Province, in China started distributing free shade tree seedlings to all coffee farmers in 2012, to support the conversion from coffee monoculture to agroforestry systems. In a few years only, shade trees were planted on virtually all coffee estates in the region (~95,000 ha), making it a rare example of large-scale conversion towards agroforestry.

Mature shade trees are known to provide a range of ecosystem services (improving soil fertility, buffering extreme climatic events, allowing revenue diversification, lowering coffee biannual production patterns, etc.) as well as some ecosystem disservices in the case of poorly selected or managed tree species (competition between shade trees and coffee for resources, higher incidence of some pests and diseases, etc.). In the present study, we measured the provision of ecosystem services and disservices of shade trees only a few years (3–5) after their introduction on coffee farms, to evaluate their rapid on-farm impact. We present here some key findings. Firstly, there is unexpected high tree species richness on coffee farms of Yunnan. Secondly, there is a clear positive impact of all investigated shade tree species on soil chemical and biological quality. Thirdly, there was a marked impact of shade trees on microclimate and they had a protective effect during a frost event in December 2017. Lastly, we show that coffee yield under shade trees could be as high as those measured in open areas, when shade tree species are carefully selected and managed.

This study shows the rapid benefits provided by the introduction of shade trees in coffee farms, and therefore the potential for agroforestry to rapidly contribute to more sustainable coffee production. It sets up a baseline for further monitoring and evaluation of this rare example of a large-scale conversion program. In particular, we advocate for further monitoring of the competition from shade trees, likely to increase as trees grow, and the possible replacement of some tree species by more compatible ones in the coming years. We also advocate for adapting the current intensive farming practices (particularly by reducing current high fertilizer inputs) to maximize the benefits provided by shade trees.

## KEYWORDS

Arabica coffee, agroforestry, China, ecosystem services

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