

# A conceptual modelling approach of tropical agroforestry systems: a case study on coffee-based agroforests in "Guinée forestière" (Guinea, West Africa)



Interactions between component are not understood

Farmers' practices are barely known

Lamanda Nathalie<sup>1</sup>,  
Ngo Bieng Marie-Ange<sup>1</sup>,  
Wery Jacques<sup>2</sup>

<sup>1</sup>CIRAD/ PERSYST/ Umr System  
<sup>2</sup>SUPAgro / Umr System

Corresponding author:  
nathalie.lamanda@cirad.fr

- Lack of tools adapted for assessment and design of agroforests systems
- A Framework is needed for the evaluation of agroforests' production

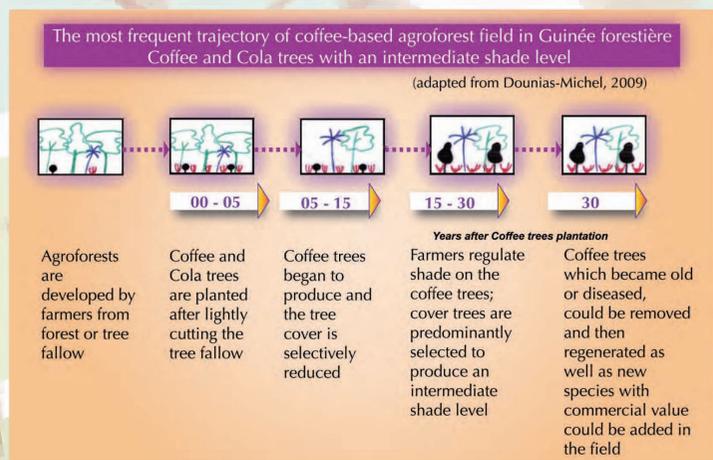
## Objective

Develop a conceptual model of coffee-based agroforests using the method of Wery et al. (2009) developed for the conceptual modelling of a cultivated field in order to:

- Better understand the production of coffee-based agroforests
- Share knowledge with scientists of various disciplines and local expert
- Using a case study in Guinée forestière (West Africa)

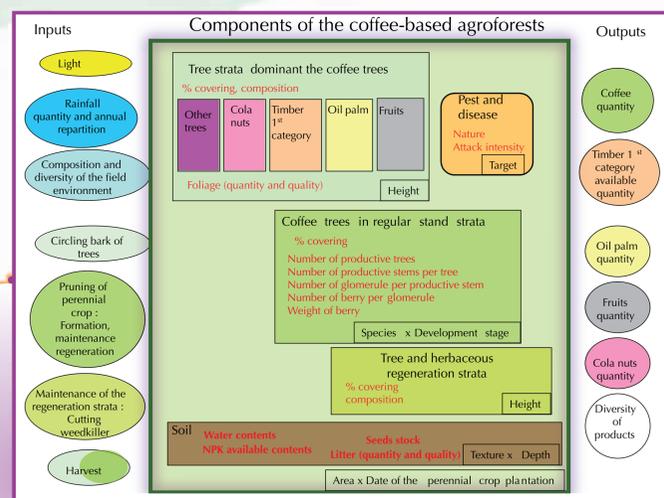
## Results

1 - The trajectory of a coffee-based agroforest field is represented by the succession of structural groups (composition and structural criteria of the vegetation) along the coffee-trees development.



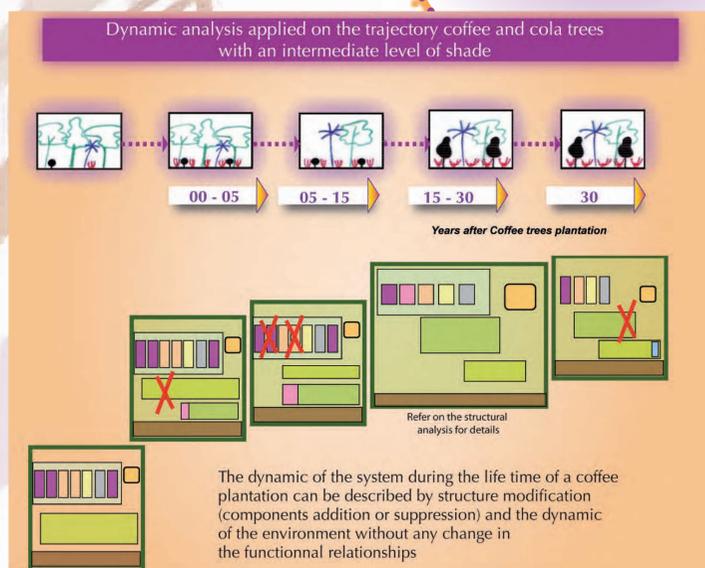
2 - Structural analysis of a coffee-based agroforest field

- Coffee-based agroforests can be described with a limited set of components (the tree strata, the coffee-trees strata, the tree and herbaceous regeneration strata, the soil strata, a pest and disease component).



- Inputs are of biophysical and technical nature
- Outputs are the main products of the various components of the agroforest field
- Functional relations (not shown) link inputs to components, component among then and components with outputs.

3 - Dynamic analysis of a coffee-based agroforest field



## Conclusion

- The method proposed by Wery et al. (2009) on simpler cropping systems is relevant to study agroforest fields
- The conceptual model will be further improved with expert interview and validated by agronomic diagnosis (Rapidel et al. 2006)
- After this *in-field* validation, the conceptual model can be used for designing new systems by experiments and building a numeric model of the long term dynamic of coffee-based agroforests' production.