



Máster oficial  
**Geoforest**



## PROPUESTA TFM CURSO 2020-2021

### An interactive dashboard for decision support in cocoa agroforestry systems.

#### Description:

Agroforestry (AF), the art and science of farming with trees (Van Noordwijk *et al.*, 2016; Torquebiau, 2000) covers 800–1000 million ha worldwide (Nair *et al.*, 2009; Zomer *et al.*, 2009). Shaded tree-crop systems [involving crops such as coffee (*Coffea* spp.) and cacao (*Theobroma cacao* L.)] are prominent examples of AF systems. Cocoa-based AF systems have been top-ranked as land use alternatives to cope with climate change because of their high levels of species diversity, year-round soil cover, high levels of stored carbon in both the soil and wood (above and below ground biomass) and other desirable attributes (Cerdeira *et al.*, 2014; Harvey *et al.*, 2014; Vaast and Somarriba, 2014; Tscharntke *et al.*, 2011). A proper design and management are critical for enhancement these attributes. Farmers have a significant amount of knowledge on the roles, uses, advantages and disadvantages of shade trees in cocoa farming (Silva *et al.*, 2013; Anglaere *et al.*, 2011; Asare, 2005), but ‘flunk’ in complex issues such as the management of the interactions between shade–soil fertility–cocoa yields, and in understanding how changes in exposure, tree density, and species composition affects agroforestry systems. The development of an interactive dashboard will provide farmers, researchers, and the general public with a user-friendly tool to decision support in agroforestry systems.

This student project will build on the models developed to estimate tree biomass in cocoa AFS for West Africa in the CocoAgroforecast project funded by Mondelez and CABI International. The objective is to design and create a prototype of a visual dashboard to dynamically interact with the models and data. The technology to be used will be Shiny and R ([see examples here](#)). The student will learn and work with the supervisors using a collaborative coding platform (GitHub repository). Students with interest in programming and applied research are encouraged to contact us. Proficiency in reading English is recommended.

#### Example:

Saha, S., Shekhar, S., Sadhukhan, S., & Das, P. (2018). An analytics dashboard visualization for flood decision support system. *Journal of Visualization*, 21(2), 295-307.

#### Supervisors / directores:

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