

“*Faidherbia-Flux*”: A long-term Collaborative Observatory on food security, GHG fluxes, ecosystem services, mitigation and adaptation in a semi-arid agro-silvo-pastoral ecosystem (groundnut basin in Niakhar/Sob, Senegal)

Dry season, 2/3 of the year



Wet season, 1/3 of the year

“*Faidherbia-Flux*” Web site :
<https://lped.info/wikiObsSN/?Faidherbia-Flux>

Contact: olivier.roupsard@cirad.fr

Remote sensing

diack.ib@gmail.com

serignemansour.diene@univ-thies.sn

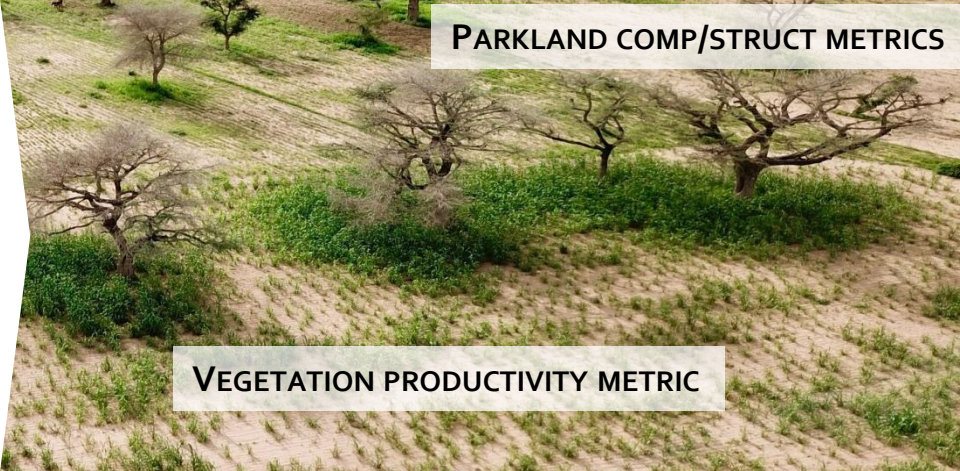
louise.leroux@cirad.fr

aziz.diouf@cse.sn

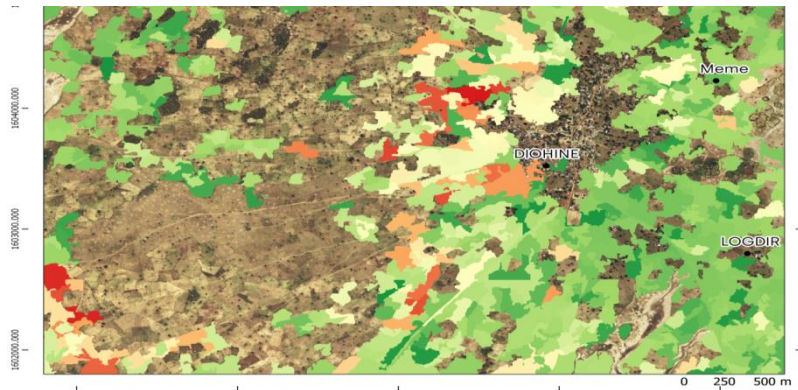
moussa.diallo@ucad.edu.sn

idrissa.sarr@ucad.edu.sn

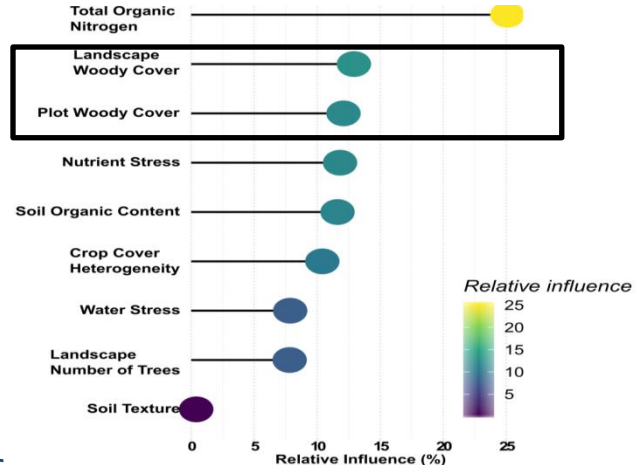
Effects of parklands on millet yield spatial heterogeneity at landscape scale



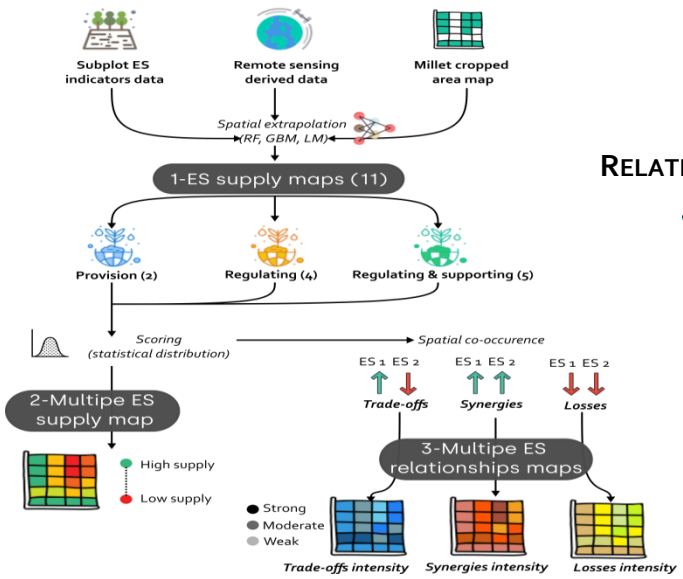
1- From satellite information to yield estimates accounting for tree effects



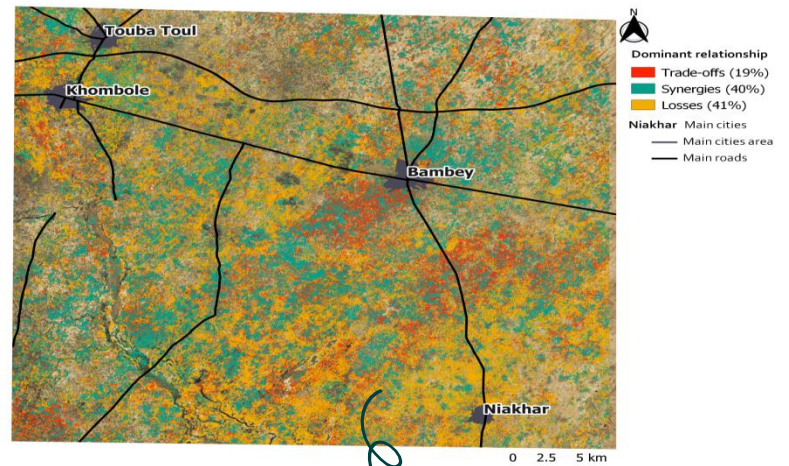
2- Drivers of millet yield spatial heterogeneity?



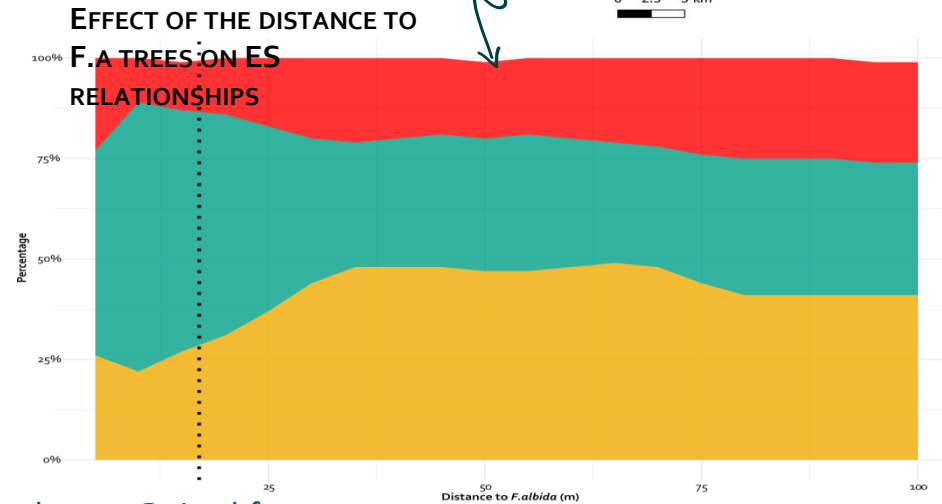
Effects of parklands on the supply of multiple ecosystem services



RELATIONSHIPS AMONG 11 ES

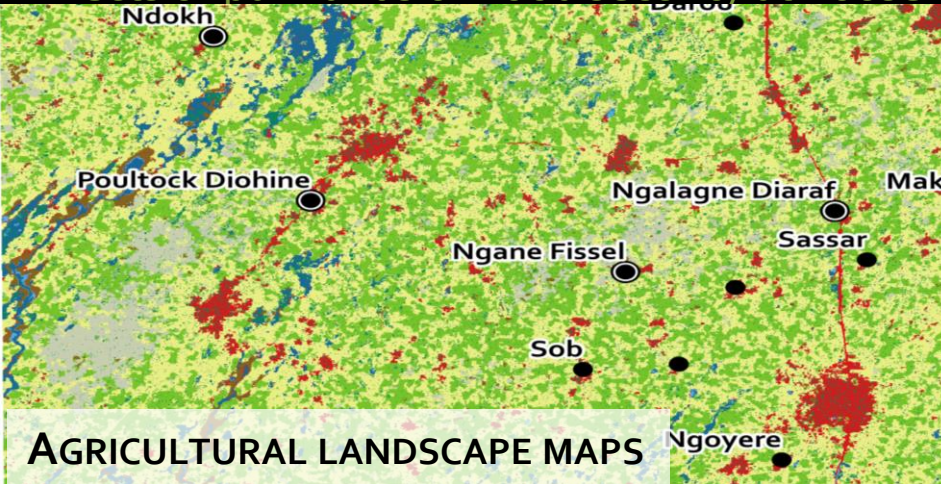


EFFECT OF THE DISTANCE TO F.A TREES ON ES RELATIONSHIPS

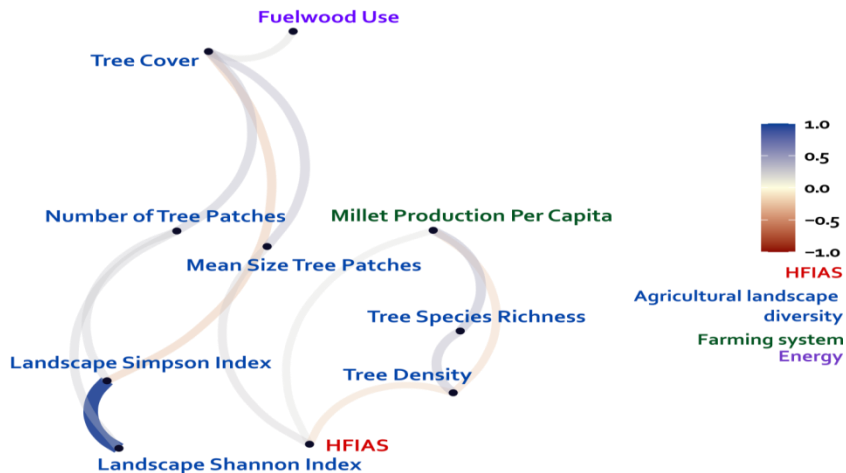


- The synergies follow a gradient effect with the distance to *F. albida* trees, with synergies occurring mainly at a distance up to 10-m from the trees.
- Above a distance of 35-m from the trees the sharing between trade-offs, synergies and losses were not evolving anymore suggesting that beyond this threshold millet crop was no more under tree influence.

Effects of parklands on food security at household scale



HOUSEHOLD SURVEY ON FOOD SECURITY

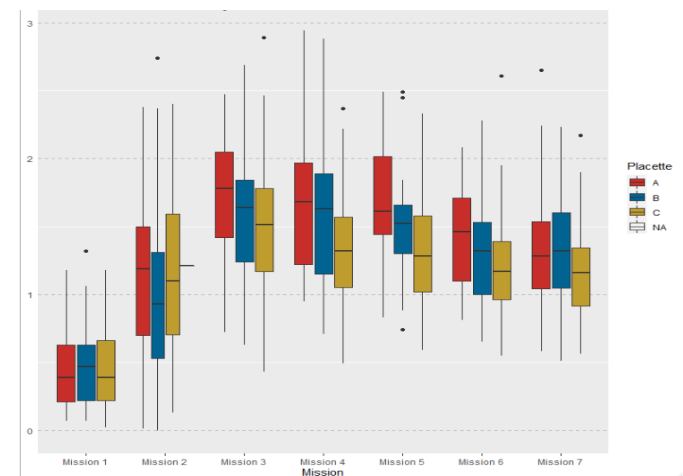


An agro-ecological pathway : Households that are in more diverse agricultural landscapes, in terms of **tree species composition**, tend to be more food secure thanks to a higher agricultural production (boots of crop yield, diversify source of feed for livestock ...).

Estimation of Leaf Area Index under F.albida parklands : A comparison of different approaches



Example of results for LAI-METRE in 2021



Articles

- Gbdjo YJE, Ienco D, Leroux L. 2021. Benchmarking statistical modelling approaches with multi-source remote sensing data for millet yield monitoring: a case study of the groundnut basin in central Senegal. International Journal of Remote Sensing 42, 9277-9300. [10.1080/01431161.2021.1993465](https://doi.org/10.1080/01431161.2021.1993465).
- Leroux L, Castets M, Baron C, Escorihuela MJ, Begue A, Lo Seen D. 2019. Maize yield estimation in West Africa from crop process-induced combinations of multi-domain remote sensing indices. European Journal of Agronomy 108, 11-26. [10.1016/j.eja.2019.04.007](https://doi.org/10.1016/j.eja.2019.04.007).
- Leroux L, Falconnier GN, Diouf AA, et al. 2020. Using remote sensing to assess the effect of trees on millet yield in complex parklands of Central Senegal. Agricultural Systems 184, 102918: [//doi.org/10.1016/j.agsy.2020.102918](https://doi.org/10.1016/j.agsy.2020.102918).
- Ndao B, Leroux L, Gaetano R, Diouf AA, Soti V, Begue A, Mbow C, Sambou B. 2021. Landscape heterogeneity analysis using geospatial techniques and a priori knowledge in Sahelian agroforestry systems of Senegal. Ecological Indicators 125. [10.1016/j.ecolind.2021.107481](https://doi.org/10.1016/j.ecolind.2021.107481).

Communications

Shared database in R

[Faidherbia-Flux Collaboratif\Database](https://baobab.sedoo.fr/)
<https://baobab.sedoo.fr/>