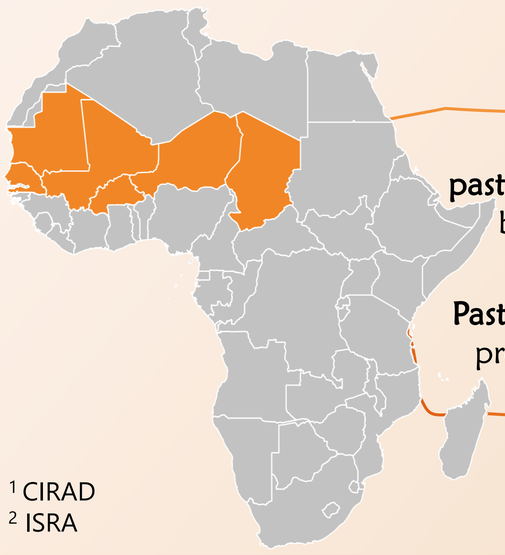
Sahelian livestock

Carbon footprint

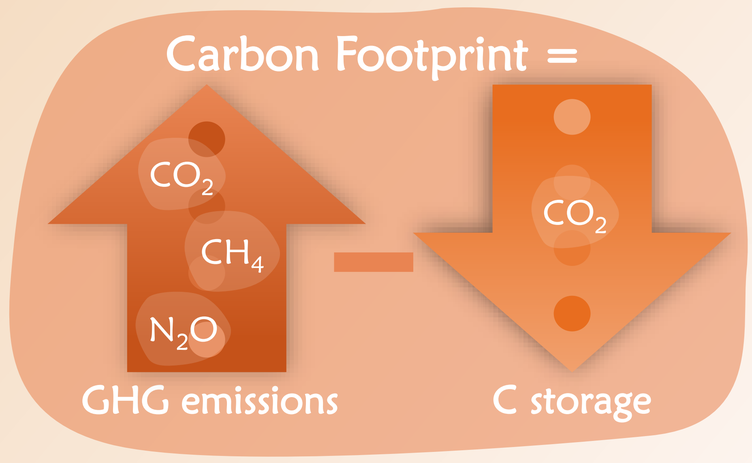
Boury-Esnault A. [1], Salgado P.[1] , Taugourdeau S. [1], Touré I.[1] , Assouma M.H. [1] ,
Diop M.[2] , Corniaux C.[1], Diedhiou L.[2], Traoré E. H.[2]



[1] CIRAD
[2] ISRA

In sub-Saharan Africa, maintaining **pastoral mobility** is a key action to preserve both the stability of **populations** and **ecosystems**

Pastoral livestock is a source of income and protein that ensures the **food security** of many families



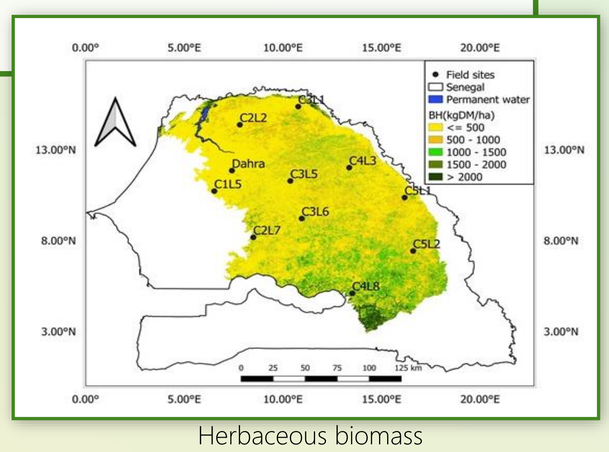
All exchanges of a defined **territory** are measured: **greenhouse gas (GHG) emissions** into the atmosphere and **carbon (C) storage** in the ecosystem

Plant

Root growth collar

Analysis of plant biomass using *satellite images* and *UAV* → calculation of the quantity of available straw and calibration of UAV for the evaluation of pastoral biomass

Study of the structure of woody plants and their C storage capacity using *teledetection* and *growth collar* on trunks and roots



Herbaceous biomass
Lo A., Diouf A.A, 2021

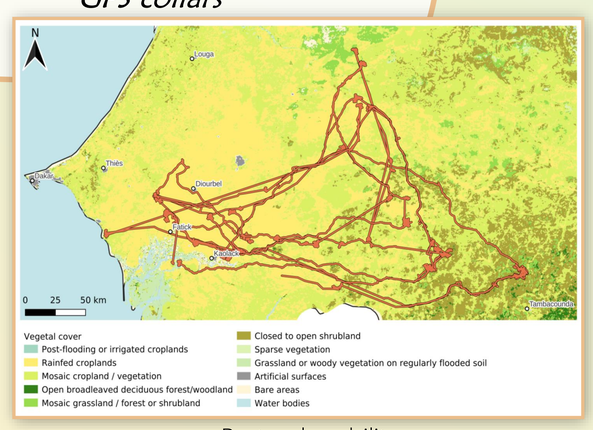
Animal

GPS collar

GreenFeed

Direct measurements of enteric methane emissions using *GreenFeed* → variation of CH_4 emissions according to the type of forage ingested

Monitoring of transhumance herds with *GPS collars*



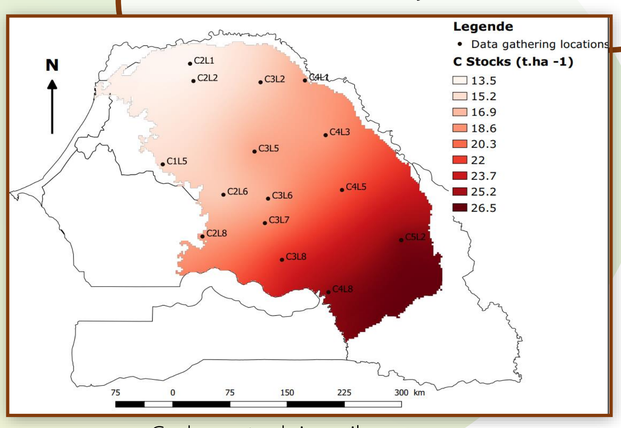
Pastoral mobility
Scriban A., 2022

Soil

Automatic chamber

Continuous assessment of soil and vegetation gases [CO_2, H_20, N_20, CH_4, NH_3] by *automatic chambers* coupled to a gas analyzer

Analysis of soil C stocks using *near infrared spectrometers*



Carbon stock in soils
N'Goran A. and Taugourdeau S., 2018

Conduct a CARBON FOOTPRINT on a national scale

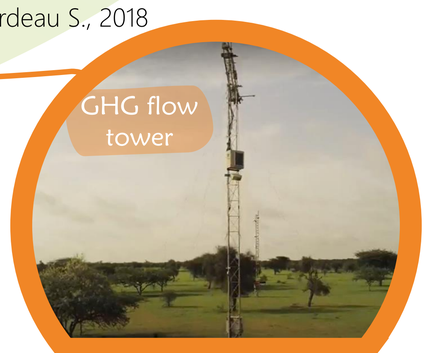
Describe the main elements of the territory (animals, soils, plants) as well as the interactions between them and with the atmosphere

Territory

Co-designing options for optimizing the carbon footprint, with local stakeholders, on animal rationing, resource management and tree planting → test and validate these options according to their environmental, social and economic viability

Temporal variability of GHG emissions [CO_2, H_2O] from ecosystems assessed at high frequency by *flow towers* → throughout the year, the ecosystem studied traps C: in the dry season, by the trees in leaf and in rainy season by the crops

The export of crops cancels out a large part of their contribution to the C footprint



Ecosystem

10 PhD theses

35 Master internships

Academic trainings

Professional trainings

Beneficiaries	Examples of topics covered
Agents of the research and ministries	Systems and methods for assessing the carbon footprint
Pastoralists and farmers' organizations	Practices and innovations to optimize the carbon footprint of pastoral activities

Photos credits : Taugourdeau S., Cesaro JD., Diédhiou L.

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