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AGRICULTURAL RESEARCH
FOR DEVELOPMENT

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CIRAD, September 2021. Communication Office. Illustration: Delphine Gaud-Lavigne, CIRAD

**WORKING TOGETHER FOR
TOMORROW'S AGRICULTURE**

LRG Annual Meeting

Lyon, September 1st, 2023

***M.H. ASSOUMA, D.
Bastianelli and P.
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Dr. Mohamed Habibou ASSOUMA

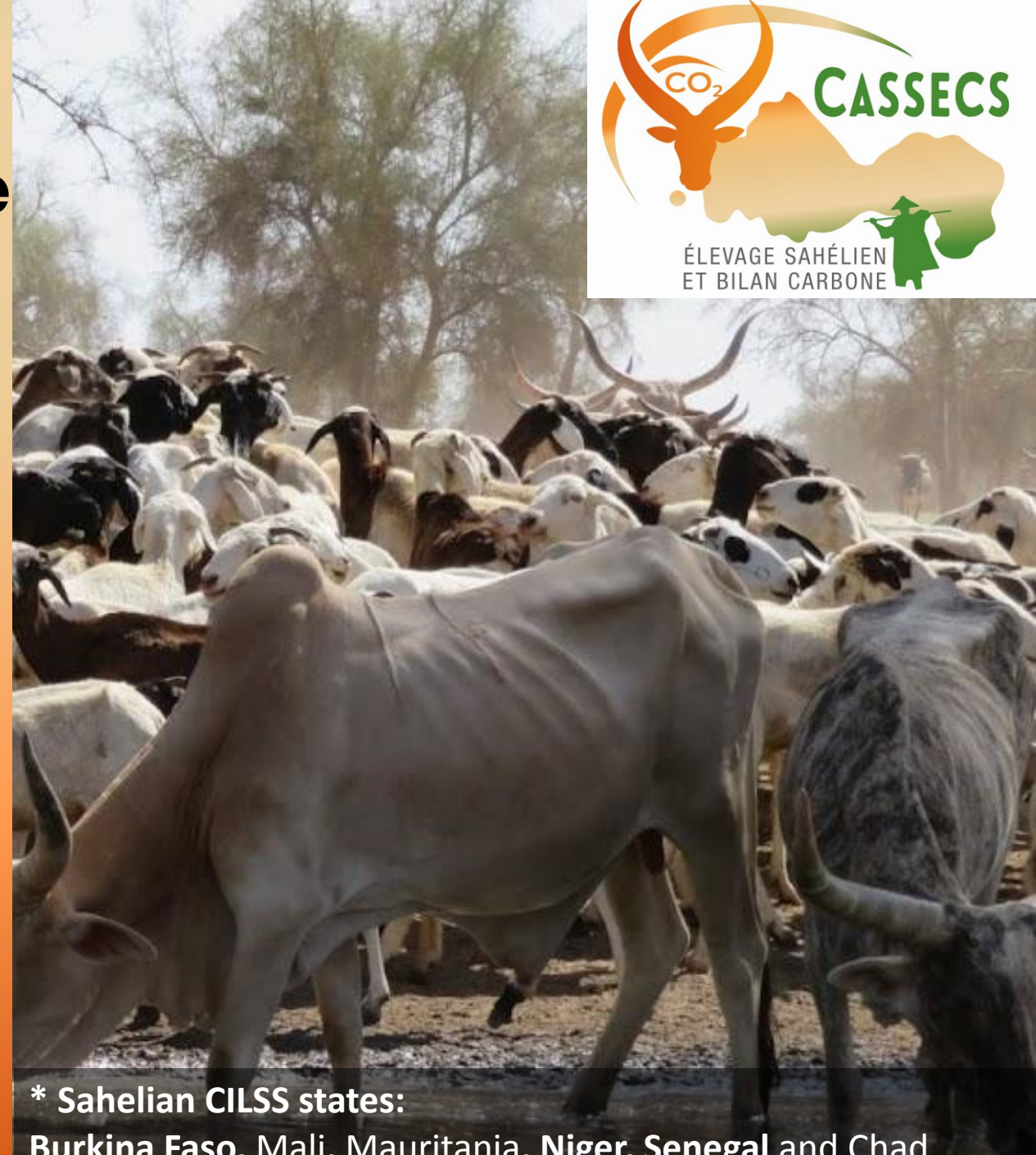
Researcher, Agronomist and Animal scientist
CIRAD-UMR Selmet & CIRDES - Bobo-Dioulasso – Burkina Faso



Carbon sequestration/storage and greenhouse gas emissions in (agro) sylvopastoral ecosystems in the Sahelian CILSS States*

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* Sahelian CILSS states:
Burkina Faso, Mali, Mauritania, Niger, Senegal and Chad

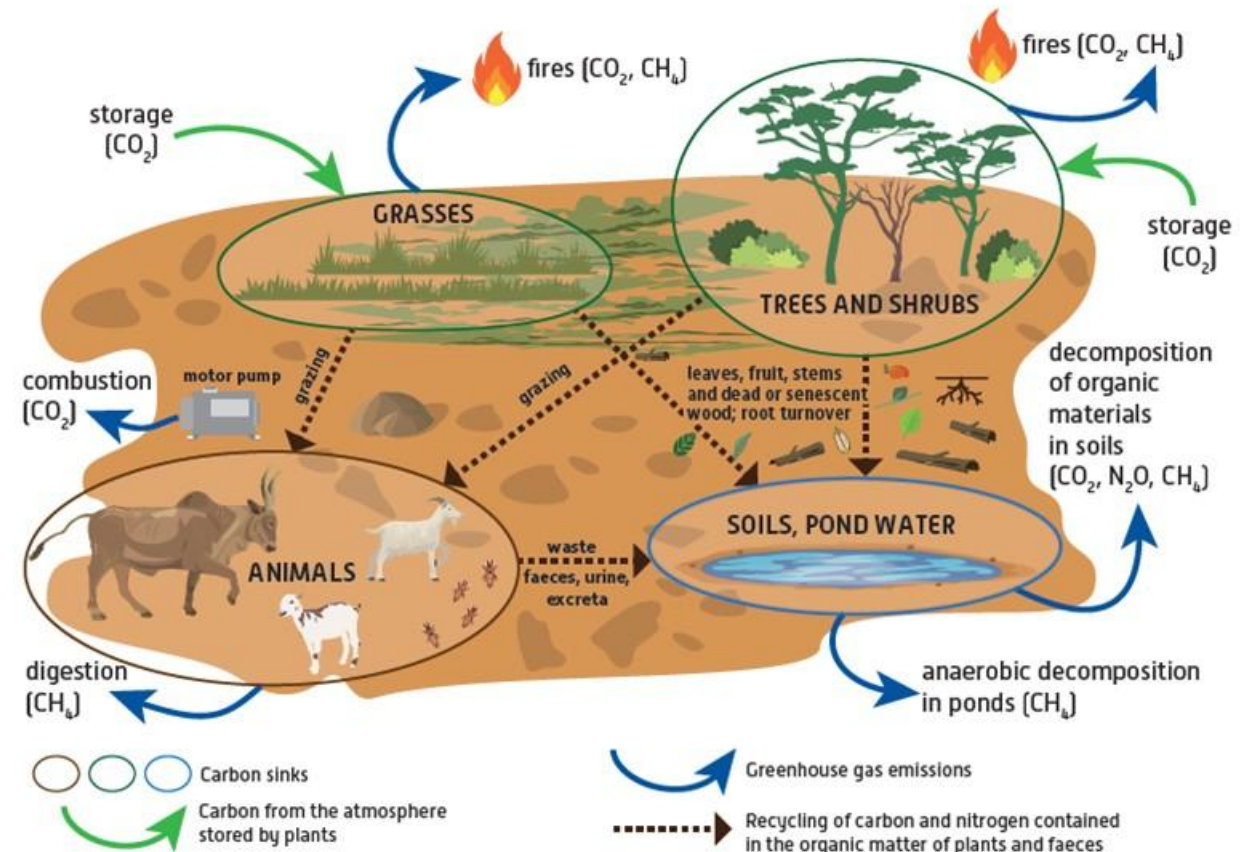
Overall objective

To improve the **assessment** of the **carbon balance** of Sahelian (agro) sylvopastoral ecosystems in order to better quantify their **impacts** on climate change for the development of livestock **policies adapted** to the Sahel



Pastoral landscapes in the Sahel: A carbon balance with unexpected potential for climate change

Simplified model of greenhouse gas emissions and carbon storage in a Sahelian pastoral landscape:
the carbon balance ecosystem approach is based on this model



(Assouma *et al.*, 2019)

Production of reference data

GreenFeed automated system (Burkina Faso)



CaSSECS project install a **GreenFeed** in **Burkina Faso** and started experiences on methane production of local feed

⇒ *in vivo* data on methane emissions
of local African cattle breed and local diets

Results

Season	Living weight (kg)	Total intake Feed (g DM/kg LW)	DMd	MATi (g/kg DMI)	CBWi (g/kg DMI)	NDFi (g/kg DMI)	ADFi (g/kg DMI)	ADLi (g/kg DMI)	CH4 (g/d)	CH4 (g/kg LW)	CH4 (g/kg DMi)	CH4 (kg/UBT / an)
Rainy	130,43 ± 14,37	22,30 ± 1,41	0,57 ± 0,03	64,67 ± 1,59	337,24 ± 3,04	337,24 ± 3,04	391,26 ± 4,08	75,80 ± 2,05	58,57 ± 12,40	0,45 ± 0,11	20,46 ± 4,92	41,06 ± 10,03
Cold dry	139,48 ± 15,35	23,00 ± 1,46	0,50 ± 0,02	47,71 ± 1,58	336,78 ± 11,19	336,78 ± 11,19	401,45 ± 10,67	77,48 ± 2,26	77,82 ± 16,01	0,56 ± 0,11	24,42 ± 5,19	51,10 ± 10,03
Hot dry	145,28 ± 15,68	15,71 ± 1,81	0,46 ± 0,03	28,11 ± 1,05	397,30 ± 7,68	397,30 ± 7,68	453,97 ± 7,15	75,18 ± 2,60	71,20 ± 16,70	0,49 ± 0,12	31,83 ± 8,29	44,7 ± 10,9

Seasonality of eCH4 yield, and lower value during de wet season

Results

Paramètres	R1				R2				<i>P-val</i> <i>ue</i>
	Min	Moy	Sd	Max	Min	Moy	Sd	Max	
CH₄(g/d)	60.71	84.12	12.97	103.81	76.36	95.19	14.74	125.13	0.382
CH ₄ (g/kg LW)	0.28	0.41	0.06	0.50	0.33	0.46	0.08	0.60	0.598
CH₄ (g/kg DMI)	16.59	25.05^a	4.84	32.36	11.98	20.99^b	4.47	27.24	0.017
CH ₄ (g/kg of Milk)	42.41	62.39	11.78	80.84	38.79	48.43	9.13	70.46	0.002
CH ₄ (kg/UBT/an)	25.28	37.70	5.66	45.47	30.43	41.69	7.23	54.24	0.595

Protein supplementation with *S. hamata* L. reduces eCH₄ yield (g/kg DMI) for 16%

GreenFeed as an innovative tool for monitoring and mitigating enteric methane emissions in West and Central Africa

CIRAD with its partners have recently also awarded a C-Lock 2023 equipment grant.

Receive from C-Lock: one Horned GreenFeed pasture system;

Two SmartFeed standard systems and the consumables for three years of normal use of the Green Feed

Device will be installed at the Faculty of Agricultural Sciences, within the University of Abomey-Calavi in Benin by the end of 2023

Develop specific training at capacity development program modules for students, researchers and research center & university technicians in West and Central Africa

GreenFeed as an innovative tool for monitoring and mitigating enteric methane emissions in West and Central Africa



GreenFeed Pasture System



GreenFeed - Large Animal

GreenFeed as an innovative tool for monitoring and mitigating enteric methane emissions in West and Central Africa



SmartFeed system

Message

- 1. There are experimental facilities for monitoring GHG emissions and carbon in SSA**
- 2. It's important to find the funding to keep them functioning over the time**
- 3. Training and capacity building**
- 4. Develop synergies and complementarities between research teams addressing the issue of livestock and climate change**

MeCLAN: Method to evaluate low-carbon livestock in sub-Saharan Africa - research network

Objectives

- Identify research gaps in SSA and, if sufficient data is available, best management practices to increase livestock productivity, reduce GHG emission intensity, and increase C sequestration of pastoral systems in different climatic regions.
- Organize a research school
- Visit with hands-on activities of an existing measuring facility.
- Training on GHG measurement and prediction methods (models, proxies) at different levels to initiate transfers or adaptation of skills and technologies



Thanks for your attention

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