

Carbon emissions from open burning of agricultural biomass during fields clearing in Burkina Faso (West Africa)

Christian P. BOUGMA¹, Loyapin BONDE¹, Valaire Séraphin Ouehoudja YARO¹, & Oumarou OUEDRAOGO¹
¹Laboratory of Plant Biology and Ecology, University Joseph Ki-Zerbo, 03 BP 7021 Ouagadougou 03, Burkina Faso
christian.bougma@ujkz.bf; Tel : (+226) 70567011

Introduction

Agricultural biomass burning is an annual routine practice widely operated by farmers for croplands clearing before sowing. It is one of the main sources of carbon emission. Therefore, our study explored how climatic conditions and cropland types influence carbon emission in agricultural sector.

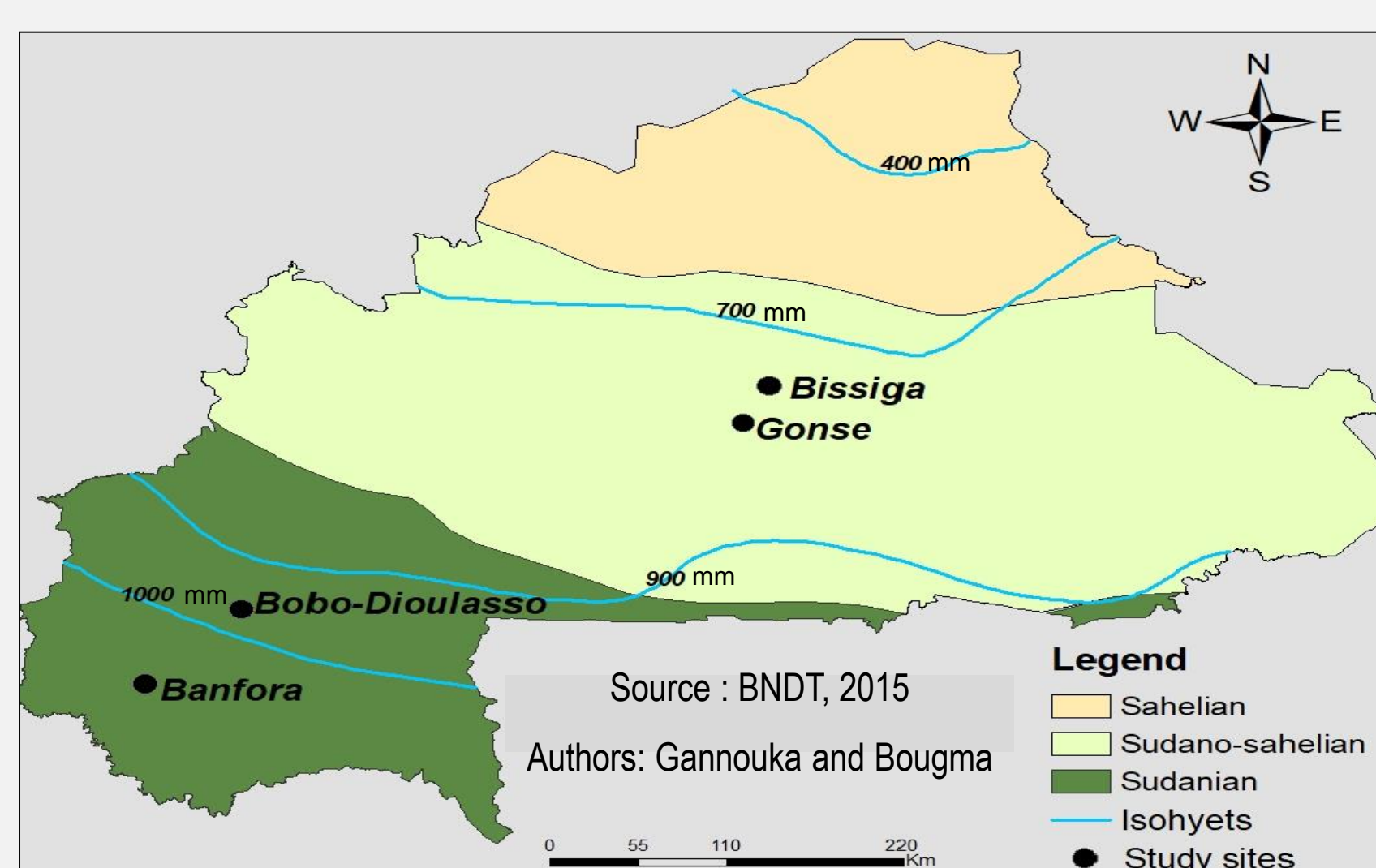
Materials and Methods

Study areas

Study sites were selected based on the presence of croplands remaining croplands (CC) and lands converted to croplands (LC)

CC: >20 old years

LC: <20 old years



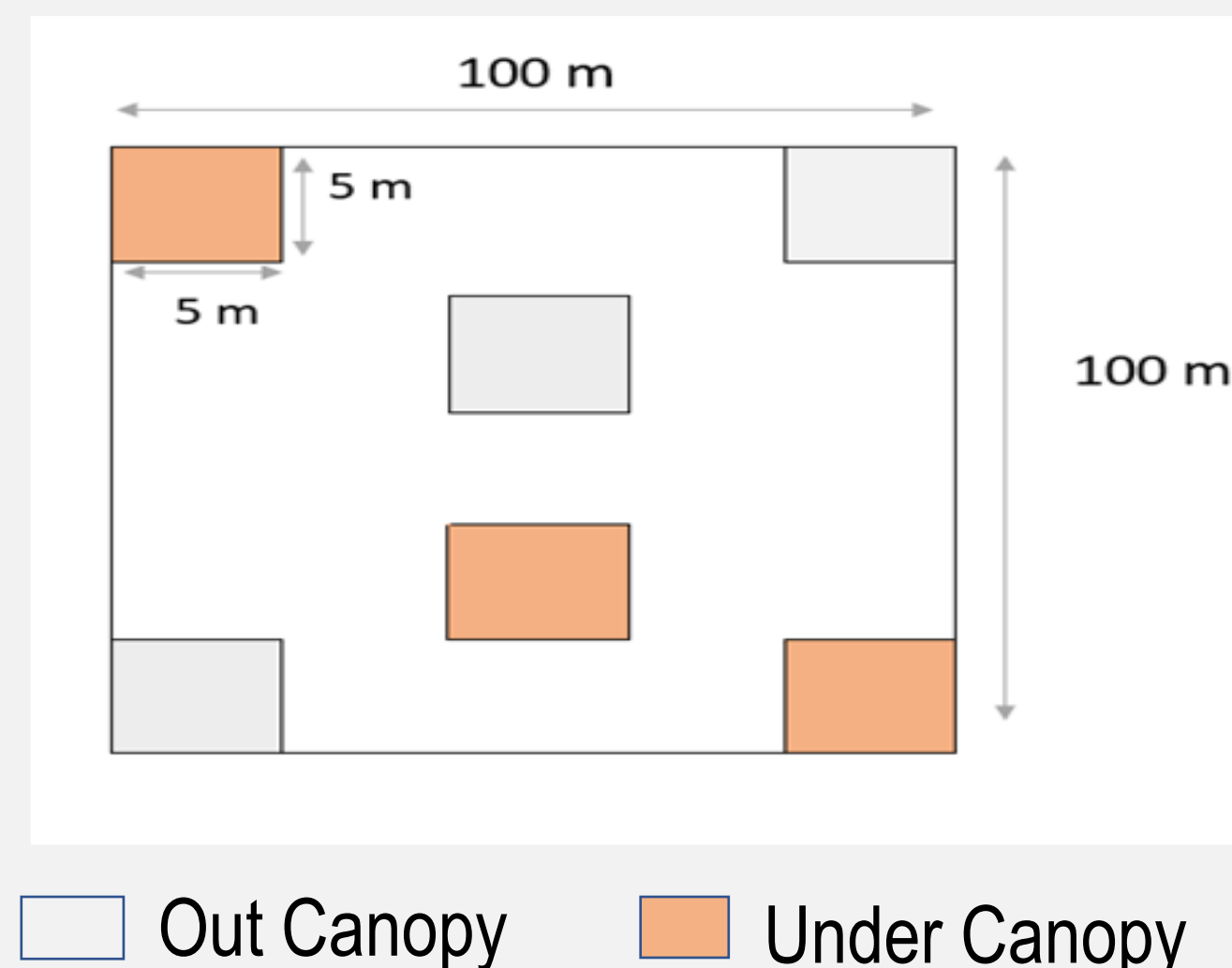
Experimental design and data collection

Open burning experimental fires were conducted in 80 plots (100 m x 100 m) equally distributed according to the following sampling design:

Climate zones	Sudanian		Sudano-sahelian	
Sites	Bobo dioulasso	Banfora	Gonse	Bissiga
Cropland types	LC	CC	LC	CC
Plot number	10	10	10	10

Biomass collection and experimental burning

In each sub-plot, dry biomass were collected, weighted and burned. Pre-fire and post-fire samples were taken to analyse the carbon content.

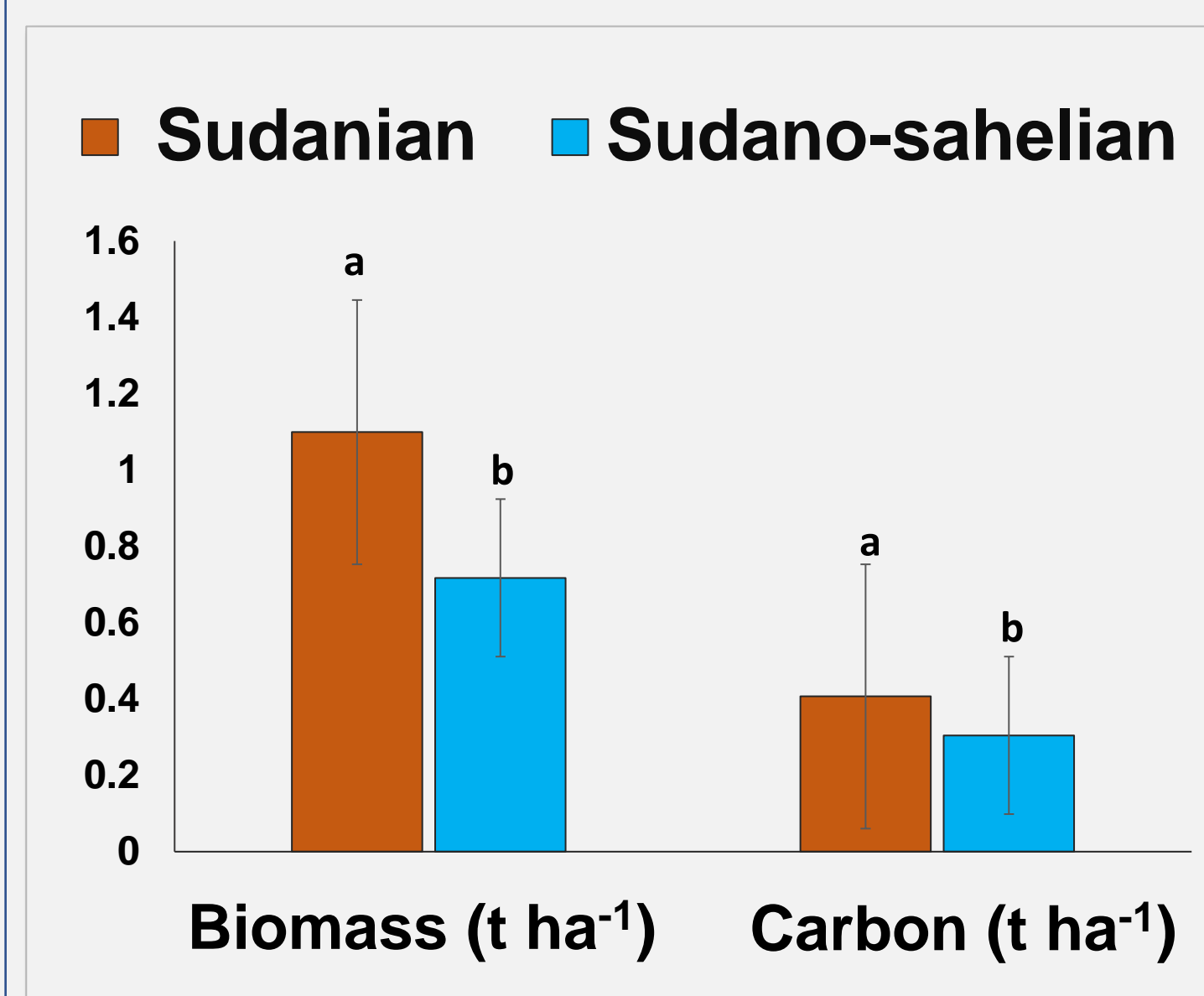


Results

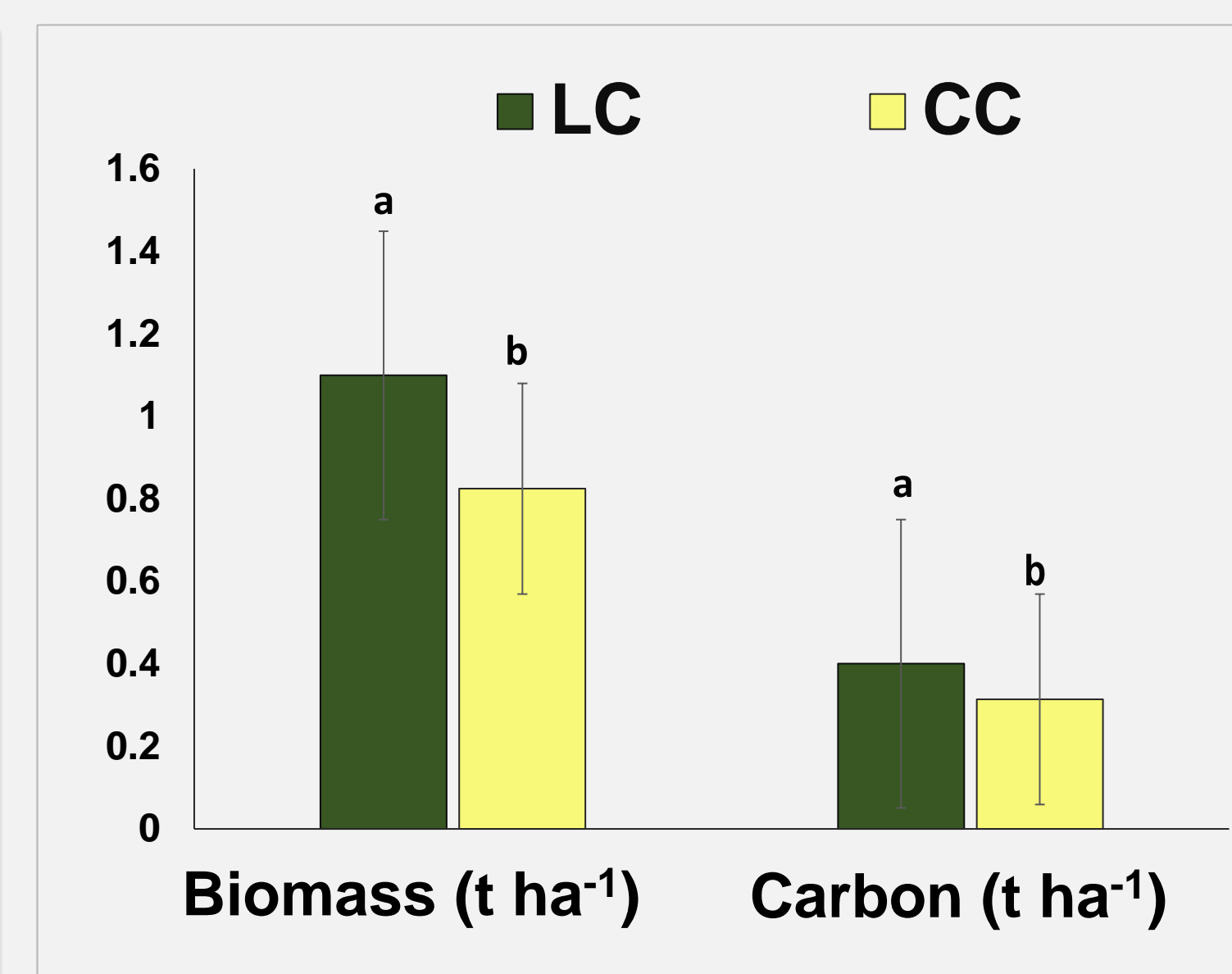
Carbon emitted in croplands

In general, carbon emission in croplands is estimated at $0.35 \pm 0.27 \text{ t ha}^{-1} \text{ C}$ (representing 37.5 % of total biomass) with variation according to climate zones and fields' age.

Climate zones



Cropland types



Emissions factors of carbon (g kg⁻¹ C)

Climate zones	Sudanian	Soudano-Sahelian	P value
	820.8 ± 21	838.8 ± 25	0.001

Cropland types	LC	CC	P value
	812.7 ± 20	847 ± 15	0.001

Conclusion & implications

Emission factors varies inversely with carbon emissions. Climate zones and cropland types have significant influence on carbon emission. Our findings will help to update the NDC of Burkina Faso and predict future carbon emission.

Recommendations

- ❖ Using biomass to delimit fields or composting
- ❖ Burying biomass in field (soil carbon sequestration)



Potsdam, 16-20 January 2023, Germany

Acknowledgement

