

Welcome to the NUTRiGREEN project

Welcome to the fourth NUTRiGREEN Newsletter and the second of this year! A lot has happened since we published our last newsletter in April. Stay up to date with the latest developments in our project and get to know more of the great young scientists in our team. Happy reading!

"Tropentag 2023"

The NUTRiGREEN Team took advantage of this year's "Tropentag" Conference in Berlin to present three posters (see pp.7-9) and one oral presentation. Supported by the NUTRiGREEN project and the Friends of SLE Association, Awa Touré and Saïd Rehema, two young scientists from Senegal, actively participated in the Tropentag 2023 conference. Here, is a brief summary of their experiences:

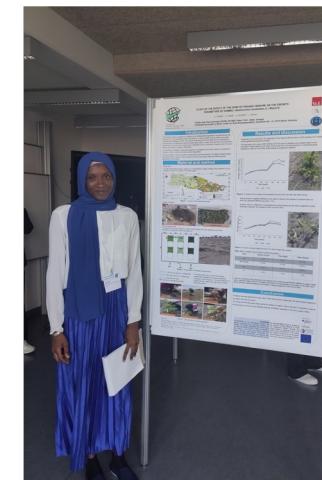
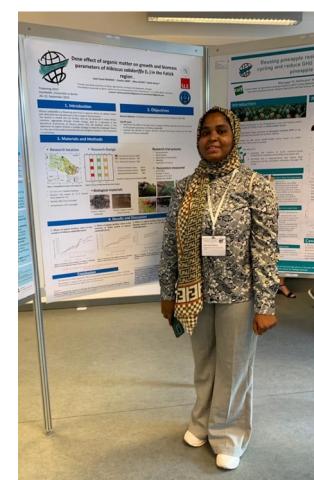
Saïd Chanfi Rehema:

From 17 to 24 September 2023, we travelled to Germany to attend the Tropentag 2023 conference and present our research findings from the NUTRiGREEN project. Tropentag is an annual event and this year's theme was "Competitive Pathways for Transformation of Equitable Food Systems: Compromises and Synergies" and was my first international conference experience. The conference featured scientific sessions, discussions, thematic sessions, and poster presentations, both in-person and via the Whova platform. A range of fascinating topics were covered, including agroecology, food networks, food system transformation processes, and the impact of climate change. On 23 September, I gave a pitch presentation of my poster entitled "Effet de dose de la matière organique sur les paramètres de croissance et de biomasse de Hibiscus sabdariffa (L.) dans la région de Fatick" ("The effect of organic matter treatments on growth and biomass parameters of Hibiscus sabdariffa (L.) in the Fatick region"). Our time in Berlin was made possible by the hospitality of the family of Dr Silke Stoeber family, and I would like to express my deep gratitude to them for making this enriching experience possible.

I must also extend my thanks to my two supervisors, Prof. Dr Aliou Guissé and Dr Omar Sarr, who guided us throughout our research. I am immensely grateful to Dr Judith Henze and the entire Tropentag 2023 organising team.

Awa Touré:

During the Tropentag Conference, I actively participated in Workshop 12, focusing on "Soil and plant nutrition management," which proved to be a stimulating and educational experience. I had the privilege of presenting my poster titled "The effect of the dose of organic manure on the growth and agro-morphological parameters of okra (*Abelmoschus esculentus*) in the region of Fatick, Senegal." One of the most memorable aspects of our journey was the opportunity to explore Germany, especially the vibrant city of Berlin. The newfound connections and engaging conversations we encountered during Tropentag were equally captivating. We return home with expanded knowledge and fresh insights that will not only benefit our ongoing project, but also serve us well in future academic pursuits. Our trip was an exhilarating adventure during which we made numerous fascinating discoveries. While the long layover in Istanbul presented some challenges due to the absence of orientation aids, we were particularly grateful for the financial support provided by the SLE Alumni Association, which helped offset some of the flight costs.



Saïd Chanfi Rehema and Awa Touré with their posters at the Tropentag 2023

Get to know our team members



© Dr. Oumar Sarr

Dr Oumar Sarr

Dr Oumar Sarr is involved in the NUTRiGREEN project as a researcher (supervisor and trainer). He finds the original concept of the project, with its systemic approach involving farmers, researchers, NGOs, schools and students, to be an excellent method of co-constructing a sustainable production environment with all the actors working in the field of agroecology. Dr Oumar Sarr finds the approach of assessing knowledge on climate change and agroecology in combination with the involvement of farmers a reasonable and valuable way to gather reliable scientific data. This approach forms the basis for designing projects that can better address the needs of vulnerable rural farmers. Finally, he sees that the project will undoubtedly contribute to the empowerment of women's groups working in the agricultural fields, encouraging them to adopt agroecological practices and master the value chain of their harvested products, such as hibiscus and okra.



© Arvid Sprenger

Arvid Sprenger

Arvid finished his B.Sc Geography in Kiel in 2021 and moved to Berlin to pursue the "M.Sc. Geographical Development Studies" program at Freie Universität in Berlin. Within his studies he was able to follow his interests and work on different topics, including postcolonial theories, the EU border regime, human-nature interaction, and energy transition. He spent an Erasmus semester at the University of La Réunion which enabled him to explore the region and improve his French language skills. Arvid is working as student assistant at the "Center for Geographies of Global Inequalities" of Prof. Dr. Uli Beisel. As he wanted to get involved and participate in a research project on sustainable development, he is content to have joined the NUTRiGREEN project in October 2023 where he is now also working as student assistant. His main tasks so far included the agrometeorological data analysis and support with the literature research on nutritive gardens.

Updates from NUTRiGREEN members

Dia Abdourahim – PhD candidate SLU

Between January and April, I resided in Sweden for three months. During my stay, I had the opportunity to reunite with Prof. Dr Kostas Karantinidis and had the pleasure of meeting Magloire Thiombiano from Burkina Faso for the first time.

Over the past six months, I have been occupied with a variety of activities, comprising the following tasks:

- Conducting an extensive literature review for three separate scientific articles.
- Reframing my first academic article, which will now concentrate on exploring the impact of non-timber forest product production (specifically baobab, moringa, hibiscus, and okra) on household income. This revised article will feature a comprehensive value chain analysis, highlighting all the involved stakeholders in the product chain.
- Initiating the sampling process for an upcoming survey that we'll be conducting shortly. These tasks encapsulate the primary activities I engaged in during this period.

Magloire Thiombiano – PhD candidate SLU

A mapping proposal identifying the various stakeholders in the baobab, moringa and hibiscus sectors has already been drawn up. The research protocol has also been proposed. We are currently at the stage of preparing the surveys, which will probably take place in December 2023. The activities around the living labs and the business plan are also being prepared. These activities will be held in Ziniaré from 15 November to 7 December 2023.

Bright Little-Tetteh - SLE Intern

Bright Little-Tetteh is a master's student from the "Institut Agro Rennes-Angers", who undertook an internship in Berlin and Senegal. The internship was supported by SLE and NUTRiGREEN project.

He completed his master's thesis entitled "Democratisation of climate knowledge : Assessing co-creation of knowledge via Climate Field Lab activities in Senegal". Here he summarises his findings:

The climate is changing rapidly, which is affecting livelihoods, especially in the Global South. Efforts are underway at global, regional, national, and local levels, to address these issues mainly through the development of climate services. However, involving local farmers in designing climate services remains weak, although mechanisms do exist.

One such mechanism was observed in the NUTRiGREEN project, which aims to improve the nutritional status and build the capacity of women farmers in response to climate change through Climate Field Schools (CFS) activities that incorporate agrometeorological and agroecological learning activities. I conducted a study using a qualitative research approach to show how knowledge co-creation takes place in the CFS of the NUTRiGREEN project in Senegal, and the efforts made to involve women farmers in decision-making. The results of the study show an overarching approach to consulting farmer groups in defining intervention strategies adapted to the local context. However, the interactions and levels of involvement between scientific and non-academic actors vary across the activities introduced in the CFS.



Focus group interview as part of the research

The two main activities of the CFS (i.e., agroecological learning and agrometeorological learning) were found to be separate activities, although the actors involved are the same. A stronger entanglement of the two approaches would be logical and more effective. The findings reveal a lack of cross-cutting communication between scientists and non-academic actors in agrometeorological learning, while frequent interactions and exchanges are evident in agroecological learning. This study serves as a basis for bridging gaps in the co-creation process, encouraging new partnerships and strengthening existing ones in the NUTRiGREEN project.

Project visit to Burkina Faso - meeting and dialogue with NUTRiGREEN partners

From 5 to 16 October 2023, Dr Silke Stöber and Dr Judith Henze from the Centre for Rural Development (SLE) carried out a project visit to Burkina Faso to meet with partners of the NUTRiGREEN programme. The trip aimed to review the final activities of the project and discuss the data collection at the end of the sorghum trials with the Koassanga Association. The first project activity was a comparative sorghum production trial in the Central Plateau region. The use of high-quality organic fertiliser, high-quality seed and agroecological practices were analysed and evaluated with smallholder farmers in four inter-village comparison trial plots.



Inspection of fields with smallholders

The team visited the trials in the villages of Razoutenga, Andem, Daygratenga, and Lelexe. The fields were first inspected together with the smallholders. The experience gained was then discussed in joint meetings. This was followed by a training session on harvesting and data collection to analyse the trial. Scientific data collection at harvest, which takes place in early November, includes counting plants in three 4m² plots, measuring plant height, size of panicle, panicle weight and 1000-grain weight.

Measurement of plants in one 4m² square

© Judith Henze



Farmer evaluation of four plots in Razoutenga

In collaboration with FasoGreen journalist Abel Yerbanga, the trial and its evaluation were documented through video and photos. The footage is now being used to produce short videos in the local language, Mooré, with French subtitles. The aim is to create a simple guide to disseminate these effective cultivation methods.



Journalist Abel Yerbanga from FasoGreen (right) with his assistant

© Silke Stöber

Another project activity was a visit to a cowpea trial in the village of Andem, where 31 women received cowpea seeds, equipment and training from the Koassanga Association. A meeting was held to jointly evaluate the weather data collected by the smallholders themselves (see page 6 for details). The trip was concluded with a visit to the official NUTRiGREEN project partner Dr Alphonsine Ramde from the IRSS.



Discussion with women group in Andem

© Judith Henze

Valorisation of project results - FOSC meeting in Bari

In order to enhance the output and impact of the various projects co-funded by the FOSC ERA NET initiative, the FOSC team organised a two-day meeting in Bari, Italy, on 25-26 October. The main objective of the meeting was to advance the development of valorisation elements in the 17 funded research projects of the 2019 call. During the event, the NUTRiGREEN and MedAgriFood projects jointly announced their intention to create a digital manual of 8 to 10 pages. This manual aims to introduce young researchers in the fields of agriculture, food security and international development to the benefits of integrating traditional ecological knowledge into research projects. As well as defining and explaining the various benefits, the manual will also address the limitations of using traditional ecological knowledge in such projects. It will also provide insights and lessons learned from both projects. The handbook is expected to be published in April 2024.

Update "Agrometeorological learning"

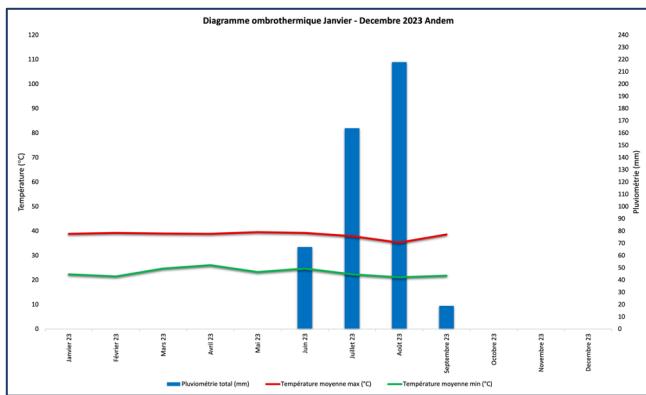
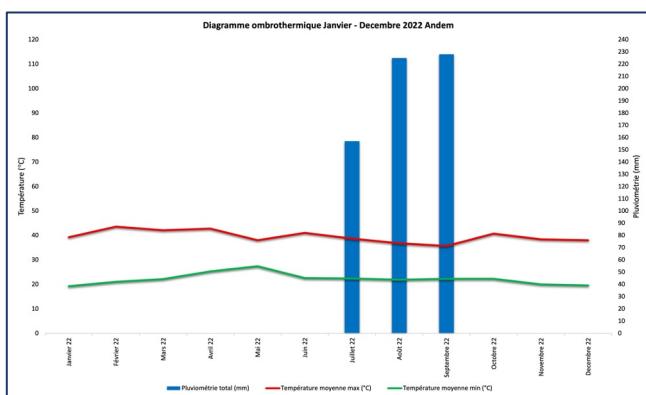
During a visit to Burkina Faso in October, a collaborative learning session was conducted with weather data collectors from the villages of Zitenga, Razoutenga, Andem, Dayagretenga, Nabingma, Koassanga, and Lelexe. This practice, initiated in NUTRiGREEN's first year, and implemented with the Association Koassanga, involves the daily recording of minimum and maximum temperatures as well as rainfall amounts by the weather data collectors who collect data on a voluntary basis. This data is compiled into monthly and annual graphs.

On 13 October 2023, during the third agrometeorological learning exchange meeting, the SLE team convened with five out of the seven collectors in Burkina Faso. Participants compared temperatures, number of rainy days, and rainfall amounts for different months and locations.

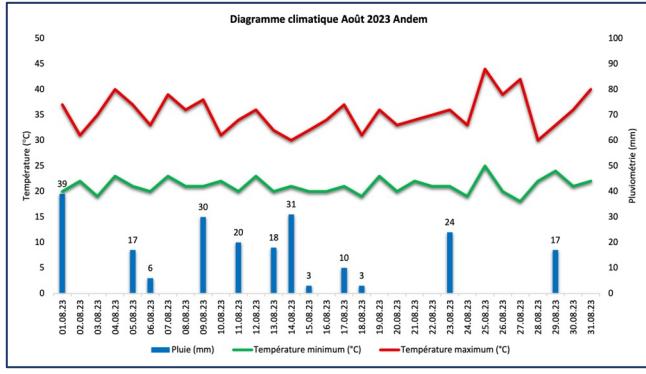
Biannual information sheet on project activities

November 2023 No. 4

We discussed rainfall variability in the villages by looking at the two previous rainy seasons in Andem. While from June to September 2023 Andem had 24 days of rainfall with 468 mm, in 2022 it was 23 days with 610 mm, which means 2023 was a much drier year compared to the previous year.



Comparison of yearly overviews in Andem (2022 and 2023)



Overview of data collected in August 2023, Andem

The meeting was an opportunity to discuss and receive feedback from the data collectors. The irregular functioning of the thermometers was identified as an ongoing challenge, and a set of new thermometers was sent out. An interesting observation was that villagers sometimes visit the data collectors after rainfall to inquire about the actual amount of rain recorded. One recommendation from the weather observers was to focus on rainfall observations only. The farmers are interested in the rainfall and the observation period is reduced to a few months.

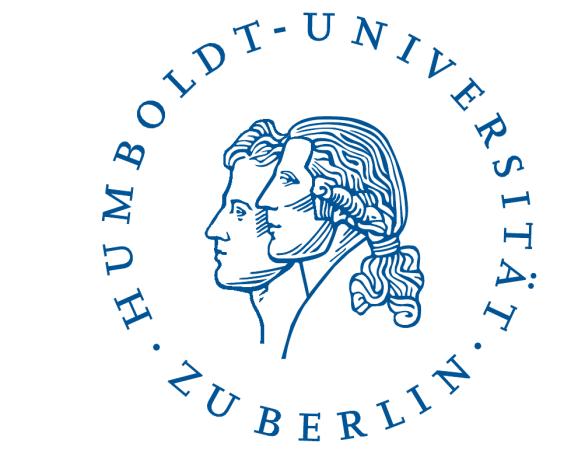


Evaluation of the collected weather data

© Abel Yerbanga



Dose effect of organic matter on growth and biomass parameters of *Hibiscus sabdariffa* (L.) in the Fatick region .



Tropentag 2023
Humboldt- Universität zu Berlin
20.-22. September 2023

¹ Cheikh Anta Diop University of Dakar, Agroforestry, Ecology and Adaptation, Senegal

² Humboldt-Universität zu Berlin, Center for Rural Development /SLE, Hessische Str. 1-2, 10115 Berlin, Germany

Contact: rehemasaidchanfi@gmail.com and omsarr2@gmail.com

1. Introduction

Hibiscus sabdariffa is a flowering plant that is native to Africa. Its calyxes, leaves and seeds plant are ingredients in a range of food products.

The decline in rainfall and soil fertility, that can be observed in many African countries, aggravated through climate change, lead to a decrease in the agricultural productivity of hibiscus plants. This, the question arises: is the application of organic fertiliser a suitable strategy to meet this challenge? Hence, it is the aim of this study to promote the use of organic residues in the restoration of soil fertility .

3. Materials and Methods

■ Research location

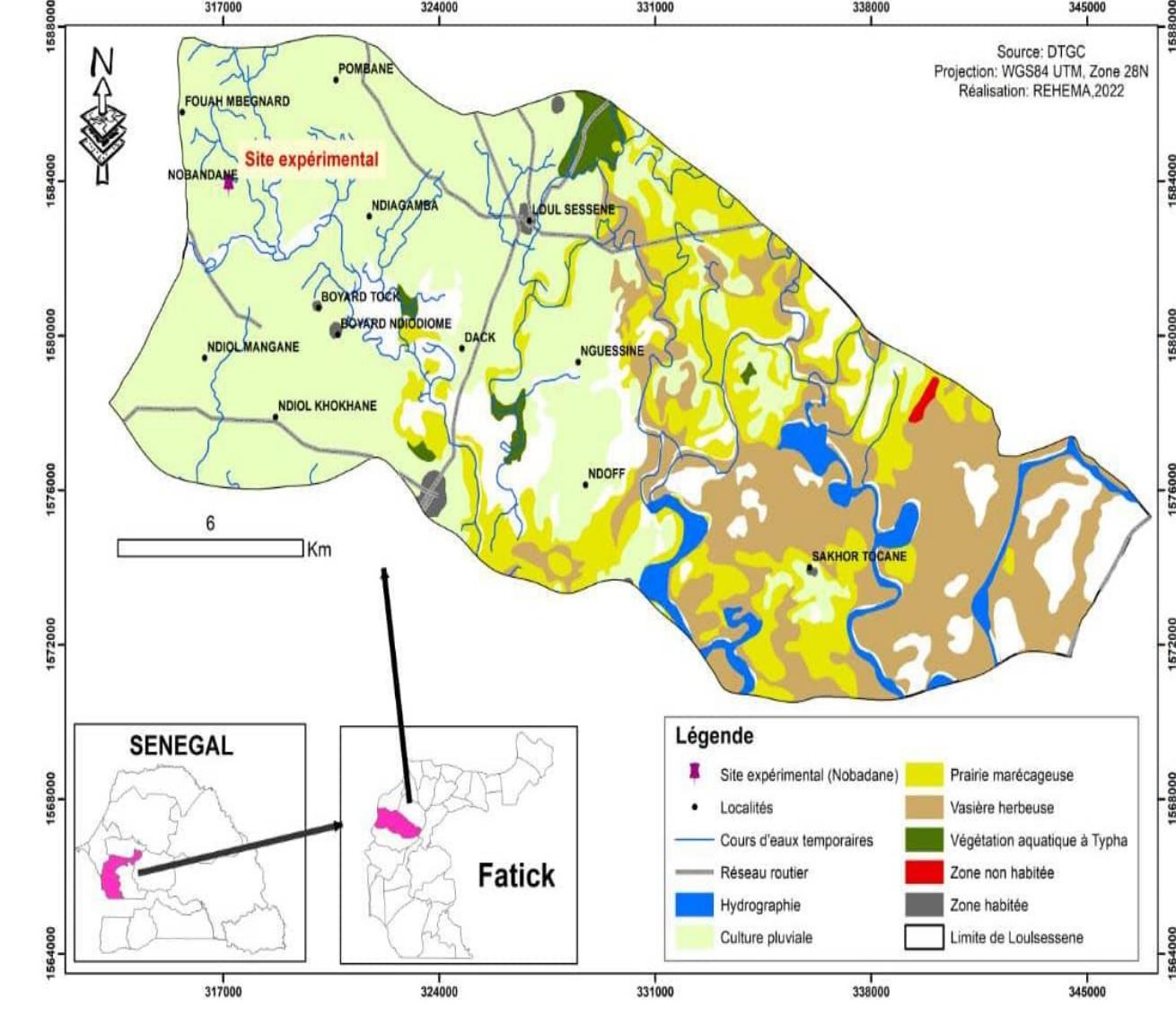


Figure 1: Geographical location of the study site

- Climate zone: Sudano-Sahelian
- Seasons: Dry season (X -Y) 9 months rainy season (X -Z)
- Rainfall: 689.7mm (average)
- Temperature: 24°C (average)

■ Research Design

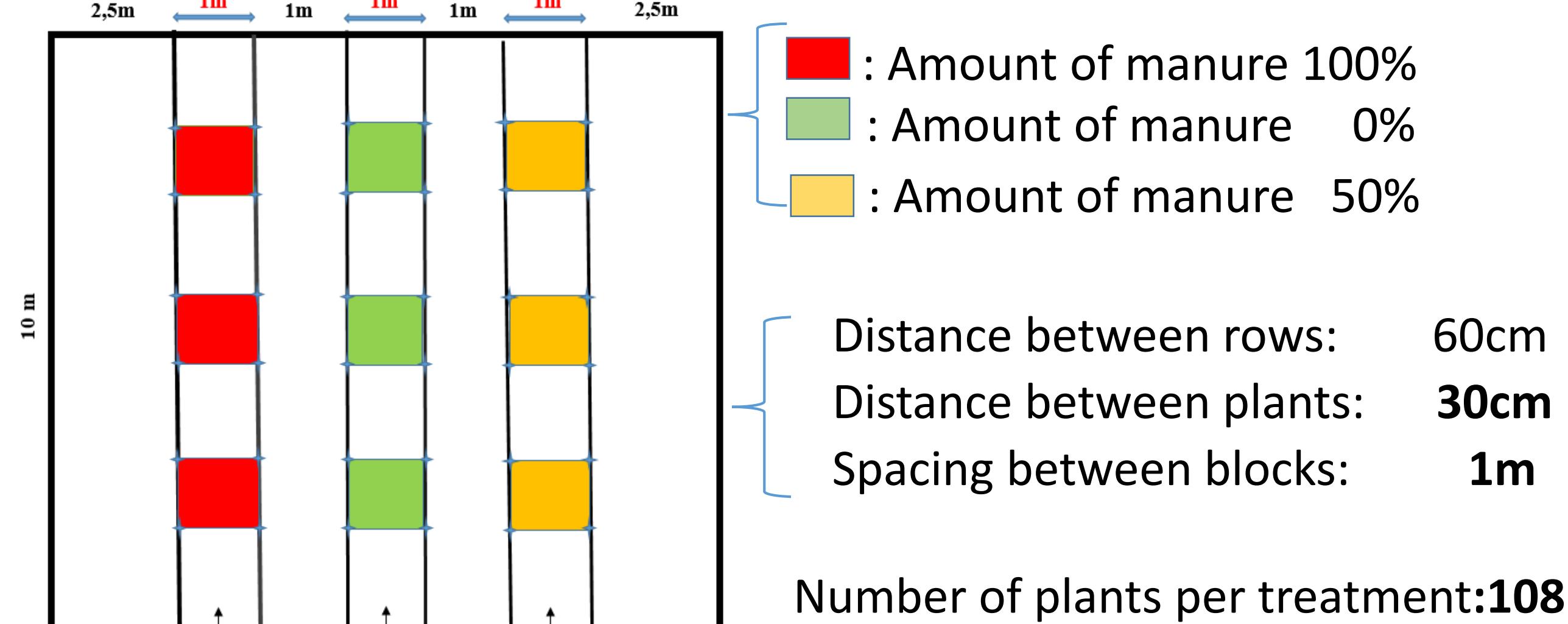


Figure 2: Set-up of experimental plot (block design)

■ Biological materials



Photo1: *Hibiscus sabdariffa*



Photo2: Organic manure (horse manure)

Research trial process

- Soil preparation
- Direct sowing
- Observation of germination
- Weeding
- Application of manure

■ Parameters measured

- Plant height
- Number of leaves
- Diameter of the stem
- Biomass /Dry weight



4. Results and Discussion

1. Effects of organic fertiliser ratios on leaf numbers of *Hibiscus sabdariffa* plants

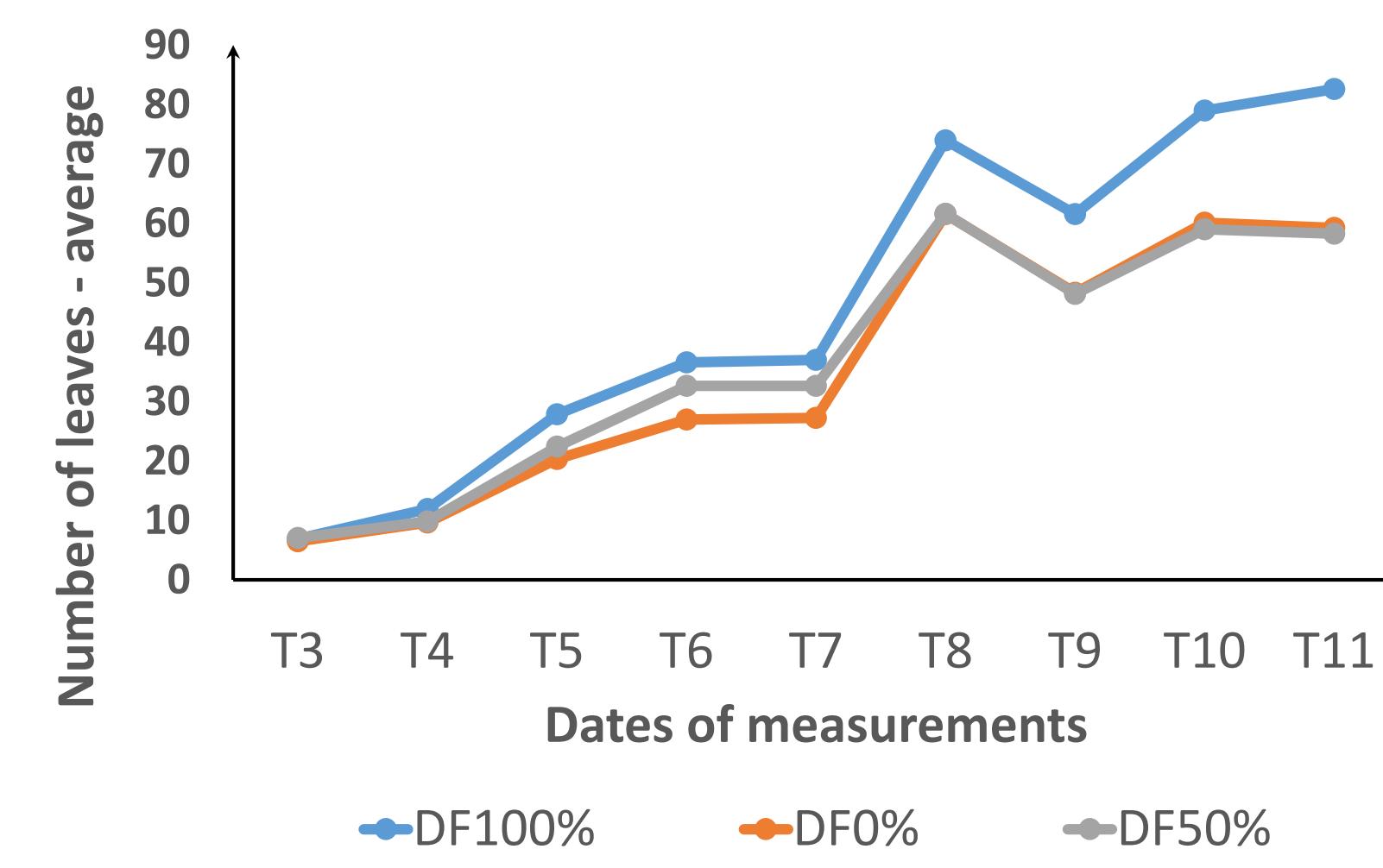


Figure 3: Evolution of leaf numbers of *Hibiscus sabdariffa* plants for three different ratios of horse manure

2. Effects of organic fertiliser ratios on the evolution of height growth of *Hibiscus sabdariffa* plants

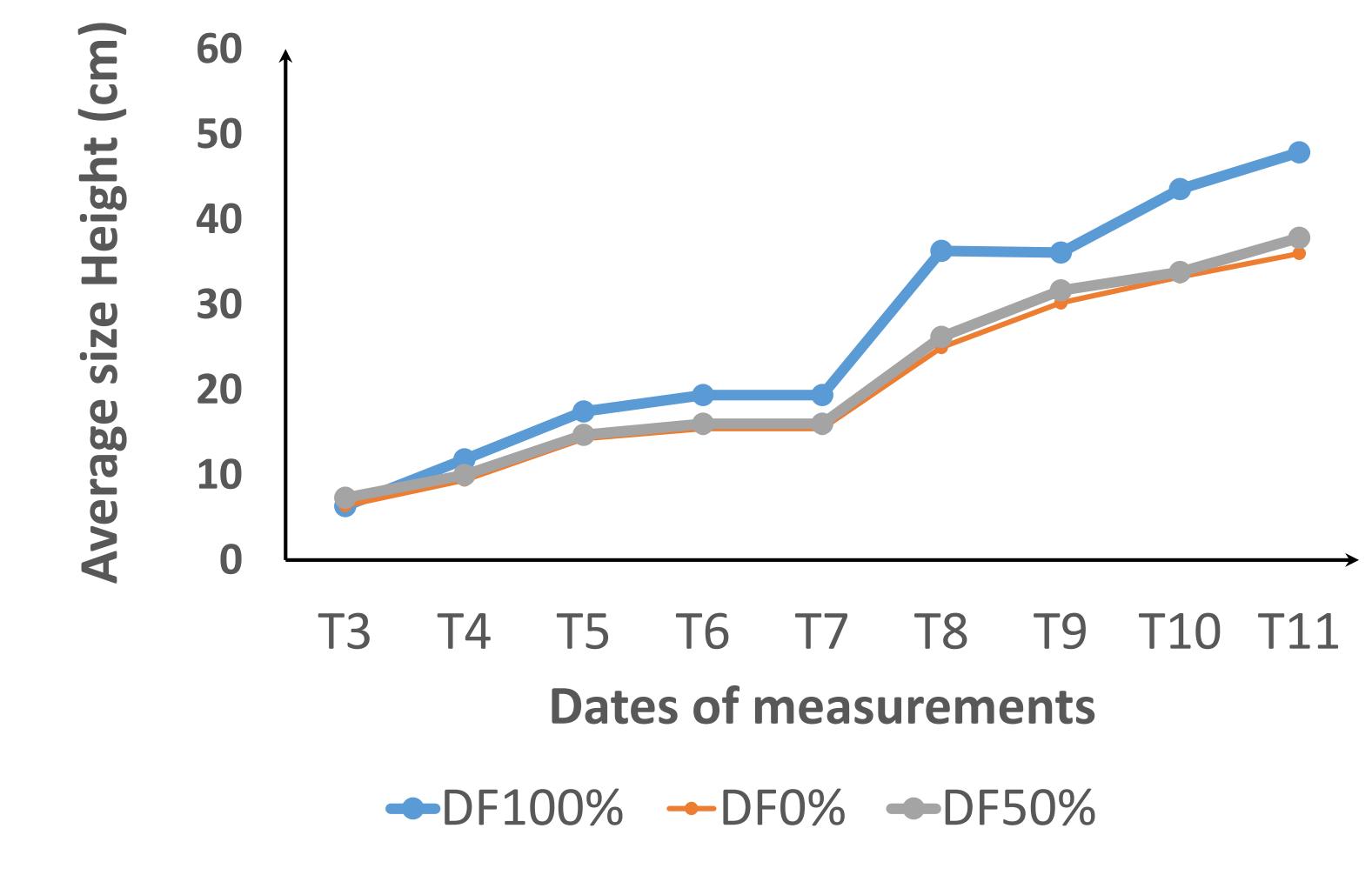


Figure 4: Evolution of the height of *Hibiscus sabdariffa* plants for three different ratios of horse manure

3. Effects of organic fertiliser ratios on the diameter growth at the collar of *Hibiscus sabdariffa* plants

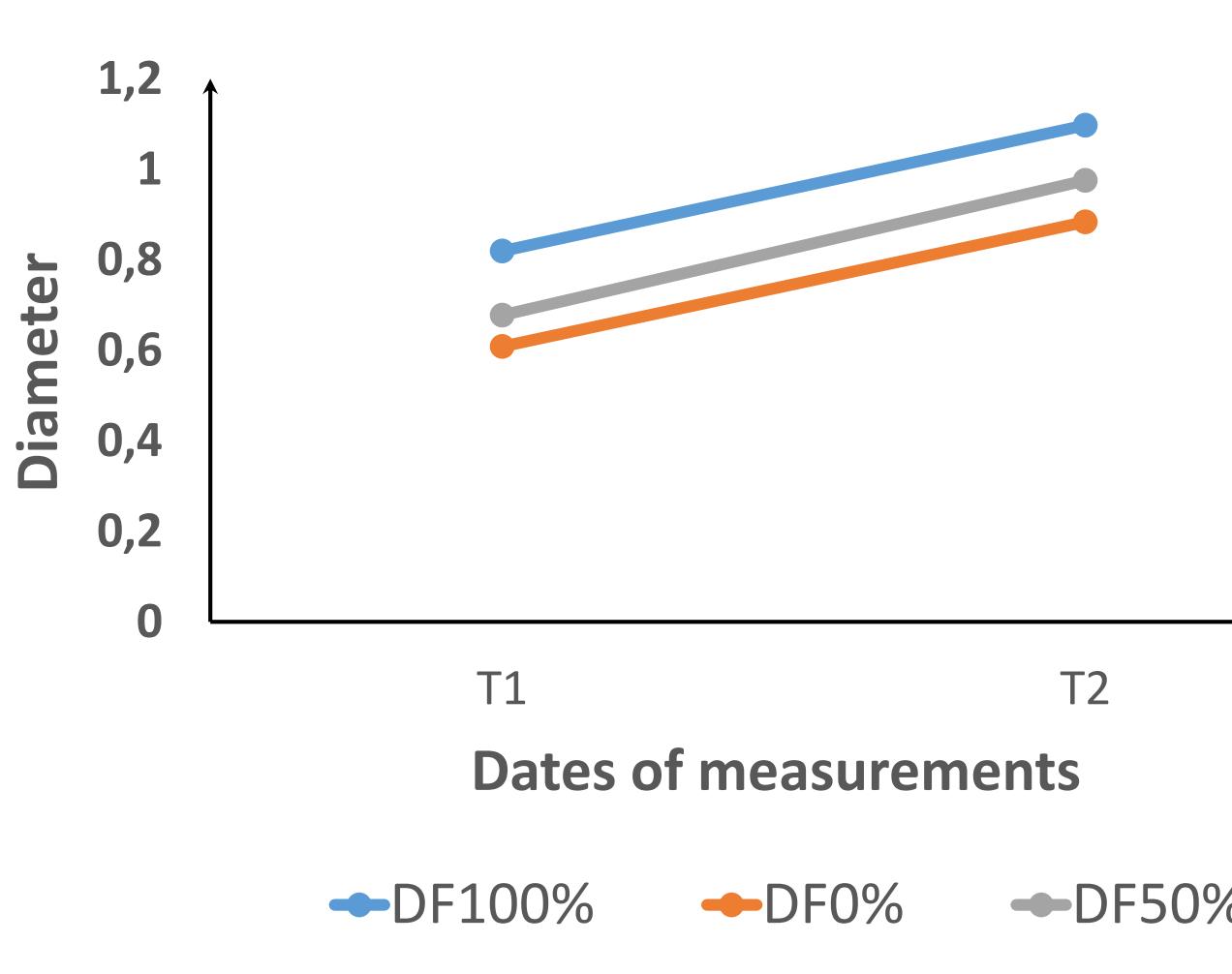


Figure 5: Evolution of the diameter of *Hibiscus sabdariffa* plants for three different ratios of horse manure

4. Effects of organic fertiliser ratios on dry weight/biomass

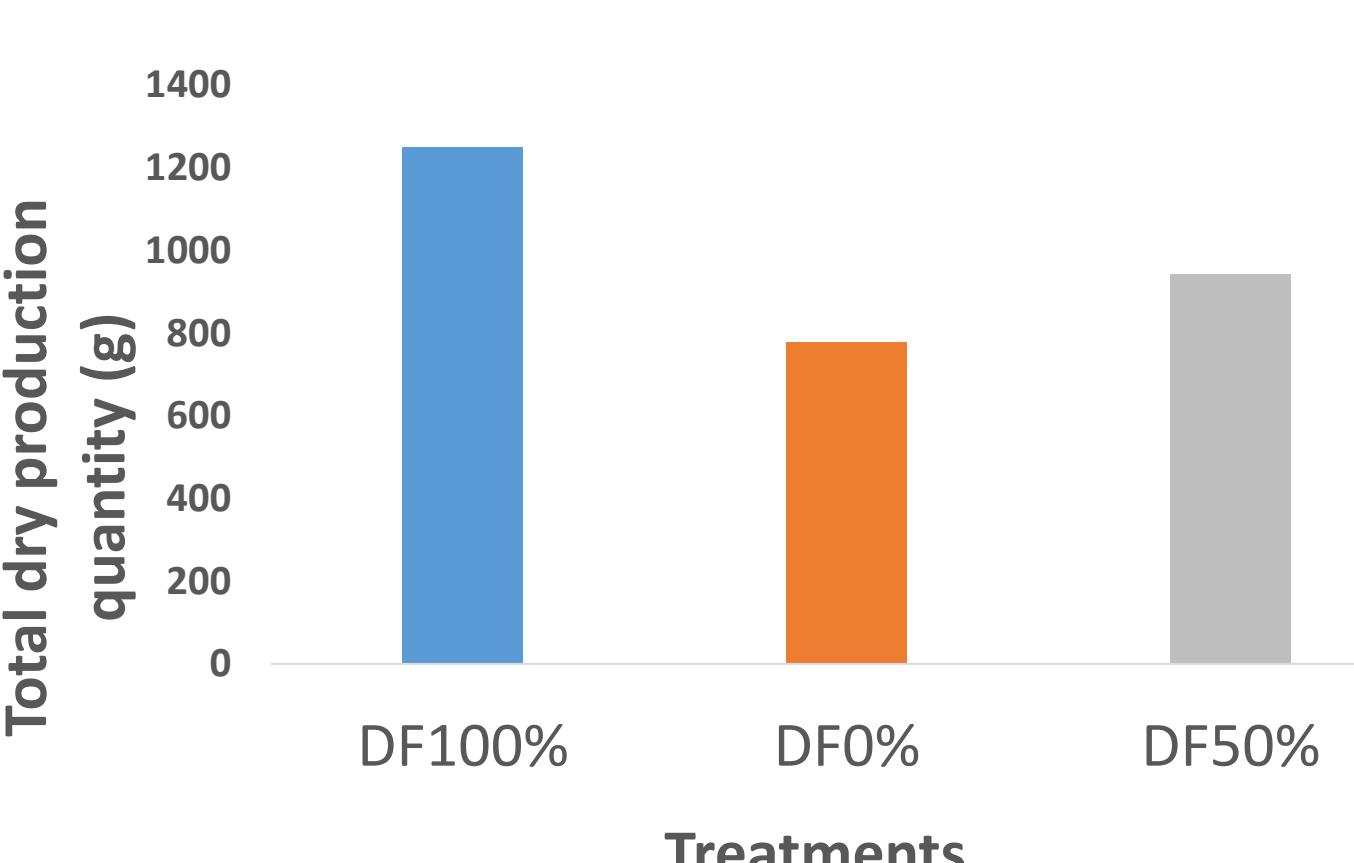


Figure 6: Quantity of total biomass (dry weight) for three different ratios of horse manure

Conclusion

- The ratio did not have a significant effect on the growth and development of *Hibiscus sabdariffa*
- Nevertheless, it appears that more growth and the best biomass production were obtained under the DF100% treatment (the highest ratio of horse manure)

Reference

Useni SY, Chukiyabo KM, Tshomba KJ, Muyambo ME, Kapalanga KP, Ntumba NF, Kasangij AKP, Kyungu K, Baboy LL, Nyembo KL, Mpundu MM 2013 . Use of recycled human waste to increase corn production (Zea mays L.) on ferralsol in southeastern DR Congo. Journal Applied Biosciences. 66:5070

NUTRIGREEN

NUTRIGREEN is an international project with partners in Burkina Faso, Germany, Senegal and Sweden. The project investigates the value chains of traditional African plants in order to strengthen their impact in the local and regional agri-food system. Together with farmers, consumers and other value chain stakeholders, we research their current status and future potentials from farm to folk.

The NUTRIGREEN project and the research results are financially supported by the German Federal Ministry of Food and Agriculture (BMEL) through the Federal Office for Agriculture and Food (BLE) , grant 2821ERA14C. This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No. 862555.

With support from

Federal Ministry of Food and Agriculture

by decision of the German Bundestag

ERA-NET Cofund on

Food Systems and Climate

FOSC

ERA-NET Cofund on

Food Systems and Climate



Tropentag 2023
Humboldt-Universität zu Berlin,
September 19-24 2023

STUDY OF THE EFFECT OF THE DOSE OF ORGANIC MANURE ON THE GROWTH PARAMETERS OF GOMBO (*Abelmoschus esculentus* (L.) Moench)

A. TOURE ¹, O. SARR ¹, A. GUISSE ¹, J. Henze ²

¹ Cheikh Anta Diop University (UCAD), BP 5005, Dakar- Fann , Dakar, Senegal

² Humboldt-Universität zu Berlin, Center for Rural Development/SLE, Hessische Str. 1-2, 10115 Berlin, Germany



Introduction

Okra (*Abelmoschus esculentus* (L.) Moench) is an indispensable ingredient in the West African diet, especially for rural populations, where malnutrition is a major problem among children and adults (Aishwarva and Bilaspur, 2018). It is a source of vitamins and mineral salts, that are essential for a balanced diet. Its importance is due to its high market value, but also to the fact that it is found fresh in all markets during the winter months (July to September) and in a dried form during the rest of the year (slices, dried slices or powder) (Sall, 2020).

In rural areas of Senegal, small market gardeners overexploit the soil, which leads to a progressive depletion of their nutrients and their possible degradation.

This study, which is part of an effort to improvement of food production in the Sahel, therefore tested three dose ratios of organic manure based on horse dung, through observing different growth parameters of okra plants.

Material and method

Study area

The agricultural field trial was carried out in the Nobadane village, located in the commune of Loul Sessène, a district of Fimela, in the Fatick region.

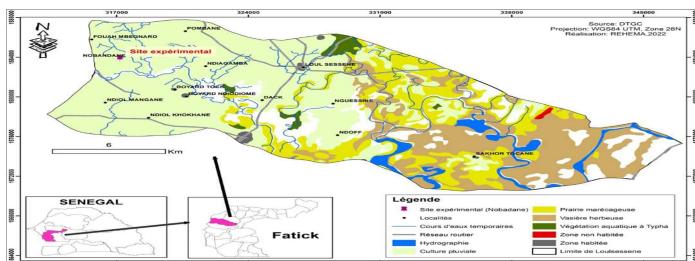


Figure 1: Location of the experimental site

Organic fertiliser



Device experimental

The experimental design followed a Fisher' blocks design with three repetitions and three treatments including one control (see figure 2)

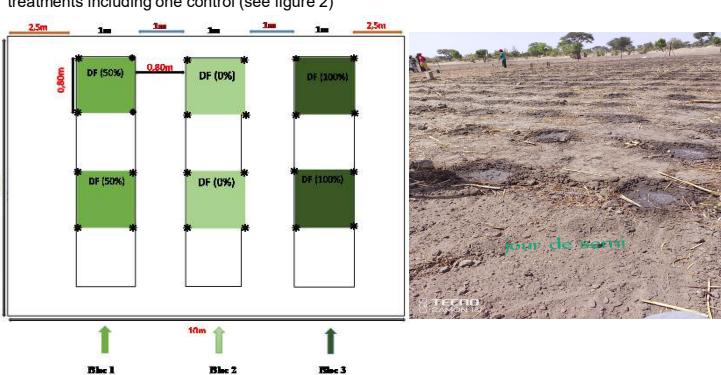


Figure 2 : Presentation of the experimental device

DF (100%): 100% horse manure i.e. 2Kg/pocket

DF (50%): 50% horse manure i.e. 1Kg/pocket;

DF (0%): control with 0%; and

Measurement of growth parameters

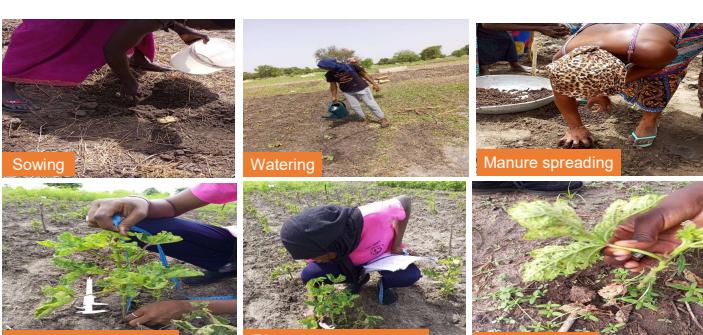


Figure 3 : Measurement of growth parameters

References

Abdou, R., Halilou, Al, Zango, O., So, TKA, Yahaya, MI, & Bakasso, Y. (2022). Effect of fertilizers on the productivity of three varieties of okra (*Abelmoschus esculentus* L. Moench.) from the Zinder region (Niger). *International Journal of Biological and Chemical Sciences* , 16 (1), 378-389

Online Sacred, H. (2020). The influence of goat farming practices in the region of Fatick (Senegal) on the presence of antibiotics in dairy products.

Results and discussion

- Compared to the control (D2), the application of the manure with the ratio of 100% fertiliser (D1) induced a fairly significant production of leaves;
- The application of the ratio of 50% fertiliser (D3) only had on average only a positive effect on the production of leaves after the 10th week. At the same time, the leaf production of individuals plants subjected to ratios (D1) and (D2) tends towards a progressive reduction.

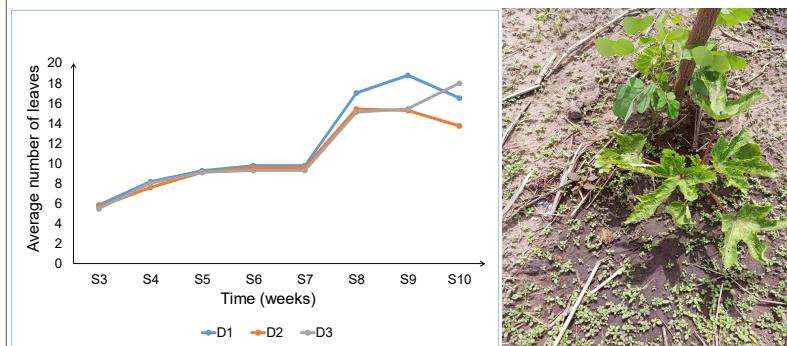


Figure 4 : Evolution of the number of leaves/plants from the 3rd to the 8th week after sowing

- Vertical growth is negatively affected by the doses of manure, the analysis of variance does not show any significant difference (p -value > 5%).
- However, there is a difference in size between the control plants and the plants subjected to basal fertilization treatment, the average of which is around 50m

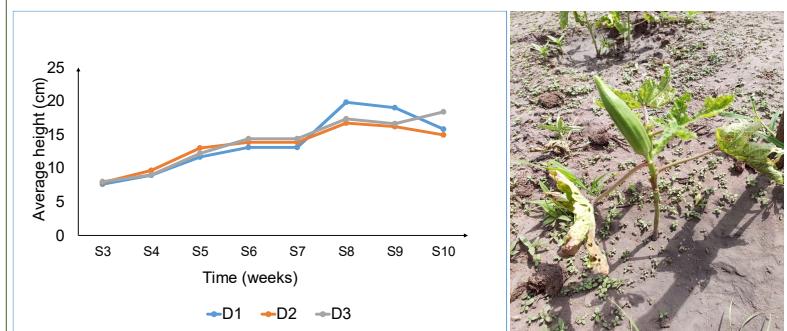


Figure 5 : Evolution of plant height from the 3rd to the 8th week after sowing

Table: Effect of organic manure dose on growth parameters

Rates	Number of sheets	Plant height	Collar diameter
D1	11.875 ^a	13.625 ^a	0.4758a -
D2 (witness)	10.734b -	13.250a -	0.4693a -
D3	11.198 ^{ab}	13.779 ^a	0.4594a -
P	< 0.05	> 0.05	> 0.05

Under the conditions of the experiment, the analysis of the results showed that the addition of organic matter had no significant effect either on the height of the plant or on the diameter at the collar. On the other hand, D50% showed a significant effect on the number of leaves compared to D0% and D100%

Conclusion

It appears from the trials that the lower ratio of 50% horse manure clearly gave the best results compared to the higher ratio and the control.

This shows that the okra plant reacts well to the addition of organic manure and that it is possible to improve the productivity of okra by using moderate amounts of fertiliser, especially in soil rich in organic matter.

With support from
Federal Ministry of Food and Agriculture

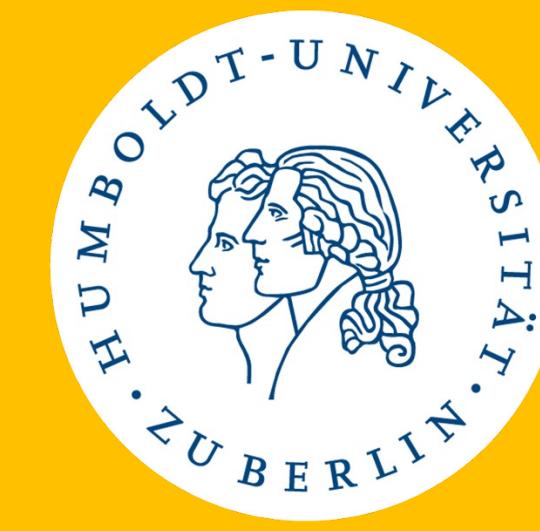
by decision of the German Bundestag

NUTRIGREEN The NUTRIGREEN project is funded by NUTRIGREEN is an international project with the German Federal Ministry of Food partners in Burkina Faso, Germany, Senegal and Agriculture (BMEL) through the Sweden. The project investigates the value chains Federal Office for Agriculture and Food of traditional African plants in order to strengthen (BLE), grant 2821ERA14C. This project their impact in the local and regional agri-food has received funding from the European system. Together with farmers, consumers and Union Research and Innovation Program other value chain stakeholders, we research their under grant agreement No 862555. current status and future potentials from farm to folk.





Agricultural production practices, challenges and opportunities of small-scale farmers in Burkina Faso and Senegal



Tropentag 2023

Humboldt-Universität zu Berlin
September 20-22, 2023

Judith Henze¹, Bright Little-Tetteh²

¹Humboldt-Universität zu Berlin, Centre for Rural Development/SLE, Hessische Str. 1-2, 10115 Berlin, Germany

²Institut National d'enseignement supérieur pour l'agriculture, l'alimentation et l'environnement,

Contact: Judith.Henze.1@hu-berlin.de

SLE

1. Introduction

Objectives

A first activity of the NUTRIGREEN project was to conduct a household survey (HHS) in the project regions, in order to:

- understand the current farming practices and decision process
- discover what plants are produced
- establish the perceived value of traditional plants
- determine how small-scale farmers perceive and adopt to climate change

Two HHSs were organized in the project regions - Zitenga in Burkina Faso, and Thies/Fatick in Senegal, interviewing head of households.

Research areas



2. Methods and sample details

Methods

The sample groups for the HHS were chosen through convenience sampling.

Burkina Faso: 210 interviews from 25. – 29. of April 2022. The interviews were carried out in the local language Mooré, by seven students from the Université Joseph Ki-Zerbo Ouagadougou (UJKZ).

Senegal: 204 interviews were conducted between 18. February and 02. March 2022 in the villages of Nobandane and Diorfoir. The interviews were carried out in the predominant local language Serer, by ten students from Cheikh Anta Diop University Dakar (UCAD).

Data was collected using tablets and the Kobo Toolbox is an open-source humanitarian technology company based out of the Harvard Humanitarian Initiative.

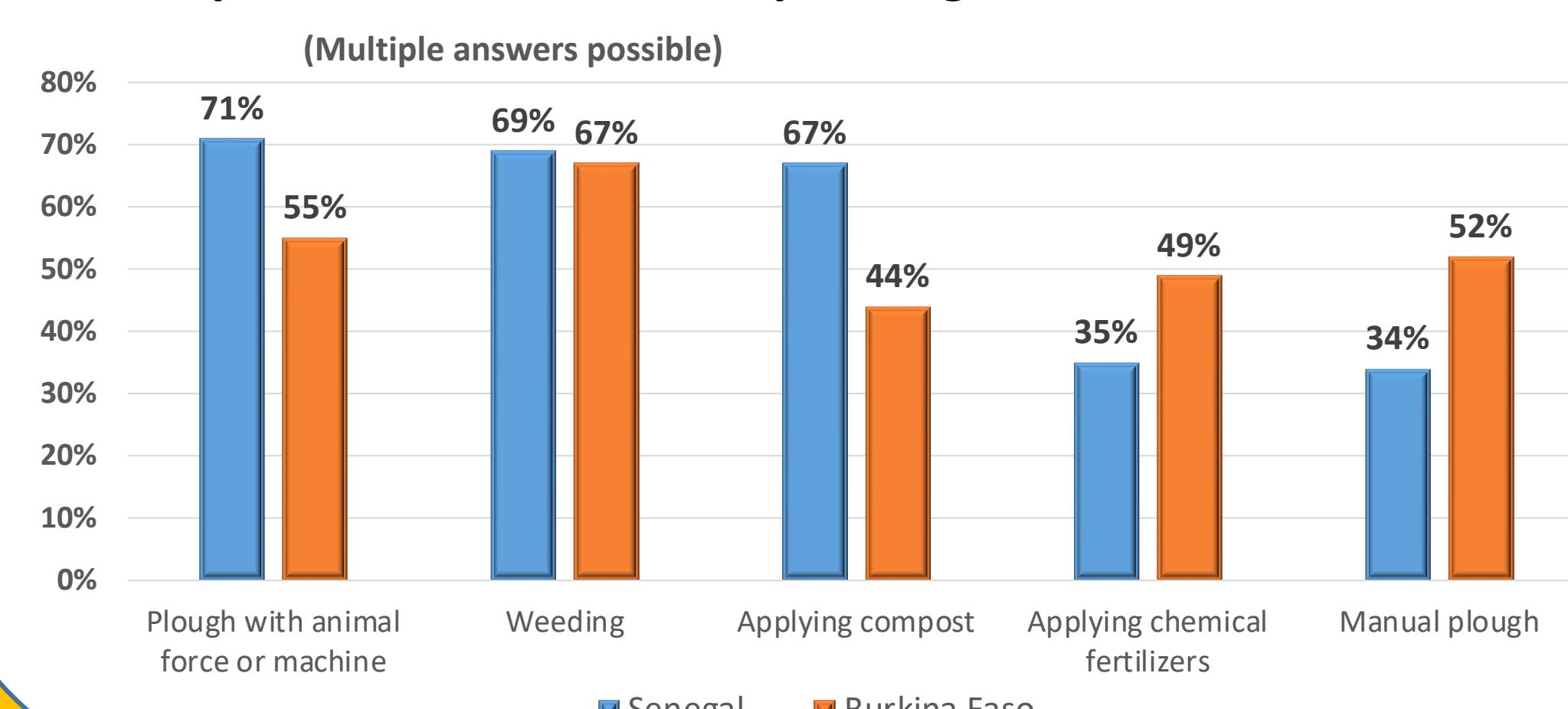
	Burkina Faso	Senegal
Male / female ratio	♂ = 175 ♀ = 35	♂ = 95 ♀ = 109
Average age	51,6 years	49,6 years
Literacy rate	36%	38%
Full-time farmers	53%	37%
Average plot size	3,4ha	3,6ha
Member of farmer's association / cooperative	18%	26%
Less than 25.000 CFA (38 €) monthly income	67%	43%

3. Results - Current practices

3.1 Key decision factors on what to produce

I plan the next crops ... - Multiple answers possible -	Burkina Faso	Senegal
...according to my crop rotation plan	40%	59%
...according to the seeds I possess	32%	55%
...like the year before, as I always plant the same things	42%	43%
...according to the season	23%	37%
...according to my production plan	13%	11%
...according to the available water & the expected weather (i.e. drought)	2%	8%
...according to the decision of the cooperative	1%	3%
...according to the demand on the market	2%	2%
...according to the recommendations from the extension officer	1%	1%

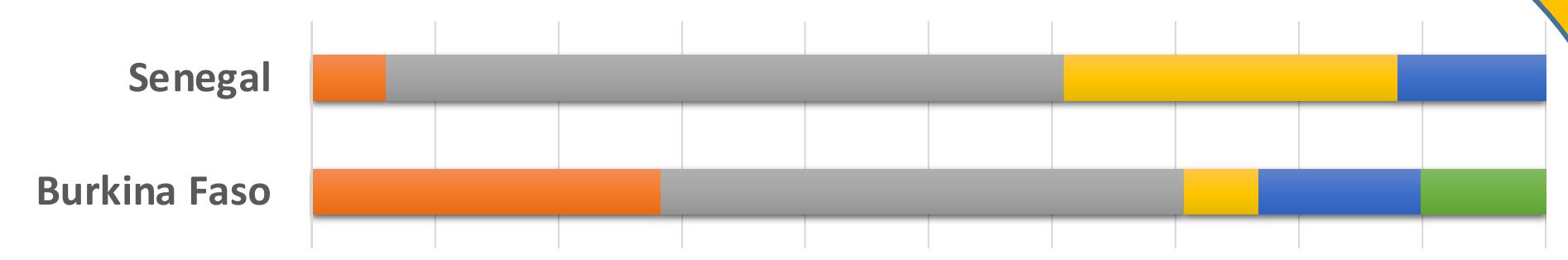
3.2 Preparation of soils before planting



3.3 Production of crops

	Burkina Faso	Senegal
Cereals		
Millet	94%	91%
Sorghum	84%	55%
Maize	83%	25%
Rice	9%	13%
Fonio		1%
Rooters and tubers		
Potatoes	7%	17%
Manioc		16%
Sweet Potatoes	1%	11%
Yam		5%
Taro	1%	
Vegetables		
Tomates	50%	40%
Onions	30%	33%
Okra	24%	27%
Cabbage	16%	22%
Black eggplant	22%	21%
Local eggplant	5%	17%
Spinach	8%	8%
Peppers	7%	7%
Cucumber	24%	6%
Green beans	4%	
Cowpeas	92%	58%
Trees		
Baobab	7%	27%
Moringa	5%	27%
Shea	10%	
Seagrape	7%	
Cassia	2%	2%
Jackalberry		3%
Sweet detar		1%
Cucumber		1%
Desert date		1%
African locust bean		1%

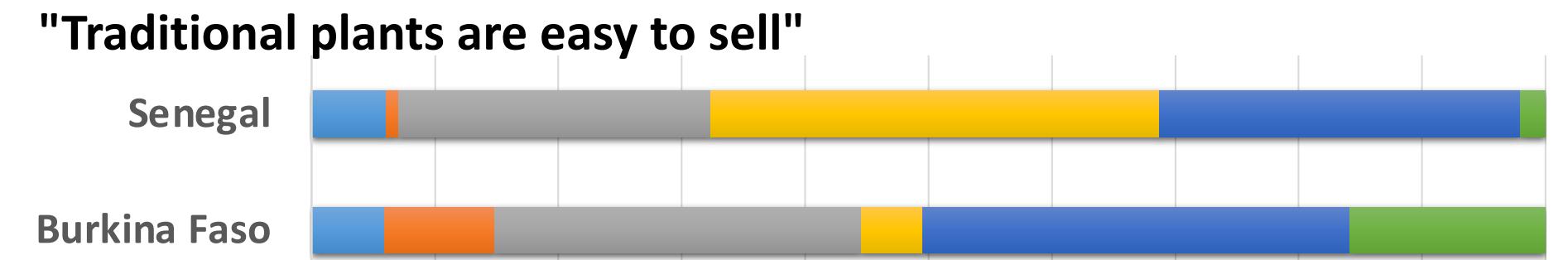
3.4 "Traditional plants are food for the poor"



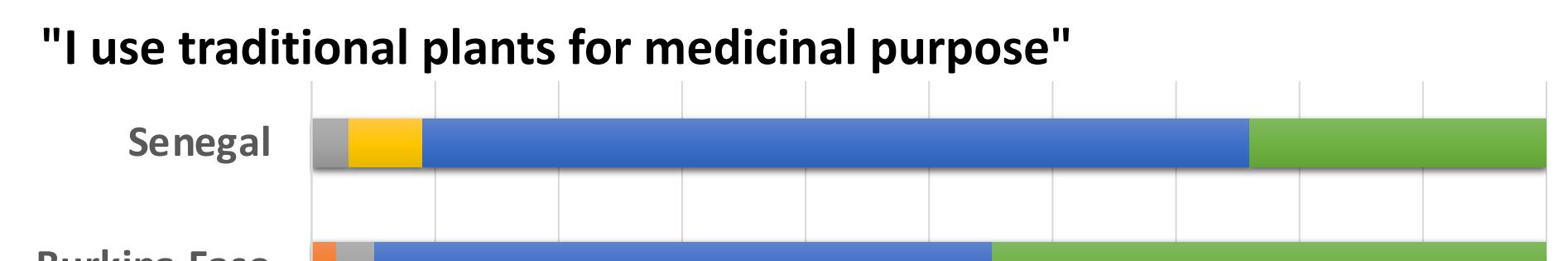
"Traditional plants are easy to buy"



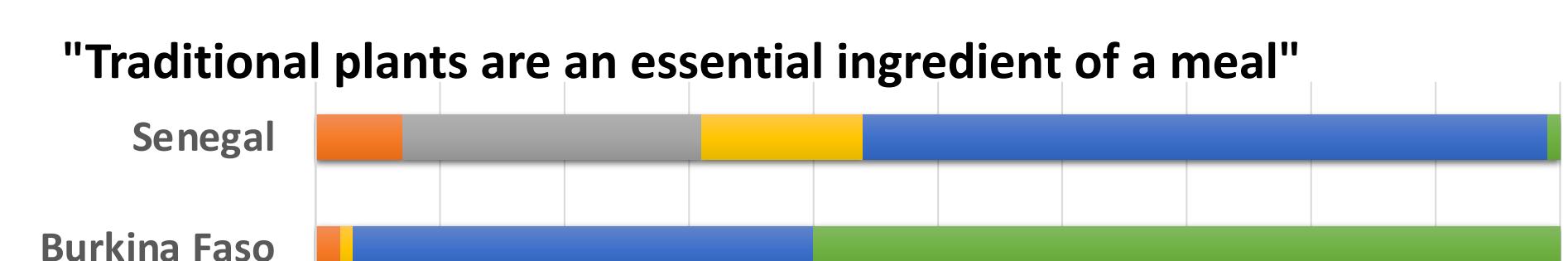
"Traditional plants are easy to sell"



"I use traditional plants for medicinal purpose"

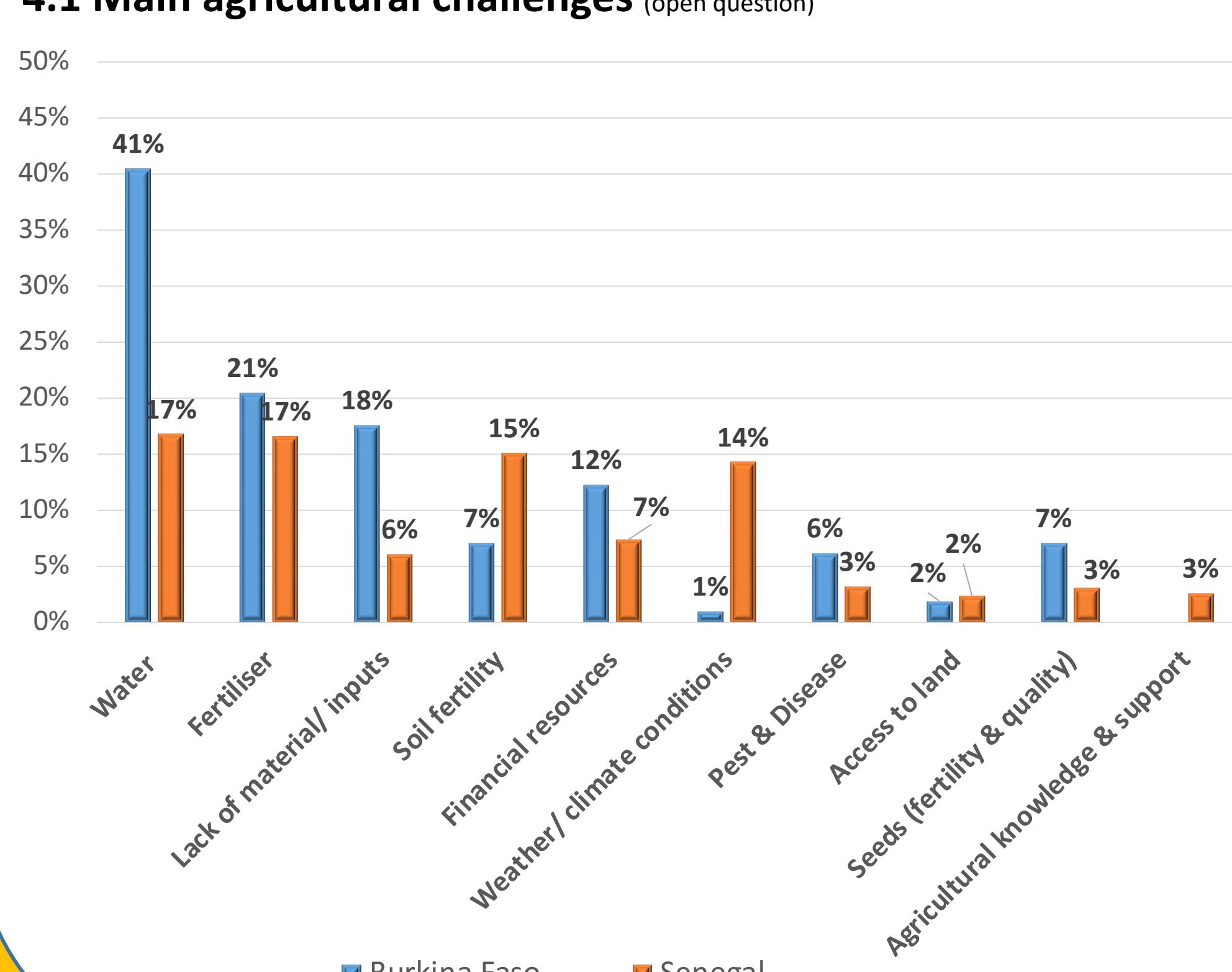


"Traditional plants are an essential ingredient of a meal"



4. Results - Challenges & potentials

4.1 Main agricultural challenges (open question)



4.2 How do you adapt your farming to climate change?

- Multiply answers possible -	Burkina Faso	Senegal
I use better seeds (e.g. drought-resistant seeds)	59%	30%
I build stone dams	50%	was not asked
I rotate crops	42%	61%
I use more chemical fertilizers	33%	35%
I use more compost and manure to increase organic matter	32%	20%
I practice agroforestry and tree planting	9%	25%
I use more pesticides/insecticides	4%	7%
I practice minimum tillage	4%	29%
I do off-farm work	3%	5%
I use more herbicides	3%	3%
I keep more livestock	2%	4%
I installed sprinkler irrigation	1%	1%
I use cover crops	1%	5%
I use climate services (weather forecasting)	1%	6%
I use windbreaks	1%	22%
I use more water (by hand)	1%	1%
I conduct furrow farming	0,5%	1%

5. Conclusions

The survey results indicated that:

- farmers' cropping choices (in Senegal, especially) seem to be influenced by their customary norms and habits, like their crop rotation plans or the persistent cultivation of the same crops as well as restrictions (seeds availability)
- in both countries, farmers engage in various soil preparation activities. However, in Senegal, a greater proportion of farmers opt for natural fertilizers over chemical fertilizers compared to Burkina Faso
- millet is the key staple produced in both countries. Farmers interviewed in Senegal produced more fruits, roots and tubers and had a significant higher ownership of moringa and baobab plants, yet more farmers in Burkina Faso cultivated sorghum, maize, cowpeas and sesame
- traditional plants have a positive reputation (they are not seen as food for the economically disadvantaged), are integral to the local culinary traditions and serve medicinal purposes (the latter two, especially in Burkina Faso). However, the process of buying and selling them seems to be less straightforward
- water issues were the most unprompted stated challenge in Senegal, which includes 'lack of water/rain', 'insufficient rain', 'irregular and low rain', and 'drought', while no one challenge stood out in Burkina Faso
- farmers employ a variety of methods to adapt to the shifting climate. Almost all of them align with agroecological principles, including the construction of stone dams, crop rotation, minimal tillage, agroforestry, and the planting of trees or the implementation of windbreaks

Sources:

- MaPhill -Map graphics revolution.™,Map Zitenga. Accessed 12.08.2022. <http://www.maphill.com/burkina-faso/ubritenga/zitenga/maps/>
- Ministry of Agriculture, Burkina Faso. 2022. Accessed 12.08.2022. <https://p2n-bf.org/2022/01/04/implantation-de-jardins-nutritifs-au-profit-des-cooperatives-feminines-des-femmes-reconnaissent-et-chantent-les-valeurs-nutritives-des-feuilles-de-moringa-et-de-baobab-a-gomdey-un-village-au-centr/>
- Paganini N. & Stober, S. (2021) From the researched to co-researchers: including excluded participants in community-led research on urban agriculture in Cape Town, The Journal of Agricultural Education and Extension, 27:4, 443-462, DOI: 10.1080/1389224X.2021.1873157
- KoboToolBox. 2022. <https://www.kobotoolbox.org>

NUTRIGREEN
Promoting Green Nutrition for the Sahel region

NUTRIGREEN is an international project with partners in Burkina Faso, Germany, Senegal and Sweden. The project investigates the value chains of traditional African plants in order to strengthen their impact in the local and regional agri-food system. Together with farmers, consumers and other value chain stakeholders, we research their current status and future potentials from farm to folk.

The NUTRIGREEN project is funded by the German Federal Ministry of Food and Agriculture (BMEL) through the Federal Office for Agriculture and Food (BLE), grant 2821ERA14C. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 862555.

