

# Vulnerability study of the agricultural sector in Senegal: the case of the Niayes and the Kolda regions

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## INTRODUCTION

Senegal, like most Sahelian countries, is facing many challenges to increase its agricultural production and ensure food security (CDN, 2017). Among these challenges are the effects of climate variability and change (CC), which is why the country has embarked since 2015, in the development of National Adaptation Plan (NAP), to integrate adaptation to CC in the planning and budgeting processes of projects and programs. It is within this framework that the SAGA project is supporting vulnerability studies of the agricultural sector in the Niayes, the Senegal's main market gardening area and the forestry region Kolda.

## INITIATIVE

The process of assessing the vulnerability of the agricultural sector to climate change is structured in three main phases:

- preparation of the study
- carrying out of the studies and identification of adaptation options
- restitution of the results (Fig. 1).

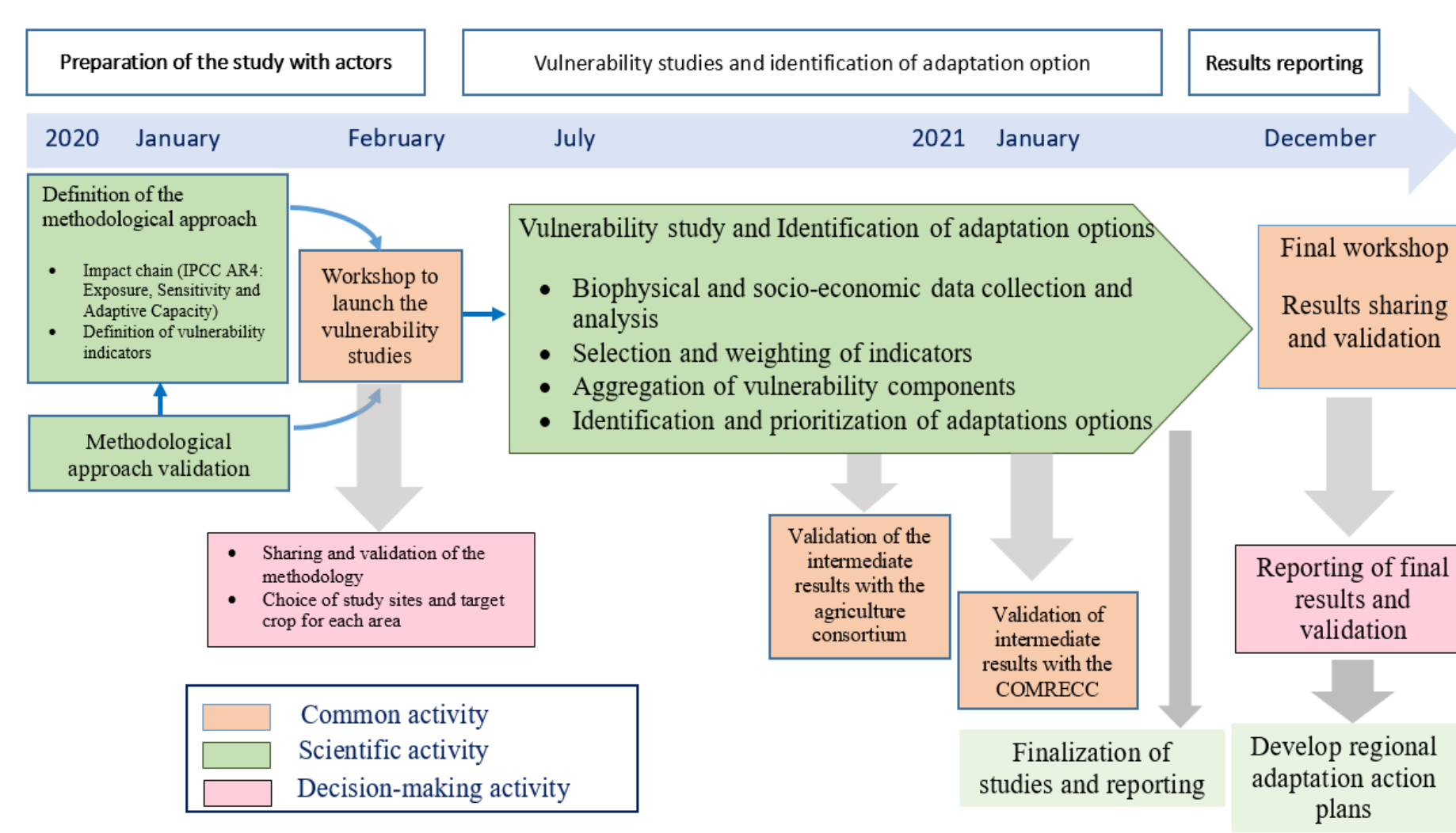
**Approach:** Inclusive process involving researchers, academics, technical services of the agricultural sector, territorial authorities, farmers' organizations and NGOs.

### Scientific results:

**Producer:** Senegalese Institute for Agricultural Research (ISRA)

**Validation:** consortium of scientific experts and the regional climate change committees (COMREC).

Results are used in the development of regional adaptation plans and the **National Adaptation Plan** of Senegal.



**Fig. 1:** Process followed for conduct climate change vulnerability studies for agriculture

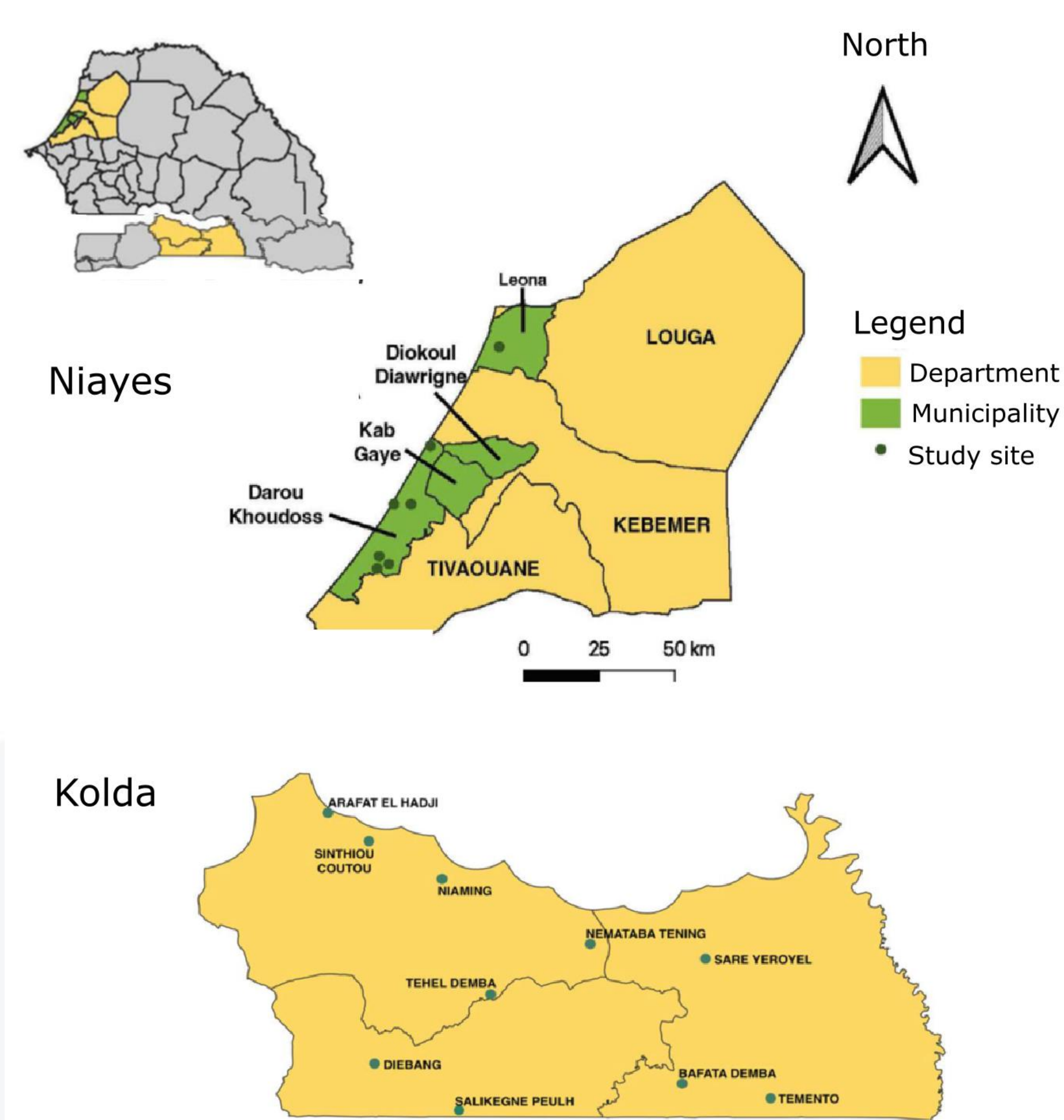
## METHODOLOGY

### Current vulnerability:

- Socio-economic surveys (focus groups, interviews, etc)
- Analysis : agricultural and climatic statistics

### Future vulnerability:

- Crops modeling SARRA-H/DSSAT: Maize and rice (Kolda)
- CROPWAT: Tomato, onion, potato (Niayes).



**Fig. 2 :** Geographical distribution of study sites in Kolda and the Niayes area

**Tab. 1 :** Aggregate indicators for the different components of vulnerability in the Niayes area

Vulnerability components	Louga		Kébémér		Tivaouane	
	RCP4.5	RCP8.5	RCP4.5	RCP8.5	RCP4.5	RCP8.5
Exposition	0,48	0,42	0,44	0,48	0,42	0,46
Sensibilité	0,33	0,40	0,33	0,40	0,43	0,50
Potentiel impact	1,28	2,49	1,22	2,73	1,27	2,85
Capacity of adaptation	0,48	0,31	0,41	0,29	0,41	0,21
Vulnerability	0,80	2,18	0,81	2,44	0,86	2,64

**Tab. 2 :** Aggregate indicators for the different components of vulnerability for Kolda

Vulnerability components	Kolda		MYF		Vélingara	
	RCP4.5	RCP8.5	RCP4.5	RCP8.5	RCP4.5	RCP8.5
Exposition	0,50	0,52	0,49	0,50	0,50	0,51
Sensibility	0,58	0,38	0,52	0,41	0,62	0,37
Potentiel impact	1,58	2,86	1,49	2,84	1,61	2,76
Capacity of adaptation	0,48	0,58	0,49	0,50	0,43	0,53
Vulnerability	1,10	2,28	1,00	2,34	1,18	2,24

## REFERENCES

Faye, A., Tounkara, A., Ciss, P.N., Ngom, M. et Camara, I. 2022. Évaluation de la vulnérabilité du secteur agricole aux changements climatiques et identification d'options d'adaptation dans la zone des Niayes au Sénégal. Rapport produit dans le cadre du projet Sécurité alimentaire: une agriculture adaptée (SAGA). Rome, FAO. <https://doi.org/10.4060/cc0688fr>

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## RESULTS

The Niayes and Kolda areas show high variability in rainfall and an increase in temperature, which have an impact on agricultural households. Projections show that regardless of the time horizon and scenario, rainfall will decrease and temperature will increase. A significant decrease and variability in yields of maize and rice crops in Kolda and horticultural crops in the Niayes according to the two scenarios RCP 4.5 and RCP 8.5 scenario. In the Niayes area, the department of Tivaouane would be more vulnerable according to RCP4.5, while Kébémér would be more vulnerable under RCP8.5 (Table 1). In the Kolda region, the department of Vélingara would be more vulnerable according to the RCP4.5 while Medina Yoro Foulah would be more vulnerable according to the RCP8.5 scenario (Tab 2).

## LESSONS LEARNED

Using the results of the vulnerability assessment, regional adaptation plans were developed. In these action plans, short and long term adaptation objectives were defined after identifying and prioritizing adaptation options (Fig. 3).

**Tab. 3:** Adaptation objectives identified in Kolda and Niayes

Localities	Short and medium term objectives	Long-term objectives
Niayes	Sustainable management of water resources in the Niayes area	Land resources management in a sustainable manner
	Improve access to factors of production and processing of agricultural products	
Kolda	Preserve and manage water resources (rice fields) in a sustainable way	Ensuring sustainable food security and preserving community income
	Building community resilience to climate change	

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