Impact of Adoption Adaptation Climate Change on Household Food Security and Incomes in Ferlo Semi-arid Area, Northern Senegal.

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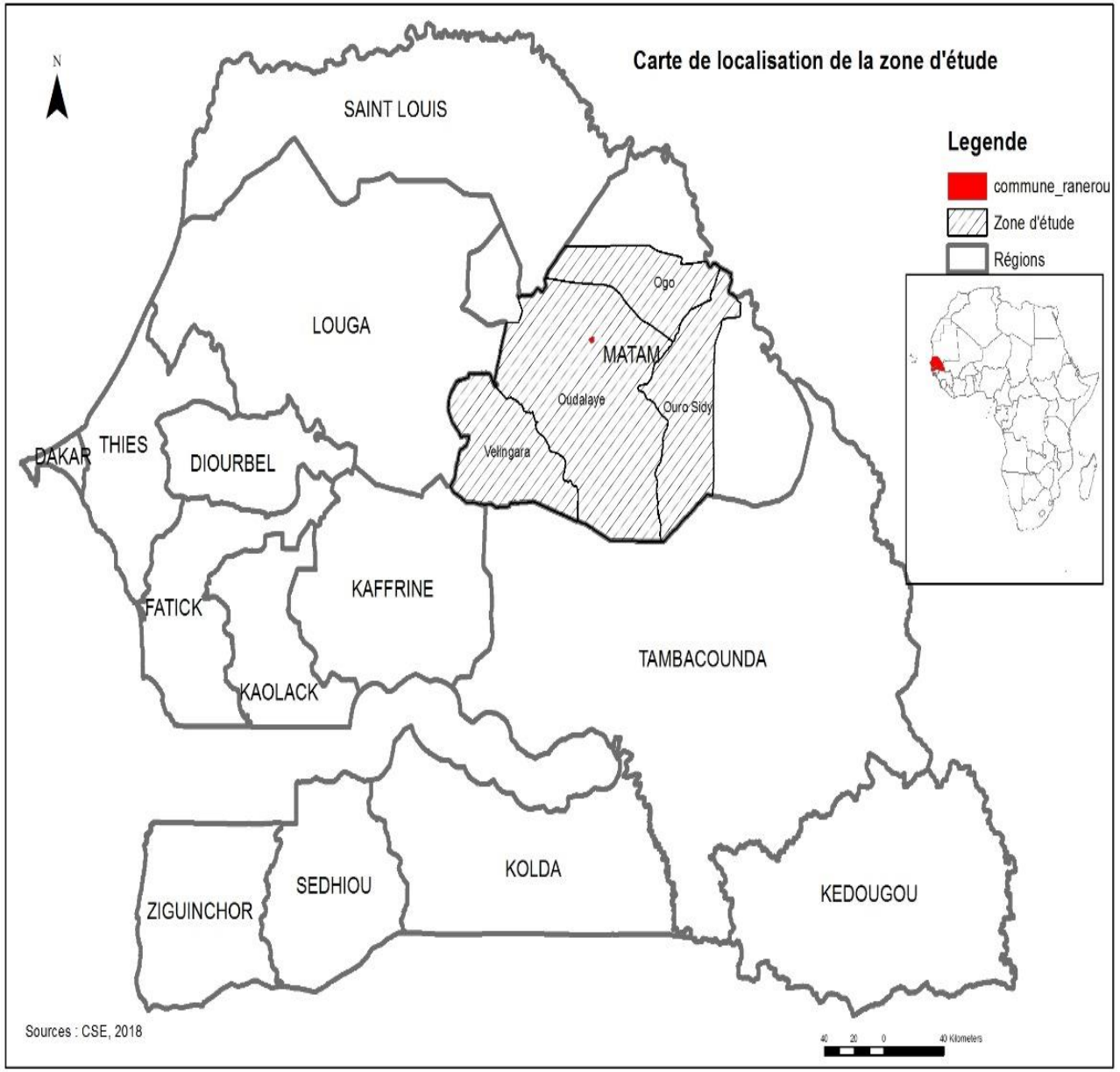
BACKGROUND

Like in many arid and semi-arid areas of Sub-Saharan Africa, pastoral communities in the Ferlo zone in Senegal are faced with several climate-change related threats to their food security and well being:

- Recurrent episodes of drought,
- Increasing water scarcity
- high temperature
- Natural resource depletion: land, pasture, water, forests…
- Desertification

BACKGROUND continued



Ferlo zone, northern Senegal.

- Sahelian zone, drought, water scarcity
- Annual rainfall : 120 mm – 450 mm
- Rainy season : 3 months (July-Sept)
- Temperatures : 25 - 45°C
- Main economic activity : Livestock husbandry
- Animals: cattle, sheep and goats

BACKGROUND (continued)

To deal with the climate-change related threats, many adaptation and mitigation strategies have been promoted widely for adoption by livestock owners in the Ferlo.

The most important of these are:

- ✓ Prohibition of bush fire and tree cutting
- ✓ Restoration of degraded land through :
  - zero grazing,
  - tree planting
  - Land use rotation (crop and livestock)
- ✓ Livestock management through :
  - Vaccination cattle, sheep and goat
  - Use water borehole

BACKGROUND (continued)

- So far, there have been limited studies evaluating the adoption of climate-change adaptation strategies in the Ferlo and their impact.

- This study aims to evaluate the impact of adoption climate change adaptation strategies on the food security and incomes of households in the Ferlo.

METHODOLOGY

- Random sampling of 339 households in 32 villages in the Ferlo:
  - ✓ 176 in 16 villages where the climate-change adaptation strategies were promoted and
  - ✓ 163 in 16 controlled villages where no promotion activity took place.

- Estimation of the causal effect of adoption of climate-change adaptation strategies on household food security and income using the counterfactual potential outcomes framework of Rubin (1974) :
  - ✓ Treatment variable: adoption of at least one climate-change adaptation strategies
  - ✓ Outcome variables: household food score consumption and income
  - ✓ Comparison of outcomes with and without adoption while controlling for selection bias due to observed and unobserved confounders that affect both the treatment and the outcome variables .

METHODOLOGY (continued)

- Identification of causal effects :
  - Based on “selection on unobservables”: the cofounders that create the selection bias are unobservable
  - Instrumental variable methods: Use of Awareness of at least one adaptation strategy as instrument to induce the exogenous change in adoption
- Focus on the Local Average Treatment Effect (LATE) parameter of Imbens and Angrist (1994), which measures the mean impact on the subpopulation whose adoption was induced by the instrument (awareness of at least one adaptation strategy)
- Use of the Abadie (2003) method for estimating the LATE parameter, when the population distribution of receipt of the instrument is not random

FINDINGS

Table 1 : Households characteristics by adoption statut.

Caracteristics	Adopters (N=163)	Non adopters (N=176)	Total (N=339)	Difference
Age of household head (year)	48 (0.99)	43 (1.05)	45 (0.73)	5***
Household size (person)	17 (7.3)	16 (5.87)	16 (6.7)	0.9
Gender of household head (man) (%)	96 (20)	94 (24)	95 (22)	1.58
Fulani ethnic group of household head (%)	99 (11)	91 (29)	95 (22)	8***
Literacy of household head (%)	66 (47)	6 (22)	37 (48)	60***
Livestock size (number)	103 (134)	199 (167)	150 (158)	-96***
Farm size (hectare)	3.98 (4.61)	2.55 (2.17)	3.29 (3.71)	1.43***

FINDINGS (Continued)

Tableau 2 : Proportion of farmers aware and adopting climate-change adaptation

Category of adaptation and mitigation climate change	Aware of at least one climate-change adaptation strategy	Adoption of at least one climate-change adaptation strategy among the households who are aware
Prohibition of bush fire and tree cutting	56 %	94 %
Restoration of degraded land	53 %	81 %
Livestock management	95 %	60 %

FINDINGS (End)

Impact of adaptation climate change innovations on food security and incomes.

Outcome variable	LATE parameter
Food Score Consumption contribution of adaptation climate change	8.46 ****
Annual income contribution contribution of adaptation climate-change	$1, 213 ****

- Adoption of climate-change adaptation strategies has a positive and significant impact on households food security and incomes:
  - ✓ Average increase in the household food consumption score by 8.46
  - ✓ Average increase in household total annual income by $1, 213.

POLICY IMPLICATIONS

Two main policy implications are noted.

- **First, the promotion of adoption of innovative climate-change adaptation strategies is one way of strengthening the resilience of pastoralist communities**.

- **Secondly, scaling up climate change adaptation innovations is a sustainable solution for the fight against poverty and food insecurity in pastoral areas.**

THANK YOU !