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# FARMER PERCEPTION OF THE IMPACT OF CLIMATE CHANGE ON **RICE PRODUCTION AND THEIR ADAPTATION STRATEGIES IN THE MAYO-DANAY, FAR-NORTH CAMEROON**

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### **Abstract**:

A survey was carried out in the Mayo-Danay Division, Far-North Cameroon to assess rice farmer indigenous knowledge of the impact of climate change on rice production, their

adaptation strategies. A sample of 140 of rice farmers was chosen at random in four rice growing municipality and was interviewed using a structured questionnaire with open and closed questions. The results showed that farmers clearly perceive climatic variations and their impact on rice production through the delay (89.00%) and decrease (87.00%) of rains, flooding (88.60%) and drought (85.00%). The impact of these climate changes on rice production was directly observed on the variation in yield according to the rice growing seasons and confirmed the perception of farmers. To cope with these climate variations, two types of adaptation strategies have been developed by farmers in area. This concerns varietal adaptation such as the use of improved varieties, and that of cultural practices such as direct seeding, transplanting, construction of protective or anti-erosion bunds and use of the fodder. These preliminary results could contribute to sustainable management of rice cultivation.

Keywords: Climatic variability, farmer perception, rice production, adaptation strategy, Mayo-Danay, Cameroon.

#### Introduction

Agriculture has shown, throughout history, a great capacity to adapt to changing conditions with or without a conscious response from farmers. These modifications have now exceeded self-adaptive limits, which require supportive policies to enable farmers to cope with the adverse effects of climate change, taking into account local traditional knowledge. A better understanding of how farmers perceive the variability of climatic factors and their effects on crop production is necessary in order to seek sustainable adaptation methods. Several authors have addressed not only the importance of taking this endogenous knowledge into account as strategies for adapting to climate change, but also as factors that can increase productivity and ensure food security in West Africa. However, this information is scarcely available for Cameroon, particularly in the Far-North region, with the exception of studies of SAHA et al. (2017) on the water deficit on agricultural activity and Watang (2011) on the effects of climate change on agropastoral systems in the Sahel. The objective of this study is to assess farmer perception of climate variations on rice production in Mayo-Danay Division and their strategies for adapting to climate change, in order to contribute to the sustainable management of rice cultivation.

#### Material and method

The research methodology was based on interviews using open-ended questions and on field observations. The survey was conducted in August 2020, period between the dry season rice campaign and that of the rainy season, where the farmers were available. The sample unit was the rice farm household with the head of the household as the respondent. The sample was made up of persons of both sexes (Table 1), distributed over the entire population (particularly the rice farmers): the full-time rice farmers (more than 97%) and part-time farmers, that is, those who associate agriculture to other activities like animal rearing, commerce, fishing. The minimum age of respondents was 35 years old with an experience of at least 20 years in the agriculture field and to be old in rice cultivation. Strangers who had not made up to 10 years in the region were excluded from the sample, because we assumed that they know little or do not know enough about the local cultural surtance. cultural systems.

A questionnaire was offered to a semi-random sample of 140 households in the four most crowded and produced rice municipalities, at a rate of 40 households per site and 20 per type of rice cultivation (irrigated and rainfed rice cultivation), except in Gobo where there is no irrigated rice cultivation. The main focus was the farmer's indicators of climate change, the constraints of rice production, the impact of climate change on rice production and the adaptation strategies of farmers to mitigate the effects of climate change. The data of rainfall and temperature variations from 2010 to 2019, obtained at the meteorological station of Yagoua and those of rice production at the SEMRY.

Characteristics of rice farmers surveyed in the four municipalities of Mayo-Danay

Variables	Modalities	Yagoua (%)	Maga (%)	Vele (%)	Gobo (%)
Age class (year)	18-24	0.00	0.00	0.00	0.00
	25-34	0.00	0.00	0.00	0.00
	35-49	37.50	40.00	55.00	55.00
	40-64	52.50	52.50	40.00	40.00
	> 65	5.00	7.50	7.50	5.00
	Male	72.50	85.00	85.00	80.00
Sex	Femel	27.50	15.00	15.00	20.00
	Massa	95.00	45.00	87.50	60.00
	Mousgoum	2.50	50.00	7.50	0.00
Ethnic group	Peulh	0.00	0.00	0.00	0.00
	Toupouri	2.50	0.00	2.50	0.00
	Moundang	0.00	2.50	2.50	0.00
	Moussey	0.00	0.00	0.00	40.00
	Single	7.50	2.50	2.50	0.00
	Married	87.50	95.00	97.50	95.00
Marital Status	Living together	0.00	0.00	0.00	0.00
	Widower	5.00	0.00	0.00	5.00
	Divorced	0.00	2.50	0.00	0.00
	Chretian	97.50	45.00	85.00	95.00
Religion	Muslim	2.50	50.00	15.00	5.00
пспъют	Animist	0.00	0.00	0.00	0.00
	Atheist	0.00	0.00	0.00	0.00
	Unschooled	2.50	2.50	2.50	10.00
Study level	Primary study	35.00	25.00	22.50	15.00
Study level	Secondary study	55.00	55.00	65.00	70.00
	High study	7.50	17.50	10.00	5.00
	Agriculture	100	97,50	97.50	100.00
Main activities	Trade	7.50	15.00	10.00	10.00
	Fishing	5.00	22.50	15.00	0.00
	1	0.00	0.00	0.00	0.00
Seniority (year)	5	0.00	0.00	0.00	0.00
	10	32.50	67.50	50.00	100.00
	> 10	67.50	32.50	50.00	0.00
Crop praticed	Rice	100.00	100.00	100.00	100.00
	Maize	47.50	25.00	5.00	35.00
	Millet	80.00	25.00	60.00	75.00
	Cassava	0.00	0.00	5.00	5.00
	Patato	0.00	0.00	0.00	0.00
	Peanut	0.00	0.00	0.00	45.00
	Cotton	0.00	0.00	0.00	95.00
Training in rice cultivation	Yes	20.00	27.50	10.00	0.00
	No	80	72,50	90,00	100
	Sale	92.50	85.00	92.50	95.00
Motivation	Consumption	100.00	67.50	97.50	100.00
	Research	0.00	0.00	0.00	0.00

### **Results and discussions**

Farmer indicators of climate change, perception of impact of climate change on rice production and consequences in the rice farmer households Farmer indicators of climate change in Mayo-Danay



The consequences of climate change in the household of rice farmers in Mayo-Danay are numerous (Figure 5), but the main ones are famine (91.40% of responses), poverty (70.71%) and rural exodus (55.71%). The other consequences, not of lesser importance, are weakly cited by respondents, such as unemployment (8.57%), under-education (2.14%) and diseases (5.71%).

#### Consequences of climate change in the rice farmer households in Mayo-Danay



### Acknowledgement: text

### Effects of climatic parameters (temperature, rainfall, humidity and wind) on rice production cycle according to season and phase of cycle in Mayo-Danay. Responses

Period of	Temperature	Rainfall	Humidity	Wind
	DS(%)	RS(%)	DS(%)	RS(%)
Sowing	0.00	4.00	0.00	100.00
fertilizer application	25.00	82.00	3.33	0.00
Tillering	5.20	8.00	40.00	11.25
Fertilization	0.00	0.00	0.00	0.00
Heading	53.12	52.00	1.67	0.00
caryopsis maturation	0.00	0.00	16.67	16.25
Dry season (DS) and rai	ny season (RS)			

### Farmer itinerary and rice production constraints

Variables	Modality	Yagoua	Maga	Velé	Gobo
	0.5 - 1	80.00	85.00	\$0.00	90.00
Field area (ha)	1.5 - 2	12.50	12.50	15.00	10.00
	2.5 - 3	7.50	2.50	5.00	0.00
Plot preparation	Protective bunds	100.00	100.00	100.00	65.00
	IR46	75.00	75.00	72.50	40.00
Variety of cultivated rice	NERICA	62.50	55.00	57.50	95.00
	TOX	2.50	0.00	2.50	0.00
Transformer	Direct sowing	37.50	12.50	10.00	100.00
Type of sowing	Indirect sowing	90.00	97.50	67.50	15.00
	December	50.00	50.00	50.00	0.00
Sowing period	May	15.00	15.00	32.50	5.00
	Jun	77.50	85.00	67.50	95.00
Fertilization	Yes	100	100	97.50	95.00
Too Charles	Organic fertilizer	0.00	10.00	5.00	0.00
Type of Jeruizer	Chimical fertilizer	100.00	90.00	95.00	100.00
	14-21	100.00	100.00	100.00	0.00
-	21-28	0.00	0.00	0.00	0.00
Fertilizer application period	28-35	0.00	0.00	0.00	0.00
(Day after sowing)	14-21	0.00	0.00	0.00	0.00
	21-28	5.00	0.00	0.00	10.00
	28-35	2.50	0.00	0.00	90.00

### Rice production constraints varied according to the sites and type of rice cultivation.

	□Seasonal variation	BLow soil fertility	
	Diseases and pests	Lack of improved seeds	
	DPoor access to equipment	□High input prices	
	SLack of water in boreholes		
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od 20			
2 0			
	Gobo Maga Vele Yagoua	Gobo Maga Vele Yagou	
	Irrigated rice cultivation	Rainfed rice cultivation	

### Adaptive strategies of farmers to climate change

Measures	Dry season	Rainy season	
Respect of agricultural calender	75.00	50.00	
Improved varieties	16.67	30.00	
Direct sowing	5.00	38.75	
Transplantation	35.00	47.50	
Protective bunds	15.00	26.25	
Drilling	1.67	17.50	
Agroforestry	0.00	0.00	
Afforestation	1.67	2.50	

### onclusions

It was a question of analyzing the farmer perception of the impact of climate change on rice production in Mayo-Danay Division. It appears that the farmers of Mayo-Danay perceived climatic disturbances in irrigated and rainfed rice cultivation. Based on the answers of the respondents, nine types of climatic disturbances perceived by the farmers emerged. These are the delay of rains, the early cessation of rains, the violent wind, the flood, the drought, the decrease in rains, the increase in rains and insolation. Climate change affects rice production according to producers. Thus, rainfed rice farmers are the most vulnerable to variations in climatic parameters. This vulnerability manifests itself during the end of the rainy season through a low rice yield. Faced with these climatic disturbances, rice farmers have adopted several coping strategies. Two types of adaptation have been identified in our work. This involves the use of improved varieties and cultural practices such as the practice of direct seeding, transplanting or transplanting, the construction of protective or anti-erosion bunds and the use of boreholes. Despite these peasant adaptation measures, rainfed rice cultivation remains exposed to climate risk. Moreover, apart from the effects of variation in climatic parameters on rice production, the latter is also threatened by other production constraints which are linked to climate change or not, such as the variation in seasons, low soil fertility, diseases and pests, poor access to equipment, high input prices. These climatic variations expose the population of Mayo-Danay to major problems

