



[Science Archives \(ISSN:2582-6697\)](https://doi.org/10.47587/SA.2022.3315)

Journal homepage: [www.sciencearchives.org](http://www.sciencearchives.org)



<https://doi.org/10.47587/SA.2022.3315>



Research Article

# The food habits of the Adjoukrou of Dabou (Southern Ivory Coast) in the face of climate change

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Received: Aug 8, 2022/ Revised: Sept 7, 2022/ Accepted: Sept 10, 2022

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## Abstract

This study aims to analyze the impacts of climate change (CC) on the eating habits of the Adjoukrou people in the department of Dabou. It is based on a mixed-method approach combining quantitative and qualitative methods, using direct observations in the field, a questionnaire survey, and individual semi-directive interviews. In Dabou, CC has led to a decline in agricultural yields and related activities. This has had a varying impact on the food habits of the Adjoukrou people. Attike with palm oil remains the favorite dish of Adjoukrou, despite the CC. Plantain fofou and foutou are no longer frequently eaten and their quantities have decreased during meals. Once abundant and celebrated, yams are now consumed by only 3% of households per week. Adjoukrou have replaced local game and fish in their meals with frozen meat and fish purchased outside Dabou. In the CC era, Adjoukrou have adopted traditional Ivorian and "foreign" dishes: rice, placali, djounglé and kplala sauces, peas, couscous and spaghetti. Industrial beverages are more consumed at the expense of artisanal beverages such as palm wine and koutoukou.

**Keywords:** Climate Change, Disruption of agricultural and related yields, Food habits, Adjoukrou.

## Introduction

CC is a global challenge facing all of humanity. It can change environmental conditions (Farah, 2014; Banque de France, 2021). In developing countries, especially in Africa, agricultural production remains dependent on climatic conditions. Farmers develop their activities according to the climate. The majority of these producers practice only rain-fed agriculture (Paturel et al., 2010; Adjovi et al., 2019). In Côte d'Ivoire, CC is increasingly felt by (1) the actual decline in rainfall over the past three decades, (2) irregularity of rainfall, shortening of the length of rainy seasons, (3) rising temperatures, (4) persistent and rough dry seasons, (5) flooding, (6) frequent bushfires, and (7) increased coastal erosion (Brou et al., 2005; Djè, 2014; Kouassi et al., 2015; Ahouyao, 2017; Effe et al., 2020). Thus, CC can induce a decline in agriculture, fishing activities. This undermines the food security of populations who depend directly on what is produced on farms to cover their food needs (N'guessan and

Djè, 2012; Attingli et al., 2016; Sommer, 2020). The Department of Dabou, located in the south of Côte d'Ivoire, 27 km from Abidjan, is not immune to the effects of CC. In Dabou, the signs of climate change are seen by rice farmers in the lengthening of drought periods and the shortening of rainy periods, which, when they occur, often lead to flooding. This state of affairs causes a decline in rice yields, making rice farmers more vulnerable to poverty (Adje et al., 2017; Mouroufié et al., 2020). According to the Direction Départementale des Ressources Animales et Halieutiques of Dabou (2022), in general, fish catches have decreased and the sizes of fish have decreased. As a reminder, the eating habits of the Adjoukrou people are based on the main dishes such as attiéké (cassava semolina) with palm oil, fofou and foutou of plantain or yam (cooked plantain or yam paste, with palm oil). These foods are accompanied by very spicy sauces, clear sauces (from tomatoes, peppers, eggplant, onions), and vegetable leaf sauces. There is local fish in these sauces, in general (Nomel, 2017; Akmel, 2018; Egnankou, 2020). In

view of the above, it is important to know what is the impact of climate change on the food habits of the Adjoukrou peoples in the department of Dabou? The objective of this study is to analyze the impacts of CC on the eating habits of the Adjoukrou people in Dabou department. To do so, we will successively look at (1) the overall perception of the Adjoukrou people on the impacts of CC on their eating habits, (2) the impacts of CC on the consumption of fofou and foutou plantain by the Adjoukrou people, (3) the impacts of CC on the consumption of yam by the Adjoukrou people, (4) the impacts of CC on the consumption of game and fish by the Adjoukrou people, and (5) the new foods introduced into the usual diet of the Adjoukrou people in the era of the CC .

## Methodology

### Study area

This study was conducted among the Adjoukrou people, who belong to the large Akan ethnocultural group. They are located in the south of Côte d'Ivoire and form the department of Dabou, whose capital is Dabou. The department has three sub-prefectures, including Dabou, Lopou and Toupah, where the surveys were conducted. Specifically, the villages of Agneby, Lopou, Débrimou, Mopoyem, Toupah and Nouvelle Ousrou. The "Adjoukrou" territory is located between longitudes 4°20'28.62" and 4°43'28.65" W and latitudes 5°14'11.65" and 5°28'44.11" N. It is bounded to the south by the Ebrié lagoon, to the east by the Agneby River, to the west by the Ira River and to the north by tributaries of the Agneby and Ira Rivers. The territory is well watered by a very dense hydrographic network. The two main rivers, the Ira and Agneby, the Ebrié lagoon and their tributaries drain the area sufficiently.

### Data collection

This study is based on a mixed qualitative and quantitative approach. Thus, a questionnaire was administered to respondents on the manifestation of climate change, agricultural production and food availability in Dabou. The study population was composed of heads of households, housewives, nannies and the general population. This gives a sample of 261 people chosen according to the reasoned choice technique. The data analysis was performed by the Excel 2019 spreadsheet.

The semi-structured interviews involved the elderly, the notables and the village chiefs, as well as representatives of state structures related to the subject of the study: ANADER, DDRAH, DRAR. The semi-structured interviews allowed us to understand the evolution of the climate and agricultural production in the department of Dabou. The interviews were recorded with a Dictaphone and subjected to a thematic content analysis. Direct observation was done using a camera to observe the environment and agricultural activities in Dabou.

## Results

### (1) Overall perception of Adjoukrou on the impacts of CC on their food habits

The results of our interviews show that in the old days, when there was still forest, the climate was very favorable to the development of crops such as yams, bananas and cassava. The land was very productive, for a small cultivated plot, the harvest was very abundant. All the food crops cultivated gave very good yields because the soil was still very rich. Eggplants, tomatoes, peppers and okra were all grown in the yam fields. They were also abundant. At that time, they say, they did not need to buy food because everything was there. There was plenty of bush meat, and fish in the rivers. Thus, one ate according to one's hunger and preference. Yam and plantain were grown in sufficient quantities and are consumed in the form of fofou and foutou. Cassava was also abundantly produced and consumed in the form of attiéké, the favorite food of the Adjoukrou. The majority, 80% of respondents, claim that the eating habits of the Adjoukrou have changed today, while 19% claim that their eating habits have not changed. In fact, for the latter (19%), eating habits remain the same except that the frequency of eating certain foods has decreased, such as yam fofou and plantain.

According to the Dabou regional office of ANADER (Agence Nationale d'Appui au Développement Rural), attiéké is still the staple food of Adjoukrou. Even when they are unable to produce cassava, they go to the neighboring departments of Grand-Lahou and Fresco to obtain it. ANADER maintains that in 2019, for example, they even went as far as Bongouanou to look for cassava to produce attiéké.

### (2) Impacts of CC on the consumption of fofou and foutou of plantain banana in Adjoukrou

Fofou is an edible paste, solid or soft, depending on the consumer's taste, made only from plantain or yam tubers. As for foutou, it is either the mashed plantain (ripe) mixed with mashed cassava, or the mashed plantain (ripe) mixed with attiéké.

According to the dignitaries, plantain is no longer abundant as it was in the past in Adjoukrou country. According to our interviews and surveys with 64.7% of farmers, banana yields have declined as a result of the CC (soil impoverishment, reduced rainfall and longer drought in the department of Dabou). As a result, fofou and plantain foutou are no longer frequently consumed. Thus, due to the lack of this product, the Adjoukrou are forced to reduce their intake of fofou and foutou.

### (3) Impacts of CC on Adjoukrou yam consumption

The productivity of yams has also declined in the department, and their consumption has dropped. According to our surveys with women food vendors, more than half (53%) of the yam

consumed comes from outside Dabou department. Only 3% of households surveyed consume yams per week. Indeed, according to our interviews with farmers, the adverse effects of CC are leading to a decline in yam yields in the department. As a result, yam cultivation has been abandoned by most farmers. The festival dedicated to this food or the yam festival has disappeared in some localities of Dabou department according to interviews.

#### **(4) Impacts of CC on Adjoukrou game and fish consumption**

The sources of protein in Adjoukrou diets have changed. According to the results of our interviews, Adjoukrou in the forest were more likely to consume bushmeat. Aulacodes (commonly called agoutis) and hedgehogs were abundant in the fields. Thus, they consumed enough game or bush meat compared to cattle and fish. But nowadays, they say, there are no more animals in the bush. So they hardly eat any game anymore.

As for the Adjoukrou living on the edges of the rivers, they used to eat more fish that they caught in the waters of the department. But nowadays, Adjoukrou consumption of local fish has dropped considerably.

According to our surveys, the vast majority of Adjoukrou (90%) feel that there is less fish and bush meat in their meals. Adjoukrou in the forest and those living on the edges of rivers have changed their dietary habits in terms of food protein sources. They are turning to frozen meat and fish from elsewhere. This practice is becoming more and more important over the years. This is due to the decline in hunting and fishing production at the local level. According to the DDRAH (Direction Départementale des Ressources Animales et Halieutiques) of Dabou, in general, fish catches have decreased and so have fish sizes. Thus, the population consumes more frozen fish from Abidjan and livestock meat from Port-Bouët and Yopougon these days.

#### **(5) New foods introduced into the usual Adjoukrou diet in the CC era**

Although the usual Adjoukrou meals have been preserved, especially attiéké, which remains part of their daily diet, other foods have entered the Adjoukrou diet, according to our interviews and surveys.

According to our household surveys, rice is now part of Adjoukrou's eating habits. 18% of households have adopted rice.

Placali (fermented cassava paste cooked in water) is a recurrent item on Adjoukrou menus, both for lunch and dinner, according to 16% of those surveyed.

Our surveys and interviews revealed that in addition to the sauces that Adjoukrou usually consume, they accompany their

main dishes with other traditional Ivorian sauces: okra leaf sauce, fresh okra sauce, djounglé or dry okra sauce, kplala (*Corchorus olitorius*) sauce, palm seed sauce mixed with kplala sauce or okra leaf sauce.

In addition, "foreign" dishes are common on Adjoukrou menus today: peas, couscous and spaghetti. These "foreign" dishes concern 20% of respondents.

In terms of drinks, according to our interviews, the traditional drink usually consumed by the Adjoukrou is "Koutoukou," a traditional liqueur made from fermented palm wine or sugar and water, and then palm wine. It is the oldest in the Adjoukrou tradition and is the basis of all ceremonies in Adjoukrou country. It is this drink that is used for libations during great ceremonies. In addition to these drinks, the Adjoukrou consume traditional or artisanal juices such as gnamankoudji (ginger), bissap juice (sweet infusion of dried sorrel leaves).

Nowadays, palm wine is the least consumed by the Adjoukrou. Oil palm plants are rare in the bush. As a result, its consumption is becoming increasingly rare. Thus, liquors have replaced palm wine. Today, the Adjoukrou are increasingly abandoning the consumption of palm wine in favor of industrial beverages (wines, lemonades).

#### **Discussion**

Our results showed that because of the low yields of food crops due to climate change, the Adjoukrou have integrated several foods into their eating habits, including rice, which is increasingly important in their eating habits, as well as placali, peas, spaghetti, bread and coffee with milk for breakfast.

Our results are in line with those of (Akmel, 2018; Kouassi, 2020). According to the former, in the department of Dabou in the south of the country, in greater Abidjan, attiéké, derived from the processing of tuberous cassava roots, is becoming scarce. This uncomfortable situation has led households to change their eating habits. Thus, rice as a secondary food has supplanted attiéké, which has generated additional costs among the Adjoukrou (Akmel, 2018). As for the second, it showed that after cassava, the staple food of the indigenous Adjoukrou people, imported rice occupies a very important place in households. Yam and banana are relegated to second and third place.

CC poses a real threat to the food security of people in poor countries (HLPE, 2012). In Côte d'Ivoire, according to Adou (2015), in the department of Bouaflé, cassava is becoming one of the most consumed food crops, while rice used to rank first and yam comes second. Finally, the adoption of cassava cultivation and its introduction into dietary habits position this product as a strategy for adaptation and resilience of populations to the consequences of CC impacts (Adou, 2015).

According to N'drin et al. (2019), in Fresco, food security has been compromised by climatic hazards according to the respondents, leading to dietary changes, including the adoption of new diets made possible by new cultural varieties. Thus, attiéké has become our staple food. Among the Adjokrou, the nanny, called "wawôryow" in the Adjokrou language, is given special treatment. In the care of her family, she is fed with the mythical Adjokrou dishes: fofou with shark (plantain semolina with red oil that is eaten with a spicy sauce) and "mamissou" (vegetable leaf sauce), accompanied by attiéké, cassava semolina, with red oil (Nomet, 2017).

In the Gbêkê region, producers have changed their eating habits over time. Now, they consume other foods that previously were not integrated into their diet. Indeed, yams used to be the staple food in this region. However, its scarcity now forces them to turn to less preferred foods such as rice, cassava, taro and plantain (Effo et al., 2020).

According to Bouafou et al. (2021), CC calls for household food resilience strategies. These strategies are multiple: changing diets, reducing consumption or fasting in case of food shortage.

## Conclusion

The objective of this study was to analyze the impacts of CC (climate change) on the food habits of the Adjokrou people in Dabou department.

In Dabou, CC has led to a decline in agricultural yields and related activities. This has had varying impacts on the eating habits of the Adjokrou people. The majority, or 80% of Adjokrou surveyed, claim that their eating habits have changed today, while 19% claim that their eating habits have not changed. For the others (about 19%), their eating habits have not changed, except that the frequency with which they eat certain foods has decreased. Attike with palm oil remains the favorite dish of Adjokrou, despite the CC.

On the other hand, according to 64.7% of farmers, plantain fofou and foutou are no longer eaten frequently and their quantities have decreased during meals.

Once abundant and celebrated, yams are now consumed by only 3% of households on a weekly basis. The yam festival has disappeared in some localities in the department of Dabou.

Ninety percent of Adjokrou households have replaced local game and fish in their meals with frozen meat and fish purchased outside of Dabou, as a result of the impacts of CC on the environment of bush animals and fish.

In the CC era, the Adjokrou adopted traditional Ivorian and "foreign" dishes: rice, placali, djounglé and kplala sauces,

peas, couscous and spaghetti. Imported rice is now second in the Adjokrou diet, after attiéké.

Nowadays, industrial beverages (wine, lemonade) are consumed more by the Adjokrou than traditional beverages such as palm wine and koutokou.

In the future, the study of resilience and adaptation measures of the Adjokrou people in the context of CC, in their agricultural and related activities as well as their food, should be deepened.

## Conflict of Interest

The author hereby declares no conflict of interest

## Consent for publication

The author declares that the work has consent for publication

## Funding support

The author declares that they have no funding support for this study

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#### How to cite this article

Jacob, A., Marcel, B. K. G., Célestin, A. Y. (2022). The food habits of the Adjoukrou of Dabou (Southern Ivory Coast) in the face of climate change. *Science Archives*, Vol. 3(3), 235-239. <https://doi.org/10.47587/SA.2022.3315>

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