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# Production Diversity and Food Diversification: An Analysis of Production and Consumption Logics of Farm Households in Tuy, Burkina Faso

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**Abstract:** Consumption and production practices are part of the logics and habits of the different social structures. Every sociolinguistic community possesses its own food and cultural practices. Those practices and behaviors are not necessarily static. They can be influenced by external phenomena. This paper tries, through a socio-anthropological qualitative approach, to understand the consumption and production practices of rural households in the communes of Koumbia and Béréba. The study showed that the rural communities of Koumbia and Bereba have a diversity of cultivation practices and eating habits. However, this diversity of production does not correspond to what is consumed. The reason for this paradox stems from the perceptions that these communities have of food. Rural households are more focused on “eating their fill” than on the nutritional quality of what they consume. Thus, dietary behavior or food choices are ultimately much more determined by cultural values related to education, openness, curiosity, acquired and ethnic information than by technical-economic factors related to the resources of the farm or its environment as supported by classical theories. Food habits therefore remain determining factors in production and consumption practices. They favor change because societies are dynamic and highly functional in contact with modernity and the diffusionist current resulting in the mixing of cultures.

**Keywords:** Food Diversity, Production/Consumption, Logics

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## 1. Introduction

Food diversity is a real issue for many developing countries among which Burkina Faso according to Kanazoé [1] referring to the study of CSAO-CILSS [2] in Burkina Faso:

“Food diet of the majority of the population is more or less diversified [...]. The lack of diversification is the cause of important rates of micronutrients deficiency, but also the cause of a food intake unsuitability to the adults as well as the children in quantity and above all in quality.” CSAO-CILSS [2].

According to this report, agricultural products except cereals are in majority designed to marketing until the consumption of households. This fact generates a food imbalance particularly poor in lipids, proteins and micronutrient. That’s why, according to Kanazoé [1]:

“Nutritional quality of food improves through the increase

of the number of food products and/or groups of food, that’s why we say that a more varied diet enables to have an active and healthy life. The more the diet is diversified (number of groups of food highly intaken), the better is the quality of the food” Kanazoé [1].

In the survey realized by the Agricultural, the Hydraulic and halieutic resources Ministry in 2009, it emerges that the food diet in most households in Burkina Faso is very low diversified. In addition, this situation has a geographic disparity at many levels. From one part, we notice that food diversification in the rural area is at low level compared to the urban area. As an example, the survey reveals that “the proportion of households that are in low food diversification is 54,8% while it is 34,9% in the urban area.” MAHRH [3] In the same logic, ACF [4] finds that: “The inequalities between the rural and urban areas are important: 65% of urban households have an average and high diversification, while

only 45,2% of rural households are in that case” [4]. Even if there is a gap between the burkinabè Ministry of agriculture data and that of the NGO ACF, we notice that the urban households have much more diversified food than the rural households in Burkina Faso. That’s what UNICEF [5] also confirms through a worldwide study of the phenomenon:

“There are large disparities in the prevalence of minimal food diversity according to the residence place (urban/rural) and the income level. The food consumption prevalence from at least eight groups of foods is on average 1.7 times higher among the children from urban households or wealthier households than among the children from rural households or poorer households» UNICEF [5].

On the other hand, there is a disparity between regions. Thus, the Cascades region is the region where households consume the most diversified because it is one of the largest fruit-growing areas in the country, estimated at 40.3%. The study classifies households in the Boucle du Mouhoun region among households that differentiate their diet little. However, the study concludes that "by then studying the differences in the composition of household diets, it appears that the diet is characterized by an almost general consumption of cereals and condiments both in rural areas and in urban environment” MAHRH [3] In the same view, Sanou [6] in a study conducted in the North region also claim that the foods most consumed by households in the region are cereals.»

Agricultural production in the western part of Burkina Faso is relatively satisfactory and is generally enough to cover the food needs of agricultural households. It presents a variety of agricultural products. The speculations produced are cereals, oilseeds, tubers, market garden products, fruits and NWFPs (non-woody forest products) but oppositely, a part of the rural population still suffers from malnutrition linked in large part to an imbalance in the consumption of this diversity produced. By comparing what is produced and what is consumed, it is possible to understand the logics that guide the food and production of rural households. This is why, we are wondering, what are the reasons that justify the paradox between production diversity and food non-diversification in this part of the country? What perceptions do they have of food diversification? These are all questions that guided this reflection about the link between production and household consumption in the two rural communes visited in this western part of Burkina Faso. The following part of this reflection is subdivided into three main points. The first is the methodology used to carry out this research. In the second part, the results we arrived at are presented and analyzed. Finally, a discussion of the main results of the study is made.

## 2. Methodology

The overall objective of this work is to understand and explain the relationship between what is produced and what is consumed in an environment of local farms. If the mistake can be made to automatically admit that those who produce a

diversity of foods must logically "eat" diversify, it is just as simplistic to conceive that in this part of the cotton-growing area in the western part of Faso, rural households all eat the same way, and without any diversification of meals and/or sauces and snacks. To satisfy this scientific concern, the approach is based on a qualitative survey, applied to a sample of farms chosen in a reasoned way, in order to identify the determinants of production in connection with the consumption of the populations of the rural communes of Koumbia and Béréba. It was about understanding the logics which govern the choices made between what is produced and what is consumed in the villages of Gombélé Dougou, Makognadougou and Wakuy.

### 2.1. Presentation of the Study Area

The study was conducted in the province of Tuy in western Burkina Faso (Figure 1), located in the heart of the cotton and cereal zone of the country where problems of chronic malnutrition and stunting are observed in households despite an average level of production well above the self-sufficiency line of cereals in the view of Lourme-Ruiz [7]. Three villages were chosen for their different contexts: Makognadougou is located on a main road at 50 km from the town of Bobo-Dioulasso; Gombélé Dougou is a more isolated village; Wakuy is the village most oriented towards cotton production but also the most isolated and with less research and development projects in agriculture or health than the two other villages.



**Figure 1.** Location of the 3 villages, Tuy province, Burkina Faso OpenStreetMap [8].

### 2.2. Sampling

The sampling was based on a household survey about consumption practices of 105 farms. Our sample was taken from this database to deepen reflections from a “socio-anthropological” perspective in the perspective of Olivier De Sardan [9] A sample of 27 farms was retained in the account of the three villages. This first target was accompanied by a second target including 3 farms per village to compare views with the first given that the second target had not been involved in the project or in the follow-up survey of farms that took place in 2018.

Eventually, a sample of 25 monitored farms (target 1) and 9 unmonitored farms including 3/village (target 2) were interviewed, so, a total of 34 farms against 36 planned. Indeed, two farms could not be investigated due to the death of the CE and the move to another village of an EA. The interviews concerned the CEs and their wives. A total of 68 semi-structured interviews were carried out using an interview guide.

### 2.3. Data Collection Tools and Analysis Strategy

The study being purely qualitative, our approach was to design categorical interview guides according to the targets from a certain number of research axes. The axes on which the discussion focused are: i) Land tenure, production management decision, ii) Role and responsibilities of the household members and functioning of the farm, iii) Management of granaries, income and feeding strategy, iv) Contribution of AGRs in diet diversification, v) Women, farming and diversification, vi) Perception linked to production diversification, vii) Perception linked to diet diversification, viii) Picking, hunting and fishing in the food diversification of EA. The study was therefore conducted through semi-structured individual interviews with 68 people in the three villages concerned by the project.

Data were processed through content analysis with reference to authors such as Bardin [10] and Deslauriers [11]. This method makes it possible to classify and codify several elements of the analyzed material in order to better understand the characteristics and the in-depth meaning of the statements collected in the field. Content analysis according to Quivy [12] aims at “the study of the unsaid, the implicit”. Content analysis is thus positioned as a technical analysis of the gap between the “said” and the “unsaid” of the people surveyed.

### 2.4. Theoretical Model of Reference

The theoretical model on which this research is based is that of “rational choice”. This theoretical model appeared in the field of economics envisioning to explain how individuals make decisions and presupposes that these are essentially rational, aiming to seek the greatest benefit at the lowest cost. The theory was subsequently introduced in other fields such as psychology, sociology... with the same objective as in the field of economics. The sociological figures who adopted this theory are among others Weber [13] and Boudon [14]. In sociology, the “rational choice” theory is a variant of methodological individualism according to Weber [13] and Boudon [14].

Boudon [14] quoted by Yao [15] thinks that individuals are rational beings. In this sense, they are: “*an unsurpassable point of reference. All phenomena can only be understood or explained if we start from the individual actors who are at the origin of these phenomena*”. In the case of the current study, individuals make decisions, make choices of production and/or consumption according to their interests, the information available to them,

according to their representations and their preferences that they have of agricultural production. Yao [14] supports to this effect that any act taken by an individual has a certain rationality insofar as he always has “good reasons to act” in one way rather than another. We base on this theory in order to know “the good reasons” which explain the paradox between what is produced and what is consumed in the households studied.

## 3. Results

### 3.1. Land Tenure and Management Decision of the Production

We make here the hypothesis that the land tenure of a farm could influence the choices of production and consequently of food. In particular in the event of insufficient land, the producer will favor in the choice of crops on the one hand those which correspond to his food habits and on the other hand those which provide him with the cash he needs. Thus, in the case of a land pressure, he will not seek to diversify his crops because this would correspond to him taking too high risk and therefore will not integrate the notion of food diversity in these choices in connection with nutritional values. In addition, these small-area farms generally have limited performance in this case and the producer will find it difficult to make up for this low production diversity through purchases. Due to population growth in these villages, some farms have reduced their cultivated area and sometimes the number of crops because part of the land they previously cultivated has been taken away from them by temporary rental. They are then forced to reposition themselves on the usual cash crops and basic cereal production.

The three study areas (Gombéléldougou, Makognadougou and Wakuy) are bwaba areas. The bwabas are the natives but cohabit with migrants such as the mossi, the fulani, the dafing, the lobi, the samo etc. in terms of numerical superiority, the village of Makognadougou and Gombéléldougou hosts a large number of Mossi migrants, while Wakuy has remained strongly dominated by the Bwabas.

The bwabas are the landowners and grant the land to the migrants for their production according to the contracts that bind them. These contracts are diverse and range from loans to rental and from rental to the transfer of the right of ownership by an informal deed of sale. The contract that poses a problem today is that of annual rental, which must be discussed each year and for which the tenant producer must pay between 15,000 and 20,000 FCFA per ha and per rainy agricultural season. But some mossés today hold vast spaces which were allocated to them by the village chiefs when they arrived in the village several decades ago and over which they have the right of usufruct, a right which they can transmit to their children. The Fulani also respond to the same configuration.

The results show that apart from the natives, some migrants, most often from the families who arrived last, are

facing land problems to be able to produce a diversity of speculation. In this case they are forced to go through often sporadic short-term rental contracts to produce. Overall, each household has land for its production, but in variable quantity and quality.

Regarding to the decision and the management of production, a diversity of managerial practices exists according to ethnic groups and according to the structure of the household.

Among the Bwabas, women do not have the right to land, exploit the land of the CE on which the EA takes advantage for its food sovereignty. In this same configuration, we note that some households allocate land for women to enable them to invest in the cultivation of legumes and vegetables. On the question of rotation, among the Bwabas the decision of the choice of what to produce is the responsibility of the head of household or the CE. Women are not involved in decisions on crop rotation issues.

Concerning the mosses, men are responsible for the production, but they allocate individual fields to the women to allow them to grow small crops such as groundnuts, soybeans, cowpeas and vegetables.

As for the fulani, exceptionally, women do not participate in field work. Therefore they do not have individual fields. Their production activity is milking cows and marketing milk, breeding and introducing vegetables such as sorrel and okra around the huts, which are then produced in small quantities and exclusively reserved for sauces.

It is clear that the allocation of individual fields to women is part of the social codification that each ethnic group makes of the woman place in the household. But with the various inter-ethnic, city-country influences, this organization is becoming more and more flexible.

Each ethnic category has its specificities, but it should be noted that overall, the rotation in these farms includes cotton, maize, sorghum, millet, soybeans, cowpeas, groundnuts, okra, sorrel etc A diversity of production exists in the area that it would be important to assess by the rotation constituted by each monitored EA. This diversification of production is more or less significant in terms of the total number of crops and the area devoted to each crop. It depends on the concerns of the CE and the requests of his/her wives: (i) for land when there are individual fields (CI) on these farms and (ii) for diversification production (cowpea produced on common fields (CM)).



**Figure 1.** Baobab field of the village chief of Makognadougou. Cliché: T. Fayama, 17/08/2020.

The production of baobab leaves for making the "baobab leaves" sauce (fresh or dried) is particularly distinctive and frequent among the bwabas (it is their favorite sauce) but also for all households in the 3 villages, regardless of their ethnicity. This is explained by the integration in non-native households of local food habits. Many concessions include just outside, sown or protected baobabs when they sprout on their own from the household garbage. This quasi-culture of baobab can be explained:

- a. By seeking autonomy in the kitchen, women find fresh leaves on the spot for a good part of the year;
- b. The baobab is the culturally codified sauce tree;
- c. Economic strategy. The leaves are collected and dried for the dry season. They can be sold dried at the market if the production is large and goes beyond household needs;
- d. The baobab is a tree that has a long lifespan and can reach exceptional heights to the point of compromising the harvest of its leaves. In this case collecting leaves becomes impossible or very dangerous. If you are only looking to harvest the leaves, it is possible to regularly top the young baobabs, which slows down their growth and therefore facilitates leaf harvesting.
- e. Among the bwaba, it is never planted in the yard or if it is planted in the yard, which is very rare, the orientation of its shadow must be studied so as not to face the door of entrance.

### **3.2. Role and Responsibilities of the Household Members and Functioning of the Farm**

On the farms of the three villages, the head of household or head of farm is the guarantor of the food sovereignty of the household, that is to say the ability of the household to consume only the cereals it has produced. To do this, he must ensure that cereal production will be sufficient for an annual consumption cycle, taking into account the needs of his family but also of his allies (more distant family in difficulty, donations, etc.).

Among the bwabas, the fulani, the dafing, the dagara, just like the mossés, the crop rotation decision is taken in the vast majority of cases by the head of the household. However, exceptions exist. When the CE is no longer active and it is one of the sons who assumes responsibility for the production unit, there is necessarily consultation on decisions and choice of crops, in other words, for the management of production and harvests. When the CE is inactive, he becomes the one who plays the role of coordinating activities and cohesion of the social fabric in the family. His decision alone does not pass. It's still flexible when it's a monogamous family. But when it comes to a polygamous family, consultation is much more recurrent, otherwise we are witnessing in most cases, dislocations in households.

The one who feels injured will ask to take their autonomy, that is to say to have a large field apart. As a result, there is a decrease in the number of EAs comprising several households in favor of those including a nuclear household. This type of exploitation occupies the largest area in the three villages.

Among the Fulani when the mother-in-law lives in the household, the management of crop rotation decisions does not change but those related to the kitchen do. The son who is the CE organizes the kitchen with the mother who is the relay in terms of supplies with the other women in the household. Generally, only one kitchen is established and in a rotating way under the supervision of the mother-in-law. In the case where the CE is a woman, the rules of the game change because the woman changes place and role according to this new context. These are rare cases because in traditional societies even when you lose your husband, you are under the control of the extended family and consensus is reached to keep you in the home. When the case arises and the woman becomes CE, she manages everything with her first son generally and the decisions are much more those of the son. She is CE but it is the eldest son who decides what they are going to produce and it is he who organizes everything and reports to the mother who makes him suggestions on management to avoid slippages. In case she does not have a child old enough to take on the responsibilities with her, she decides everything.

Regardless of ethnicity and when the husband is CE, women, for their part, assure the role of assistant, the ones who take care of household chores and the maintenance of children. They constitute, in the same way as the active children, the family labor of the EA except for the fulani women who are not involved in the field work. The latter devote themselves to the sale of milk in addition to daily household chores and the management of the kitchen.

### 3.3. Granary and Income Management and the Feeding Strategy

The management of the granaries depends on the ethnic groups and the crops (cereals or secondary crops) but in most of the households surveyed, the management of the cereal granary is the concern of the CE. The woman, on her part, manages the income from her individual fields. There are two kinds of cash in each EA:

- The EA treasury or main treasury under the control and management of the CE to ensure the expenses of the EA and the family for which he is responsible.
- The woman's treasury that she manages her income as she pleases.

The treasury of the EA merges with that of CE for its personal needs. This common treasury must first enable to provide basic social services for all members of the household such as health, school and expenses related to marriages of one of the members of the household or other persons to whom the household is linked socially, participation to funerals, festive celebrations. This cash is also partly oriented towards the satisfaction of production expenses, in particular fertilizers, herbicides, labour, rental of tractors or draft oxen. The CE must also provide the members of the household with bicycles, motorbikes, housing, etc. These loads are generally huge and do not allow the involvement of the man in the kitchen, which is why the woman is much more involved. The woman's cash, if she

allows it, can be used to meet certain expenses that the CE would have to face when the main cash is in deficit even if a priori this is the responsibility of the man or the CE because he manages the common "basket". It should be noted that she is not socially obliged to meet these needs, which fall to the male CE or head of household. This means that when the household is not self-sufficient, food diversity remains low because both men and women are much more concerned with solving certain needs to the detriment of others, as the case of food diversity or variation.

Regarding the cash flow of the woman, it is precisely that she has needs for herself, but she is also responsible for managing the meals in most cases and must meet the daily needs of the children. Its treasury is much more used for cooking in the dry season. In the rainy season, men take over in households where there are no meals.

In the whole, the resources from the main treasury are little reinvested in food since the production allows to guarantee the current food supply of the family contrary to the income of the women. However, in case of a gap in the household, it is up to the man to manage to support his family in terms of food and must continue to play his role of guarantor of the household's food security by assuring by all means what its members need to feed themselves. This is why solidarity and mutual aid is much more developed in those rural households. So you have to have a good social base.



**Figure 2.** About twenty Baobab trees around the household of Konfè Wahab, Cliché: T. Fayama, 17/08/2020.

For the CE, these baobab leaves are the cooking pot for the sauce and reduce his kitchen expenses. Every woman knows that these baobab leaves somehow replace meals and have included it in food codes. Which for the woman looks like a kind of imposition. For the CE interviewed, planting these baobabs contribute to reducing the meaning of meals and the woman interviewed obviously thinks that the CE imposes this sauce to them so as not to make purchases or to spend less on meals. According to her, it is a strategy in her sense developed by her husband to save money. She goes so far as to evoke the notion of "stingy" to qualify this attitude of her husband.

The baobab today is the best shared and most available resource because it is often present in front of each house. The leaves can be requested from the neighbor and collected from the trees in front of his yard, he will give them to you

and vice versa. It is so widespread in the village that it is no longer necessary to walk in the bush to obtain it, it would be a waste of time. In addition, the leaves are much more collected by children and women and this work requires little time, it is very frowned upon when you go out to buy baobab leaves, it is so accessible on the nearby inhabitations. It is only in the dry season when some households are out of stock and can now go to the market, this happens when the women have not been able to store and dry a large quantity.



Cliché: T. Fayama, 17/08/2020

**Figure 3.** Individual kitchen outside the household at Makognadougou in her store (EA monitored).

The above picture shows a lady who prepares in her shop, therefore outside the household, what she is going to eat. This cooking is done in her place of work where she has the opportunity to feed herself because of the regular income that her commercial activity provides her. She confides that it is the monotony of consumption of tô plus okra sauce that she faces in her household that leads her to vary her diet outside the household, for herself and her children if they come to eat with her. The empowerment of women through the development of IGAs allows them to diversify and/or vary their diet but in strict compliance with social values. This cooking could hardly be done in the household which in this case includes three women and collective cooking is done in turn. She can't do it at home for several reasons. The first reason is that she exposes herself to the husband who may refuse because of his sole role in providing basic cereals. The second reason is that it is a household of about thirty people, she cannot prepare for herself and her children and leave the other children of her co-wives without giving them a little of this dish. She also wouldn't have the financial capacity to do it for everyone because of the size of the household. Another reason in link with that of household size is the sense of belonging of children. Any child from this household is

considered her child and for her, it is not acceptable that we create differences between the children as soon as they are in the compound. "The children of my co-wives are also my children," she says. A third reason is the social cohesion of the household because doing small cooking in full view not only calls into question the social foundation that surrounds this unique or common cooking practice observed in the household or in Moaga society, but also cracks intra-household relationships. A fourth reason would be not to expose the weaknesses or limits of the husband to the whole society, this cooking is therefore done outside the common home (the large courtyard), on the sly in order to respect the values of the family and local society.

### 3.4. Contribution of IGAs in Food Diversification

Income Generating Activities are multiple and multifaceted, depending on the opportunities that arise for women and men. IGAs are most often considered as individual economic activities of women or men such as cattle, sheep and pig fattening, shops, money exchange businesses, gold panning, cereal trade, animal health, masonry, blacksmithing (mostly male activities), sale of dolo, porridge, restaurants, sale of soumbala, street food, maquis and refreshment bars (mostly female activities), etc. These IGAs are carried out solely to provide additional income to the assets of the agricultural household. They contribute to the improvement of daily life conditions, including diversity in the preparation of meals, especially sauces. A good part of this income is reused on a daily basis to manage these food supply problems or prepare for the rainy season with the purchase of agricultural inputs and herbicides. But when it comes to buying food, this does not necessarily mean looking for a diversified diet. IGAs can also provide substantial monetary income, but there is no correlation between the size of this income and the diversity of meals.

### 3.5. Women, Farming and Diversification

The reality of women in the farm depends on their ethnicity and the related cultural background Overall, among the Bwabas women do not own individual fields for their own production but invest in the common field or collective. However, exceptions exist where the EC gives an individual field for the woman's small crops such as groundnuts, soybeans, cowpeas, okra and sorrel. Moreover, the EC easily gives permission to his wife(s) to grow sorrel or okra on the border lines of common fields. In most cases, these crops occupy small areas, hence the term secondary crops and the products obtained allow women to diversify their diet (at least the sauces) and to obtain a small income to cope with certain of their needs.

Among the mossé we still have a high number of women who have individual fields but among the dagara and dafing it is not as frequent.

But on the whole, the management of the main productive resources (land, labour) and of the products and incomes from them being entrusted to the men, that is to say to the

CEs, the tiny resources of the women who could contribute to diversifying the food are divided between the kitchen and the daily problems that they live as well as the care of the children. So in conclusion, we think that if action is needed to change food behavior in favor of diversification or variation, it is necessary to act on ECs or men in general because although they do not manage the kitchen, they have, manages and controls EA resources. For example, for the family to regularly eat a dish of cowpea, renowned for its richness in protein, the CE must decide either to cultivate cowpea on a larger surface in a common field or agree to devote part of the income of the EA to the regular purchase of cowpea.

Of course it is also possible to improve the sauces either by introducing rich foods more often and in greater quantities (legumes, fish, meat, etc.) but here again the CE with the income from the EA is more able to buy these foods.



Cliché: T. Fayama, 17/08/2020

**Figure 4.** *sombala of soybeans + néré: Transformation of hut in the village of Wakuy.*



Cliché: T. Fayama, 17/08/2020

**Figure 5.** *Pure sombala of soybeans.*

### 3.6. Perceptions Linked to the Diversification of the Production

The production objective at the CE level is much more market-oriented for the satisfaction of problems and certain more material needs. Nevertheless, producers in the three

villages surveyed first guarantee basic cereals for households. For them, food is above all cereals. They are much less concerned about the production needs for the sauce because they also think that nature already provides enough consumable products especially to make the sauces. Production is therefore primarily oriented towards the market (income) and the objective of having enough to eat (quantity of cereals).

The objective of producing and diversifying is often linked to the CE strategy to have several sources of income. Some think that they diversify so that the children do not leave to ask people i.e. to meet the needs of the children to prevent them from showing others their weakness. When the CE diversifies the share of production that is sold is much larger than that which is consumed. Only maize is stored much more because when he talks about the granary it is of course the stock of corn that is mentioned because it is their basic food.

Clearly, it should be remembered that the primary objective of producers is to produce enough cereals to feed their families, but diversification is not sought at all costs. Added to this is the need for equipment (motorcycles, construction of cement houses), linked to weddings, funerals, celebrations. According to the EC, eating monotonously (without diversity) allows them to save money. In the opposite, they consider that eating in a diversified way is more expensive than always eating the same thing. In addition, the EC can also sell part of the secondary productions (such as cowpeas) because his family consumes little of it.

Therefore, they are forced to find themselves in a food monotony to be able to satisfy this daily experience. This is why some go so far as to sell subsidized fertilizers and are satisfied with the natural capacities of the soil to produce and in the end the level of productivity will be low. In the households with low cash flow and low capital, they are forced to sell fertilizers or even sell off certain crops or livestock products to meet urgent problems.

### 3.7. Perceptions Linked to the Food Diversification

First of all, it should be noted that food diversification is not an objective to be achieved for most of the households surveyed. However, we still see that some households diversify their diet quite well. There are far less households that diversify their diet due to eating habits and their perception of food. For them, eating means being full and eating what is part of their food habits or practices.

Then, it should be noted that this perception is much more generational. Old people do not have the same apprehensions of food perception as young people. For the older generation heard, varying the food is a matter of "civil servant" behavior and that at their level they do not need it, but the problem lies in the ability to buy food diversity and less than that of diversify the production of EAs. Crop choice decisions for common fields and land allocation for individual fields or purchase of food to diversify being made by ECs who do not have a "good perception" of the need for variation/ improved

diet also influences the eating practices of other members of the household. However, the fact is that the educated will not see food diversity in the same way as the uneducated.

Some people have benefited from food/nutrition education that takes into account the diversity and nutritional quality of foods. These are often those who have gone to “white school” because it is the most frequent learning environment, those who have joined peasant organizations. This type of person also has links with the city and knows “the culture of the city”, the openness to the city and cultural mixing. Most of them have internet access, although this is still rare in the agricultural households surveyed. In other words, those who are “cultured”, i.e. who have knowledge of the concept of food diversity or the basics of good nutrition. Therefore, a number of variables must be taken into account in understanding the perception of food diversification.

Each society or ethnic group has a social construction of food which explains the monotony of food consumption in rural households. However, these eating behaviors are influenced by certain variables such as the level of education, connection to the city, access to sources of information, eating habits, secular cultural practices... Indeed, the sources of information of the populations of the villages surveyed in terms of production and diversified food products and especially nutritional education remain the health centres, the connection or the stay of one of the household members in the city, the social trajectory of the migrant, the churches, the kindergarten, radio (rarely), TV (rarely also). TV and radio programs specific to human food are not frequent. Some young villagers have a smartphone, these young people often have the level of education allowing them to use and understand them. The case of Gombélé Dougou and Makognadougou is remarkable. Few young people go in search of information (for example Kani Baweï and Hori Adama in Gombélé Dougou; Hypolite Kaboré, Badoum salif... in Makognadougou). They have facebook pages where they post about their production activities etc. Smartphones are less present in Wakuy, which may be linked to its isolation.



Cliché: T. Fayama, 24/08/2020

**Figure 6.** Some cooked dolo for consumption of the household at Gombélé Dougou.

### 3.8. Picking, Hunting and Fishing in Food Diversification of the EA

Picking is a seasonal activity, the period depends on each product. It is primarily an activity of children and women and more rarely of men. Women gather these first for family consumption and often to sell part of it when they have enough. But they point out that these gathered products are declining due to their low productivity, something attributable to climate change and above all to growing anthropogenic pressure (clearing, overgrazing, fewer trees in the plots) Hunting also is not a classic activity but it is practiced in a traditional way from time to time by the bwabas, the fulani but it is not observed among the mossés, the dafing and the dagara or lobi and samo. Fishing is also a much more occasional practice with the exception of dafing which makes it an activity in its own right. It is cultural among the dafing. All these activities could in principle be used directly to improve cooking, but as far as hunting and fishing are concerned, the obtained products are mainly intended for the market. Picking products, such as certain fruits in villages that are not close of the main road, are not marketed much but rather consumed. It is only in Gombélé Dougou, crossed by the national road that we find children and women who sell a lot of picking products (liane goines, shea, wild grapes... and even products from hunting). As a result, these natural products are not very present in the food practices of households, even those who have picking habits. For example, shea nuts are first sold and are not used in the diet of agricultural households, bush meat is generally sold to facilitate the purchase of dolo. In conclusion, we can then say that the availability of food resources and financial resources will not automatically mean “variety consumption” because the selling of all types of food products is possible. It is therefore clear that agricultural households do not seek to achieve food self-sufficiency, i.e. to produce the largest part of consumed food, for example women prefer to sell shea nuts rather than transform them into shea butter as a cooking oilseed, which leads households to buy vegetable oils that are often imported and of poor quality. Some ethnic groups identify and assert themselves socially with the availability of resources and not their consumption, for example the Fulani all own cattle but this does not necessarily correspond to a high consumption of meat (the Fulani consume a lot of purchased rice and fish). This availability gives them a privileged status within their community. In other words, a CE will be sensitive to the social status acquired by the goods acquired, the size of his livestock, etc. But the diversity of his family's diet will not be taken into consideration in his perception of his social status.

## 4. Discussion

As shown in this study, Sanou [6] in the case of the North region had observed that the diversification of agricultural production does not rhyme with the diversity of household consumption during the rainy season. However, these authors

observe a weak correlation between the diversity of household production and their consumption during the gap season. Several other studies have raised the paradox of the diversity of agricultural products which is not necessarily reflected in household consumption. The author Lourme-Ruiz [7] summarize the situation showing on the one hand a positive relationship between the diversity of production and that of household consumption in India and Malawi through respectively the studies of Baggowaia [16]. Jones [17]. On the other hand, there is a negative or almost zero relationship between diversity of production and individual or household consumption in Mali, Kenya, and Ethiopia based on research by Torheim [18]; Sibhatu [19].

If the diversity of agricultural production does not seem to be unanimous in terms of diversity of consumption, it should nevertheless be emphasized that according to Lourme-Ruiz [7] the presence of different local tree species preserved on the plots had a very significant and important effect on food diversity over the period from May to August 2013 in their study area. However, this was not the case in January 2014 because the picking of species is seasonal. Thus, through this observation by these authors and the strong presence of baobabs, it is easy to understand the high consumption of baobab leaves in the study area.

In the same direction as the results of our study, Lourme-Ruiz [7] also affirm in their study on the diversity of production, agricultural income and food diversity in Burkina Faso that the agricultural income or not of women is more associated with household food diversification than that of the farm manager or the head of household. Thus, for these authors: "When a woman sells agricultural products, she consumes 0.214 ( $p$  less than 0.1) more food group". However, given that in the African context and more particularly in Burkina Faso, the man remains the head of food and all the decisions come back to him, it is appropriate to improve the diversity of household consumption to activate the change of behavior in the man. just like in women.

According to Sanou [6] household size is one of the factors that does not have a significant effect on household food diversity in their study. By comparing these results with those from this research, we can argue that household size has a negative impact on food diversity. Like this respondent who is obliged to cook in her workplace in order to diversify the diet of her small family (herself and her children) because she lives in a polygamous family. Thus, it can be said that the size of the household represents an essential factor in food variability. However, in the literature on this factor, a paradox emerges. Indeed, Zoyem [20] observed in Burundi that households are more likely to diversify their diet when the size of the household is high. However, the authors draw attention to the fact that this does not necessarily mean that people living in large families benefit from a more varied diet. For them, this situation could be justified by:

"The multiplicity of consumption decision-making centers in large households rather than food diversity for each of its members. The adults in the household, including major

children, can in fact make purchases on their own initiative and not distribute these purchases to all the members of the household. This type of result clearly shows the limits of the concept of dietary diversity for classifying households in terms of vulnerability."

The situation thus described is consistent with the strategy of this respondent who is obliged to cook outside the family home in order to allow her children to eat a variety of foods.

According to this research, education and openness to the world is also a positive factor in consumption diversity, like two of our respondents who have profiles on social networks, which allows them to have a view of what is done elsewhere and to see to what extent to copy or integrate this into their habits. This fact was attested by Gandval [21] at the level of West African countries in these terms "This is how we see foods typical of certain regions spreading over the past twenty years well beyond from their territories of origin, and crossing borders (cassava products for example)"

For his part, Tankari [22] pushes the reflection further by arguing that the level of education has a greater effect on food diversity for women compared to men. In other words, the acquisition of educational knowledge acts as an element favoring the search for information on food needs adapted to individuals. This is why the observation made by Akakpo [23] can be accepted in the context of this study:

"Several analyzes show that individuals with a higher level of education are more likely to find gainful employment or to significantly improve their productivity and living conditions. One of the major challenges therefore remains the fight against illiteracy by improving performance in education and investing in basic social sectors."

All of this tends to corroborate the idea that food diversification is a matter for whites and/or civil servants. This idea is very present in the minds of respondents in this study who believe that it is people who have attended school who can afford such a luxury (to vary their diet). In any case, according to several organizations working in the field of food, food diversification can be stimulated from the perspective of public policies. Thus, for UNICEF [5] public policies should promote the education and information required to enable a change in the behavior of individuals and society in favor of a healthy but also diversified diet. This recommendation is adapted to the situation of our respondents where we can see the premises of food diversification due to the openness to the world through the information collected here and there on various communication channels.

It appears from this study that one of the obstacles to food diversification is the lack of means. Indeed, the respondents consider that eating in a diversified way is more expensive than eating the same thing all the time. According to the ACF [4] on the reconciliation between agriculture and nutrition in Burkina Faso, it is noted that "more than half of households do not have access to a diversified diet". This NGO explains this state of fact by the strong seasonality of food prices and the high cost of a

quality diet. Thus, food diversification has a cost that is undoubtedly beyond the reach of the majority of Burkinabè households. This means that consuming diversified food is a luxury for households that barely have to eat twice a day. Consequently, ACF [4] states that:

“the cost of a balanced and sufficiently diversified diet is out of reach of the incomes of vulnerable households. (...) the cost of a diversified diet would represent around 170% of the total income of the poorest households. Only middle and better-off households could afford to have access to a balanced diet, even if it would require them to spend 100% and 90% of their total income on it, respectively.”

However, according to UNICEF [5] it seems that the cost of a healthy or even varied diet is: “lower than that of current food consumption habits if we take into account the externalities linked to health and climate, there are, in some contexts, other significant indirect costs and trade-offs”. This position is better understood if we establish the comparison of a dietary variation which avoids certain deficiencies and pathologies for the body and the non-variation which generates health problems such as malnutrition... Consequently, an unvaried diet does not go without consequence on the state of health of a human being in the sense that the variation of the food contributes to reinforce and to give to the human body the whole of the nutrients necessary for its good functioning. It is in this sense that Issanchou [24] establish a link between diet and certain pathologies.

Beyond the various determinants that abound in the literature and do not favor food diversity, this research has made it possible to highlight a determinant that does not often go unnoticed as a negative factor in dietary diversity: it is the ethnocultural factor or more generally “eating habits” in connection with Bourdieu's [25] theory of social habitus. Indeed, there is a kind of homogeneity in the consumption of different ethnical groups in the survey area. We were able to observe that mainly the *tô* plus the baobab leaf sauce is by far the most consumed dish. Food habits are a break on food diversification insofar as according to Issanchou [24]: “it is difficult to change the eating habits of adults, adolescents and even children, it seems desirable that the child acquires as early as possible eating habits in accordance with nutritional recommendations”. The author Lourme-Ruiz [7] in their study are of the opinion that there may be ethnic specificities with regard to culinary habits leading to a non-diversification of household food. However, these authors point out that the statistical tests carried out on the data at their disposal do not allow them to confirm this hypothesis.

In the case of this study, it appears that the use of baobab leaves as a sauce is explained by the lack of resources of heads of household and/or the availability of those leaves. This observation is not shared by Pauzé [26] who rather thinks that eating habits are influenced by the level of knowledge, beliefs and cultural practices. The influence of beliefs on eating habits has also been attested by Sebai [27] for whom cultural traditions have the ability to influence

household eating habits. These traditions are, according to the author, to a large extent at the origin of food restrictions at certain times and for certain categories of people (in particular children, pregnant or breastfeeding women. The observation made by Sebai [27] is already apparent in the studies carried out by international organizations such as the FAO [28] showing that in most developing countries, there are socio-cultural factors that limit the diversified consumption of foods by the populations. Consequently, there is need find a strategy to induce behavioral change of households through awareness campaigns.

## 5. Conclusion

The objective pursued through this research was to be able to link a certain number of variables such as the level of education, membership of a FO, IGA, ethnicity, connection to the city, household size, culture with the logic of production and consumption of households in the study area.

There is a certain correlation between food diversity and the variables questioned, this correlation makes it possible to explain and understand why farms diversify or not. It should be noted that these variables must be linked together to better understand the food behavior of rural households. Most often we retain that eating behaviors are expressed according to the law of cause and effect.

Specifically, we note that food behavior or food choices are much more determined by cultural values (acquired through education, openness, curiosity, acquired information) and ethnic values than not technical and economic determinants linked to the resources of the farm or its environment (picking products). But it should also be remembered that food habits, although they influence production and consumption practices, can change through contact with new cultures because rural societies no longer live in a vacuum, they are also open and therefore capable of change. Clearly, food practices are much more a matter of social construction and changes can therefore be made based on communication methods for behavior change. There is also this social construction which was made of precariousness or poverty and which animates the peasant's discourse which must also be understood even if it is not completely ignored. Understanding the reasons that explain the weak link between what is produced and what is consumed comes down to including eating behaviors in the correlations of a certain number of variables mentioned above.

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