

## Farming Approaches to Non-Agroecological Onion Production in Grand-Popo, South-West Benin

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### Abstract

*In the Grand-Popo commune in Benin, non-agroecological onion production practices are observed. Despite warnings about health and environmental risks, this persistent and mobilizing cultural option of chemical inputs raises scientific curiosity. Assuming that non-agroecological onion production practices are based on farming approaches, this research aims to analyze them. To achieve this, semi-structured individual interviews and direct observation were used. Through reasoned choice, 25 actors were interviewed following diversification and saturation. Processed through triangulation and content analysis, the empirical data were compared with the theories of rational choice and social representations. The results reveal that the minimal use of biological inputs and maximal use of chemical fertilizers and pesticides are underpinned by several farming approaches: soil fertilization, crop protection and yield increasing. Even though these farming approaches are relevant, the main government is called upon to develop and implement agricultural policies that minimize the abusive use of chemical inputs in food production.*

**Keywords:** *non-agroecological production, farming approaches, onion, Grand-Popo.*

### Introduction

The works of Togbé (2022, 8) reveal that « the agricultural world is often marked by a range of knowledge and/or techniques [...] and controversial paradigms [...] » which call for agricultural practices underpinned by farming approaches of agrarian productions. The scientific literature helps identify two paradigms associated with two agricultural practices: sustainable agriculture and conventional agriculture, which respectively call for agroecological practices (cultivation methods conforming to nature preservation) and non-agroecological practices (cropping systems using chemical inputs). By focusing on onion production, the researcher attempts to highlight the inherent farming approaches in adopting non-agroecological practices instead of cultivation methods respecting environmental protection. To do so, a scientific perspective combining existing literature, exploratory interviews and observations in a grounded theoretical approach was applied to onion production, within its cultivation spaces, and more specifically in Grand-Popo.

The scientific literature reveals that onion holds a prominent place in global, African and Beninese agriculture. It represents economic prospects for rural households. Onion cultivation (*Allium cepa* L.) occupies over 3.35 million hectares with a production of 742.51 million tons worldwide (Rameez et al., 2014). In West African countries, onion cultivation represents a principal means of subsistence for rural households (Archiani et al., 2013). Statistics have shown that it generates a monetary value of around 19 to 47 billion FCFA for Niger, 35 billion FCFA in Senegal, and 24.87 billion in Burkina Faso (Yili et al., 2013) where producers create over 98.5% of the added value (Kabore, 2012).

In Benin, onion is produced in significant quantities in Malanville and Karimama regions (Aboubakar et al., 2022) and ranks first among vegetable crops in Grand-Popo commune (CARDER<sup>4</sup>, 2013). Its yields in South (Grand-Popo) and North (Malanville and Karimama) vary respectively between 10,000 and 15,000

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kg/ha and between 15,000 and 20,000 kg/ha. This relatively low yield<sup>5</sup> combined with limited grainfields in some favorable production zones leads to a rather modest national production. Compared to other African countries (Niger, Burkina Faso, Senegal, etc.), this national onion production is low thus forcing the country to make imports to meet the population's onion demand. Despite its agricultural potential in land and water, this low production in Benin is partly caused, according to Sikirou et al. (2011), by nutrient-poor soils. This constraint generally forces producers to resort to excessive use of agricultural inputs such as chemical fertilizers and pesticides generating negative impacts environmentally and ecologically (Trabelsi, 2017). The analysis by this author shows how effective the use of chemical inputs is for managing soil fertility intended for onion production. From a legitimization perspective of using chemical fertilizers, exploratory interviews show that their use combined with appropriate cultivation techniques is necessary for protecting onion production to optimize yield. Crop protection refers to the combination of different production management methods, including chemical and biological ones. Though desired, the chemical method compromises the environment in terms of agricultural speculation toxicity and water contamination. It also threatens human health due to possible pesticide residues on food and inhalation poisoning. The biological method calls for the use of non-chemical forms (bio-pesticides and biological practices) for pest and weed control that could jeopardize agricultural production. Although fitting into the promotion of sustainable agriculture, this method has not gained farmers' adherence leading to questioning the level of adoption and use of inputs related to onion production linked to biological methods (Cissé, 2014) and especially to elucidate the reasons for the persistence of the choice of chemical inputs in the investigated crop production. What is certain is that the pursued objective in using one or more methods is the agricultural speculation yield, even if quality is not neglected.

For quality agricultural yield, seed choice is crucial. This requirement is highlighted by Bennacer and Bouderbala (2016) when they mention that the yield and quality of onion production are undoubtedly linked to seed quality and especially to the maintenance performed on the cultivated space regarding weeding. Moreover, Bello et al.'s works (2019) show that the traditional practice of exclusive hoeing (instead of herbicide use) actually causes growth retardation in onion crops due to weed competition. This leads to low yields. Besides seed quality, the technical efficiency underlying irrigated onion production is called upon (Ojo et al., 2009). Measuring the technical efficiency of irrigated and rainfed onion farms in Nigeria, Omolehin et al. (2019) discovered that the average technical efficiency level was higher for irrigated onion producers (89%) than for rainfed onion producers (83%). This suggests that onion production through irrigation is recommendable. While the technical efficiency level of onion production is 92% in the northern Guinea savanna (Ibrahim and Omotesho, 2013), it is close to 90%, according to Anyatengbey (2020), in eastern Ghana. In Benin and more precisely in Grand-Popo, the technical efficiency of onion producers hovers around 88.35% according to Omolehin et al.'s works (2019). For Akpo et al. (2022), the technical efficiency of off-season onion production in northern Benin is 57.7%.

Although technical efficiency promises satisfactory yield, it cannot guarantee the expected result alone. It is more valuable in contexts where uneducated farmers are trained in the local language to acquire new agricultural knowledge (Tangara et al., 2021). These farmers use certified seeds compared to those using local seeds (Aminou, 2021; Traore et al., 2021). The age of producers also constitutes a key variable in increasing technical efficiency, even if it is debatable. According to Malinga et al. (2015) and Zalkuw et al. (2014), the older farmers become, the more technically efficient they are in terms of production owing to accumulated experiences that confer them skills. Beyond these expressed conditions, producers resort to chemical inputs both for maintaining cultivated spaces and for productivity as indicated by Sissoko and Lebailly (2019) even though they recommend combining fertilizers and organic manure to boost the yield of agricultural speculations. To support the importance of non-agroecological practices regardless of their probable harm, Kpenavoun-Chogoun et al. (2018) mention, in a similar study conducted on soybean production in Benin, that the use of high-quality seeds and application of chemical insecticides positively influence yield. In this study, an invitation is made to use non-agroecological practices in agricultural productions despite the harmful effects they might not only generate for the environment but also for

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<sup>5</sup>The yield of onion production in Niger is 41% higher than that of Benin according to information from the regional plan for the development of the market gardening sector in the departments of Mono and Couffo, developed by the regional agricultural center for rural development of Mono-Couffo in 2013, 46.

humans. This relates to various agricultural speculations and particularly onion production based on chemical fertilizers and pesticides in Grand-Popo (in Benin) at the expense of sustainable cultivation practices (Brand, 2021) that integrate economic, social and environmental aspects. Going from the hypothesis that the persistence of non-agroecological practices structuring onion production in Grand-Popo Commune is underpinned by farming approaches, this research aims to analyze them. This work revolves around three essential points which are the methodological approach and mobilized theories, results and discussion.

## Methodological Approach and Theoretical Framework for Data Analysis

### Methodological Approach

Before specifying the methodological path, a detour on the geographical situation of the studied space is essential. The research was carried out in the Commune of Grand-Popo between parallels 6° 14 and 6° 28 latitude north and meridians 1°37 and 1°60 longitude east. It is bounded to the north by the Communes of Athiémé, Comè and Houéyogbé; to the south by the Atlantic Ocean; to the east by the Communes of Ouidah and Kpomassè and to the west by the Republic of Togo. Grand-Popo is found in the agro-ecological zone of fisheries (Togbé, 2019, 218). Map 1 gives a precision on the geographical location of the investigation space.

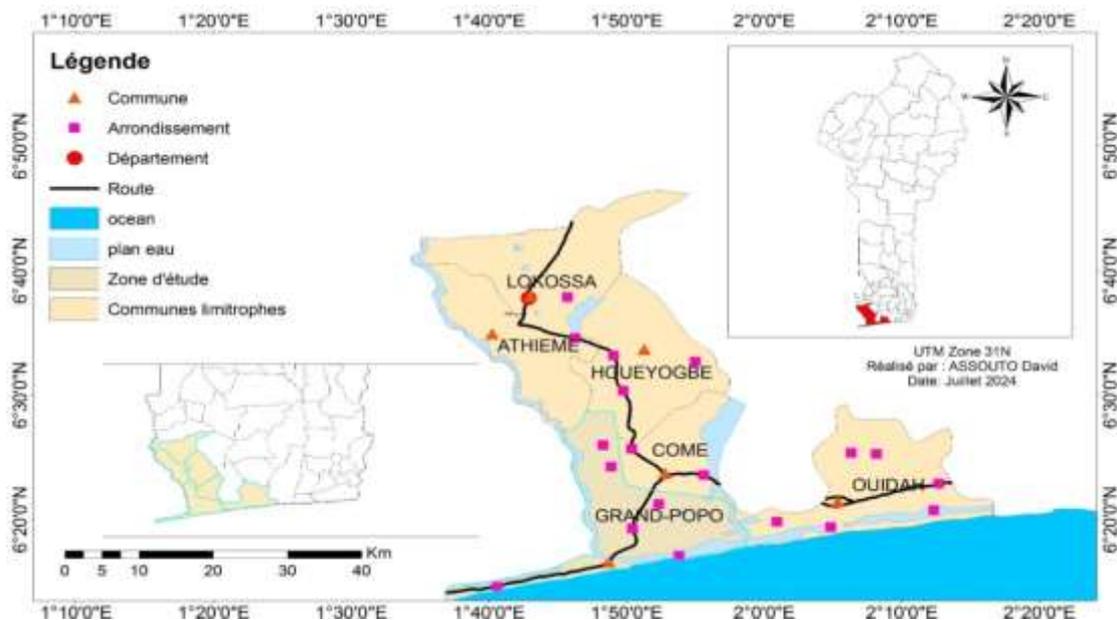


Figure 1: Administrative map of the commune of Grand Popo

Source: D. Assouto, July 2024

The methodological approach adopted is qualitative, although quantitative data were used to state the problem. Two reasons motivate this methodological option. The first lies in the orientation of the subject on the identification of "peasant logics", a fundamentally qualitative variable. To the extent that the notion of "logic" refers to « [...] various lines of coherence that the observer deduces from an overall empirical observation of particular differential practices without prejudging a sociological theory [...] » (Olivier de Sardan, 1995, 127), the qualitative approach is relevant to this task to which the researcher is invited and which obliges him to go to the onion producers to bring out the rationalities underlying the cultivation practices. The second reason associated with "peasant logics" is the collection of qualitative data which usually escapes the quantitative approach, characterized by the primacy of numerical data. In line with the nature of the research, the semi-structured individual interview and direct observation, respectively associated with the interview guide and the observation grid, were used. The interview offers the researcher

the opportunity to interact with his or her interlocutor in order to conduct in-depth discussions accompanied by qualitative information. It is a space of « exchange during which the interlocutor expresses his or her perceptions, interpretations, and experiences, while the researcher [...] facilitates this expression [...] » (N'da, 2015, 137). This choice favored the enriching face-to-face between us and the onion producers we met in Grand-Popo in the villages of Ayi-guinnou, Zogbédji, Essan-Condji, and Nicoué-Condji. In addition to the interview, direct observation was carried out. It allowed us to observe onion producers in their production areas in order to objectively assess the different cultural practices that harm the environment and human health. Through reasoned choice, diversification, and empirical and thematic saturation, 25 participants were interviewed. These are 10 onion producers, 2 agricultural agents, 3 NGO actors involved in environmental protection, 4 consumers of onions produced and sold in Grand-Popo, 3 traders and 3 local elected officials. The collected data were processed using content analysis and triangulation methods. The results obtained were analyzed in light of rational choice theory, supplemented by social representations theory.

### **Theoretical Framework and Adopted Theories**

The analysis of empirical data is based on the theory of rational choice supported by that of social representations. The theory of rational choice is often used in sociology to elucidate what motivates the decisive action of actors and their logics within an organization. It was chosen because of its explanatory dimension (Doire St-Louis, 2009) of social practices. By integrating cost/benefit calculation into all human conduct (Fournier, 2012), rationality takes into account the resources of the actor and the structural constraints of the action (Etienne et al., 2004). This theoretical perspective shows sufficiently that a rational actor, better, the non-agroecological practices of onion production incorporate rationalities, peasant logics. The theory of rational choice calls for calculations and logics that feed the practices of social groups (Togbé, 2021) as it can be observed with onion producers in Grand-Popo. By opting for non-agroecological agriculture, onion producers have had to make a choice that fits in with peasant logic. As a result, the theory of rational choice finds its relevance in the topic addressed. The theory of social representations is suitable to support that of rational choice so far as it allows, according to Groult (2010), to describe and understand the behaviors of human beings. Taken like this, this theory has made it possible to describe the peasant logic on the one hand and to understand the non-agroecological practices of onion production on the other.

## **Results**

### **Onion Production Process**

The description of the onion production stages allows us to see when non-agro-ecological practices are taking place. The preparation of crop spaces (1), setting up nurseries (2), transplanting (3), soil fertilization (4), irrigation (5), crop maintenance (6) and harvesting (7) are all stages of onion production.

#### ***Preparation of Cultural Spaces***

The preparation of cultural spaces is the very first step. Here, onion producers either plough the land themselves or have the land ploughed by suitable labour. This step is transversal to all the crops (tomato, chilli, corn, bean, etc.) that are done in Grand-Popo. It calls for the creation of boards that refers to the structuring of places of plantations or seeds. The onion growers thus map out the areas to be planted, using pickets to mark off passages for watering and maintaining production as shown in photo1.



In this photo, two producers, hoe in hand, are making planks for onion production as well as passages for watering and maintenance.

**Photo 1: Making the boards for onion production**

Source: Photo taken by Assouto David, Grand-Popo, 2024

### ***Setting up Nurseries***

The establishment of nurseries is a very sensitive stage for onion production. This step requires rigorous monitoring of watering, which is three to four times a day. This frequency prevents the earth from heat and especially drying out; which creates a favorable condition for onion production. Monitoring at this stage also involves the removal of weeds that are harmful to ripening nurseries. Photo 2 shows onion production at the nursery stage.



In this photo, there is an onion nursery to be used for **planting**.

**Photo 2: Onion production at the nursery stage**

Source: Photo taken by Assouto David, Grand-Popo, 2024

### ***Transplanting and Sowing Plants***

Transplanting is an action that consists in putting the seedlings of onion into soil in spaces prepared for this purpose. This step is considered a crucial phase of onion production. For this and according to the words of an agricultural agent, it is advisable to transplant young healthy and vigorous plants that have reached the stage of 5 leaves. Seedlings with early bulb growth are not recommended for grafting. The density at transplanting is more than 60 feet per m<sup>2</sup> or a gap of 15 cm between the lines of transplanting and 10 cm between plants located on the same line. Per hectare, the density is 600,000 to 700,000 plants. The maintenance operations that follow during the two and a half to three months are watering, picking and weeding. Indeed, watering is of paramount importance for the follow-up of young transplanted plants, the growth of the crop and especially the period of formation of the bulbs or the frequency of watering is multiplied by 2, even 3 times. Here, producers water the onion fields at least twice a day. Picking is important to promote water infiltration into the soil and facilitate onion bulb growth. Weeding is often done by hand and must be regular because the onion does not cover the soil, which promotes competition from weeds. Photo 3 shows the onion at the planting stage.



This photo shows the transplanted onion plants. This step uses soil fertilization to ensure better yield.

**Photo 3: Grafted onion plot**

Source: Photo taken by Assouto David, Grand-Popo, 2024

### ***Soil Fertilization***

Fertilisation or manure is an essential operation in the cultivation of onion that occurs after the step of transplanting. Interviews with market gardeners and other categories of people approached made it possible to realize that the cultivation of onion requires two types of fertilization to optimize yield: organic manure and mineral manure. The first is done during the evolution of culture. It occurs between 2 to 3 weeks after transplanting, after the young plants have established themselves and continue their growth. Up to 20 tonnes per hectare of organic manure made from cow dung, poultry dung or compost are required for crop development. As for the mineral manure, it is necessary to drive the development of the onion crop and can vary from 600 to 900 kg per hectare depending on the type of soil that supports the crop. According to the technical standards, the requirements of the onion in nutrients N, P and K are respectively in the proportions 3 - 2 - 4. These needs of fertilizers can be solved in three inputs which are :

- 1st stage: about 20 days after transplanting at a dose of at least 150 kg/ha urea fertilizer dosed at 46% ;
- 2nd stage: about 40 days after transplanting at a dose of 200 kg NPK (14-23-14) and 50 kg potassium sulphate (K<sub>2</sub>SO<sub>4</sub>) per hectare ;
- 3rd stage: it is made 60 days after transplanting at the recommended dose is 50 kg of NPK (14-23-14) and 150 kg of potassium sulfate (K<sub>2</sub>SO<sub>4</sub>) per hectare.

The combination of these two types of manure strengthens the soil, which is essentially sandy in the study area and therefore devoid of nutrients. This systematic fertilization operation not only contributes to the enrichment of the planted areas but also creates conditions that can ensure a better yield of the onion. For better production, well-controlled irrigation is crucial.

### ***Irrigation***

Irrigation is crucial for onion cultivation in the research space. Outside the critical nursery phase, it continues throughout the entire onion production cycle, from transplanting to harvesting. During the first month of cultivation, it is done three times a day. After the first month, the frequency of irrigation is twice a day until the onion is fully mature. Due to the sensitivity of the crop, irrigation is done with delicacy and moderation. When the onion is about to be harvested, it passes once every three days to guarantee its yield. Apart from irrigation, onion production also depends on maintenance.

### ***Crops Maintenance Technics***

The maintenance of the onion crop is crucial for its production. This activity leads producers to control the transplanting in order to replace dead plants. In addition to this strict observance, the use of pesticides and

fertilizers is used not only to combat insect pests, but also to guarantee the growth of production, which guarantees a good yield. Weeding, combined with the use of pesticides, is done three to four times before harvesting, thus protecting production.

### ***Harvest***

Harvesting is the last step in onion production. Here, depending on the areas cultivated, producers may or may not use occasional workers to help them harvest the onion. Apart from the farm workers who help to harvest the onion for a fee, there is also recourse to transporters, especially taxi-motorbike drivers. Some producers, to avoid the hassles related to the harvest, negotiate with traders who come directly into the fields to buy and transport the onion to neighboring cities such as Lokossa, Dogbo, Comé, Cotonou, etc.

The description of the onion production process shows that pesticides and chemical fertilizers are used, and the producers' logic legitimizing this cultural practice deserves to be highlighted.

### **Peasants' Logic Structuring Non-agroecological Onion Production Practices**

Peasant logics fall within the field of rural anthropology which « [...] has, among other things, as its object of study [...] peasant rationalities [and] allows us to understand from within [...] the modes of production of peasants » (Togbé et al., 2015, 486). This theoretical reflection makes it possible to identify three axes of logic underlying the non-agroecological production of onion in the studied space: logic of soil fertilization, logic of the protection of the culture of onion, and the logic of maximising production efficiency.

### **Soil Fertilization Approach**

In agriculture, natural or chemical fertilisers are inputs to nutrient-deficient land for the production of various crops. These are additional external sources that contribute to the fertility of agricultural land. While natural inputs are more recommended for agroecological agriculture, chemical inputs are, a priori, prohibited. However, what is observed in the production of onion at Grand-Popo is the use of chemical fertilizers and pesticides that predominate on poultry manure and cow dung used during the transplanting phase. The basic rationale for the dominant use of chemical inputs is land fertilization. And, in Grand-Popo, this local rationality could make sense. Indeed, due to the proximity of the administrative entity invested with the sea, most arable soils are sandy type. This characteristic of soils means that they are devoid of nutrients favourable to agricultural production. In order to meet this challenge, which is a natural one, farmers rely on chemical fertilizers to enrich the land as mentioned by an onion producer who states :

For example, I can't produce without fertilizer. Even if I did, I would be so in debt because the land here is poor. It's nothing but sand. Lands are not rich. It's the fertilizers that help us enrich the lands. If you produce the onion without enriching the soil with fertilizers you will not harvest anything [...] (Producer of the onion in Ayi-guinnou, 45ans, 05/07/2024).

The onion producer's comments show that the rationale behind using chemical inputs in production is soil fertilization. In his speech, we can read that the enrichment of soils with fertilizers is a strategy to avoid debts contracted for production in the sense that it strengthens the agricultural potential of the areas planted and guarantees by ricochet the yield. Soil fertilisation is therefore becoming a collective consciousness as a strategy for resilience to land poverty. Apart from the logic of soil fertilization, it is also identified the logic of protection of the onion crop which results in the use of chemical pesticides.

## Rationale of Onion Crop Protection

Onion producers in the municipality of Grand-Popo are developing strategies to respond to possible attacks by insects on their onion fields. In this context and not being able<sup>6</sup> to use natural methods of crop protection against pests or any plant disease, they are oriented towards the chemical pesticides available economically and geographically accessible. The logic in which this recourse is based on is that of the protection of culture, or rather, the logic of securing crops (Togbé et al., 2015, 491). This involves securing the resource by working to anticipate potential damage from invading insects. An onion grower is part of this perspective when she says :

Me, as I speak, I have already applied pesticides to the onion in this season more than (06) times. It is very necessary to not lose the crop. When I see the presence of insects, I apply so as not to have problems. Personally, I don't define an exact number for the season. I only do it according to needs. If you do not want your onion field to be destroyed by insects, you must regularly apply pesticides at the slightest remark (Productrice de l'oignon à Essan-condji, 39ans, 05/07/2024).

This interlocutor, through her speech, confirms sufficiently that it is the logic of protection of the onion cultivation that determines the use of chemical pesticides. This logic put forward by most producers incorporates other rationalities, including the "logic of securing investment" justified by the need to be able to settle contracted debts on time, the "logic of capitalization" time spent on production. Household safety can also be found there because the subsistence of members of producer households depends on onion yield.

## Onion Yield Maximization Approach

The data collected from stakeholders approached reveal that the logic of maximizing yield in onion production is a foundation for non-agroecological agricultural practices in this sector. In other words, for an abundant harvest, producers prefer to use chemical fertilizers to boost production instead of using farming practices that respect nature and human health. The words of one interlocutor confirm this analysis when he states :

I use the fertilizer to make my production a little intense. I do not use it too much, it depends on everyone's opinion. I use it at least once a month. That's my way of doing things. When I put the cow dung at the beginning of transplanting, it is the chemical fertilizers that continue. It is the chemical fertilizers that guarantee us good onion harvests (M. C. married producer, 32 years old in Zogbédjé).

From this verbatim, it can be concluded that the inputs appear as indispensable supports to boost the production of onion in Grand-Popo. Even if the interlocutor makes it clear that he uses chemical fertilizer in a moderate way, it is not less true that he aims above all to maximize the yield of his production. The informant states that he uses cow dung to show that he is concerned about agro-ecological agriculture and uses organic fertilizer. However, a closer look reveals that the use of chemical fertilisers is dominant, the idea being to maximize harvest. The logic of intensifying onion production was corroborated by another producer who says, "...these inputs allow for a return at the end of the season to pay off debts and support the family". (Producer of onion in Ayi-guinnou, 45ans, 05/07/2024). This informant's comments reflect the importance of onion yield in the settlement of agricultural debts. This highly sought-after yield, which involves the application of chemical fertilizers, also plays a key role in meeting farmers' family needs. Clearly, the well-being of the farmer and his household depends on the abundance of crops that only the supply of chemical inputs can guarantee. In such a context, it could be said that agroecological agriculture is not an

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<sup>6</sup>There are known constraints linked to organic inputs : low availability, relatively high cost, high frequency of use due to Grand-Popo's soil structure and texture (on the coast, it is virtually impossible to produce onion without organic fertilizer), low efficiency, etc.

option. Because to practice this type of agriculture that obeys nature is to risk mortgaging an entire season with the consequences it implies, as a farmer states :

The first time I tried to produce the onion without fertilizer I didn't get anything back at the end of the season. I couldn't even get my money back. This land is different from the others, and it would be difficult, if not impossible for someone to produce in this environment without chemical inputs as a support and hope for yield at the end of the season. Here, to get a good yield in the production of onion, we must use chemical fertilizers (Producer of onion in Zogbédjé, 29years, 05/07/2024).

No doubtedly, there is no evidence proving that it is the intensification of onion production that motivates the use of chemical fertilizers by producers in Grand-Popo district. But, the triangulation of the different information collected from social categories or groups helps to connect this fundamental phenomenon and decisive idea as well. This logic of maximizing yield hides another one whose unveiling could shed more light: it is the relationship between man and money and financial profit in agricultural production. It is therefore not possible to isolate the economic dimension and better understand the logic of yield put forward in onion production. To recover money invested in agricultural production and return on investment, returns must be increased at all costs, including through chemical inputs. The maximization of onion production thus adds to the economic logic of farmers.

## Discussion

Based on the assumption that the non-agroecological practices of onion production in the municipality of Grand-Popo are based on peasant logic, the approach of rooted theorisation has made it possible to arrive at this evidence due to the consistent empirical data. Indeed, the use of chemical fertilizers and pesticides by onion producers follows local rationalities no less relevant.

Compared to the logic of soil fertilization, producers at this stage of production do not use only chemical fertilizers. They first use organic fertilizers, such as poultry manure or cow bags at the beginning of production. This approach shows that they are aware of the importance of agroecological farming practices in onion production. But, they can not be satisfied with only natural fertilizers, better, local knowledge in the production of onion. In a context of socio-environmental changes (demographic pressure, innovative agricultural practices, climate change, etc.), farmers have difficulty in confining themselves to local knowledge that can contribute to the enrichment of soils for satisfactory agricultural production. Endogenous strategies for restoring soil fertility (crop rotation, long-term natural fallow, fallow with perennial crops, etc.) (Akpo et al., 2016, 371) are no longer efficient because they « [...] only improve to 25 per cent the level of performance [...] » (Ibid., 2016, 372). Even if they opted for the development of endogenous knowledge of soil fertilization already described as "poor" due to their sandy characteristics, it would be difficult for them to do so because the effects of climate change increase this poverty of the soil and demand from the farmers adaptation and resilience strategies including the use of chemical fertilizers. Natural fertilizers are not necessarily available to producers in the sense that their production has a cost according to interviews with some agricultural agents. It is therefore not easy to use only natural fertilizers as soil fertiliser in a context of economic vulnerability. Therefore, it is normal to use organic fertilisers (poultry manure) at least at the beginning of onion cultivation to give the impression of conforming to organic production and associated to it, by the way, more chemical fertilisers to reassure themselves of soil fertilization and to be part of a mix of inputs perspective. Agricultural innovations incorporating the use of organic fertilizers as an effective means of soil fertilization are still insufficient. Moreover, producers are reluctant to use them because of their inefficiency in onion production. This analysis was made by Akpo et al. (2022) when they point out that in Benin, the level of technical efficiency in onion production is lower. This technical inefficiency affects both the implementation of insufficient biological inputs, with their constraints, and their adoption by producers who are still hesitant. In short, "[...] the use of organic fertilisers is still at an embryonic stage in Benin [...] despite the fact that this country is the first in West Africa to be on the way to organic farming. The use of chemical fertilizers is still active [...]" (Cissé, 2014, iii). It is therefore difficult, if not impossible, to do without chemical fertilizers in the fertilisation of arable soils.

With regard to the logic of protecting the crop, we agree that it is normal for producers to take measures to protect their production against any risk of destruction. It is even a reflex for all informed farmers. To do otherwise would put them at risk of crop losses and expose them to significant economic and social consequences, as the lives of farmers and their households are intimately linked to agricultural production. In this context, it is necessary that onion producers mobilize the logic of protecting their crop to use chemical inputs and especially to secure yields. The protection of agricultural production, especially onion, is achieved by chemical and biological methods. While chemical methods are readily available to producers, organic methods are less accessible or even more restrictive. The producers I met are not sufficiently equipped to manufacture and adopt organic crop protection inputs. The central government, through its structures for promoting organic farming, has a role to play in this respect. This involves training farmers in the manufacture and use of organic crop protection inputs. This is a prerequisite for combining the two methods of protection. This vacuum observed at the local level inevitably directs onion producers towards a single method of protecting their fields, more precisely chemical methods. In their proven effectiveness, chemical herbicides and pesticides have environmental and human consequences. Onion growers are well aware of the dangers when using chemical inputs to protect their production. But they see them as the most effective way to protect their onion fields. This local view is part of the theory of social representation which, according to Groult (2010), allows for describing and understanding the behaviour of onion producers. The peasant logic of protecting onion cultivation is a hallmark that marks the minds of onion producers and fuels their impulses towards the use of chemical herbicides and pesticides.

The logic of maximization of yield is, for its part, a decisive element in the choice of production techniques and strategies. What every producer expects at the end of an agricultural season is the yield of his production. And, all the means necessary to achieve this result are often mobilized. The onion producers met are no exception to this common rule that is common throughout the agricultural world. The logic of yield put forward by onion producers orients their choice of chemical fertilizers; which places them in the theory of rational choice that, according to its explanatory dimension (Doire St-Louis, 2009), makes it possible to understand this non-agroecological practice of agriculture. Therefore, they use chemical inputs to boost the yield of onion production. This is an agricultural calculation made by onion producers. They measure the extent of physical, economic and material effort they provide in each production season. Therefore, they hope for profits at the end of these efforts; this forces them to resort to chemical inputs. We cannot isolate this aspect of the question and understand the conduct of the peasants. And, when the cost-benefit calculation is integrated into onion producers' conduct (Fournier, 2012), it is clear that their rationality, their logic of performance takes into account the resources they have at their disposal as well as the constraints that structure their actions (Etienne et al., 2004). By opting for non-agroecological agriculture, onion producers have had to make a calculation that takes into account the profitability of the crop. This aspect is taken into account by Smith (1776, 175) when he affirms that « the food of man seems to be the only product of the earth which always and necessarily provides a rent [...] ». This perspective is practically taken up by Bierschenk (2003, 7) when he mentions that « the development of culture [...] in Benin fits into the logic of production [...] of income [...] ». With these two authors, we can conclude that what is behind the logic of yield put forward by producers to legitimize the use of chemical fertilizers is not only the maximization of production but also and above all the search for economic profits. It is quite normal that the increase in productivity and above all the improvement of incomes push onion producers to use chemical fertilizers. In rural areas and more specifically in Grand-Popo, farmers incur debts to be able to produce. These debts may consist of a loan obtained from a local micro-credit institution or from a tontine group. It may also be a credit purchase of agricultural inputs. And, the only hope on which the repayment of various debts rests is the abundant yield of production. In such a context, it will be difficult or impossible for onion growers to use chemical fertilizers to increase their production. Organic fertilizers can also produce the same result (satisfactory yield), but the effects of climate change and population growth make it difficult to explore this path that leads to agro-ecological agriculture.

## Conclusion

In West Africa and more specifically in Benin, agriculture represents one of the crucial development sectors. In light of rural anthropology and socio-anthropology of natural resources, one discovers dynamics and

local rationalities that can help decision-makers in crafting and implementing relevant agricultural policies. Written on the basis of scientific literature and triangulated empirical data on the background of actor diversification, this article highlights the underlying farming approaches in non-agroecological onion production in Grand-Popo Commune, southwest Benin. From this study, three findings are identified through interviews with approached actors, which are (1) the approach of soil fertilization, (2) the approach of crop protection and (3) the approach of maximizing crop yield. The different interviewed social categories have coherent reasonings, which, in their agricultural production context, give meaning to the approaches they put forward to legitimize their use of chemical inputs in onion production. Regarding the approach of fertilizing agricultural land, it is observed that the soil in Grand-Popo, due to its sandy characteristic, lacks nutrients favorable to onion production. Therefore, knowing the poverty of their cultural space, onion producers resort minimally to poultry droppings (organic fertilizer) and mainly to chemical fertilizers as composts to enhance its agricultural potential. For reasons of human health and environmental preservation, common sense would have preferred that onion producers rely solely or at least largely on organic fertilizer to enrich their cultural spaces. But for now, local knowledge is no longer enough to favor this option. Moreover, agricultural institutions that could support them and lead them to favor biological inputs are not fully ready to play this role effectively. Regarding the approach to crop protection, onion producers are concerned with securing their crop. In their view, the only way to effectively combat destructive insects and other diseases that could damage their production is the use of chemical herbicides and pesticides. Although they could resort to natural pesticides and obtain the same results, they are not technically equipped for biological practices to fight against insects destroying crops. It is also not obvious that they can draw from local knowledge of natural practices against harmful pests. As for the yield approach, the goal pursued by onion producers is to maximize their production. To do so, they turn to available and accessible chemical fertilizers in their immediate environment. What is embedded in the yield approach is mainly profit. They are well aware that if they maximize yield, they will be able to make money because there is a growing demand for onions. In this context, chemical fertilizers are seen as the only means capable of helping them achieve this result. The farming approaches put forward by producers to legitimize the non-agroecological production of onions are relevant. However, in a context in which it is necessary to promote sustainable development at the national and local levels, it would be interesting for the central state and development partners to establish agricultural policies that gradually lead farmers to choose to produce naturally, at least, the crops that serve to feed humans.

## References

- Aoubakar Z., Oloukoi J., Wokou G., Etene C. G., Yabi I. et Ogouwale E. (2022). Importance socioéconomique de la production et commercialisation d'oignon (*Allium cepa* L.). *Revue Africaine d'Environnement et d'Agriculture*. 5(4), 52-62.
- Akpo I. F., Dohou M. D. et Houessingbe Z. (2022). Production de l'oignon de contre-saison au Nord-Bénin : Une analyse de l'efficacité technique à travers l'approche stochastique. *African Scientific Journal*. 3(14), 142-165.
- Akpo M.A., Saidou A., Balogoun I., Yabi I., Bio Bigou L. B. (2016). Evaluation de la performance des pratiques de gestion de la fertilité des sols dans le Bassin de la rivière Okpara au Benin. *European Scientific Journal*. 12(33), 370-390.
- Aminou F. A. (2021). Efficacité Technique des Petits Producteurs du Maïs au Bénin. Document de Politique Générale. Bénin.
- Anyatengbey V. A. (2020). Resource use efficiency of onion farmers in the upper east region of Ghana. PhD Thesis. University For Development Studies. <http://hdl.handle.net/123456789/2806>.
- Archiani V., Robbiati G. et Salifou M. R. (2013). Filières oignon en Afrique de l'Ouest : étude comparée des filières nigérienne et béninoise. *Cah. Agric.* 22, 112-23.
- Bello S., Amadji L. G. et Ahanchédé A. (2019). Efficacité technique et rentabilité économique des méthodes de contrôle culturale et chimique des mauvaises herbes en culture d'oignon (*Allium cepa* L.) au Nord-Est du Bénin. *Journal of Animal & Plant Sciences*. 42 (2), 7207-7225.
- Bennacer M. et Bouderbala A. (2016). Etude du désherbage (chimique et manuel) en pépinière sur la culture d'oignon A. cépa, (Deux hybrides F1 et une variété population). Mémoire de fin d'études pour l'obtention du diplôme de Master en Agronomie Spécialité: amélioration des productions végétales. Université Abdelhamid Ibn Badis-Mostaganem. Algérie.
- Bierschenk T. (2003). Le secteur rural dans l'économie rentière du Bénin. Allemagne. Université Johannes-Gutenberg de Mayence. Institut d'Anthropologie et d'Etudes Africaines.
- Brand M. (2021). Agriculture durable : quelles pratiques pour sortir d'un modèle intensif ? <https://www.hellocarbo.com/blog/reduire/agriculture-durable>. Consulté le 4 mars 2025.

- CARDER Mono-Couffo (2013). Plan régional de développement de la filière maraîchage dans les départements du Mono et du Couffo. Rapport d'étude. République du Bénin.
- Cissé N'Goné A. A. (2014). Etude sur l'utilisation des engrais biologiques dans l'agriculture au Sud-Bénin : Cas du produit agro bio. Mémoire de Master en ingénierie de l'eau et de l'environnement. Burkina Faso. Institut International d'ingénierie.
- Doire St-Louis A. (2009). Théories du choix rationnel : Perspectives et implications en design institutionnel. Mémoire. Département de philosophie. Faculté des arts et des sciences. Université de Montréal.
- Etienne J., Bloess F., Noreck J.-P. et Roux J.-P. (2004). Dictionnaire de Sociologie. Paris. Hatier.
- Fournier M. (2012). Bourdieu, La raison et la rationalité. Paris. Presses Universitaires de France. 51, 115-128. <https://www.cairn.info/revue-cites-2012-3-page-115.htm>.
- Groult N. (2010). L'évaluation en classe de FLE: les représentations sociales qu'en ont certains professeurs au Mexique. <http://dx.doi.org/10.1051/cmlf/2010041>. 439-449.
- Ibrahim H. Y. & Omotesho O. A. (2013). Determinant of technical efficiency in vegetable production under Fadama in northern guinea savannah, Nigeria. *Journal of Agricultural Technology*. 9, 13-67.
- Kabore J. (2012). Analyse de la chaîne de valeur oignon de l'Oudalan et de son potentiel d'insertion dans les marchés urbains au Burkina Faso. Mémoire de Master ii international professionnel en innovation et développement en milieu rural. Burkina Faso. Institut International d'ingénierie.
- Kpenavoun-Chogou S., Okry F., Santos F. et Hounhouigan D. J. (2018). Efficacité technique des producteurs de soja du Bénin. *Annales des Sciences Agronomiques*. 22, 93-110.
- Malinga N'G., Masuku M. & Raufu M. O. (2015). Comparative analysis of technical efficiencies of smallholder vegetable farmers with and without credit access in swazil and the case of the Hhohho region. *International Journal of Sustainable Agricultural Research*. 2, 133-145.
- N'da P. (2015). Recherche et méthodologie en sciences sociales et humaines : réussir sa thèse, son mémoire de master ou professionnel, et son article. Paris, Harmattan.
- Ojo M. A., Mohammed U. S., Adeniji B. & Ojo A. O. (2009). Profitability and technical efficiency in irrigated onion production under Middle Rima valley irrigation project in Goronyo, Sokoto State Nigeria. *Continental Journal of Agriculture*. 3, 7-14.
- Olivier de Sardan J.-P. (1995). *Anthropologie et développement*. Paris, Karthala.
- Omolehin R., Lawal M. & Ayodeji C. A. (2019). Measurement of Technical Efficiency of Irrigated and Rainfed Onion Farms in Kano State of Nigeria. *Measurement*.
- Rameez A. B., Sana U. B., Shahbaz K. B., Hafeez N. B., Shabeer A. B., Waseem B., Allah, B.B. & Jehangeer B. (2014). Economic Analysis of Onion (*Allium cepa* L.) Production and Marketing in District Awaran, Balochistan. *Journal of Economics and Sustainable Development*. 5(24).
- Sikirou R., Komlan F et al. (2011). *Bulletin de la Recherche Agronomique*. Bénin, Université d'Abomey-Calavi
- Sissoko P. et Lebailly P. (2019). Les déterminants des rendements du mil et du sorgho avec la technique de microdosage d'engrais. *Revue Marocaine des Sciences Agronomiques et Veterinaires*. 7(2), 213-222.
- Smith A. (1776). Recherche sur la nature et les causes de la richesse des nations. Trad. Par Philippe Jaudel (coordonnateur) sous la responsabilité scientifique de Jean Michel Servet. Paris, Economica. 2000-2005. Trois volumes.
- Tangara M. B., Traoré B. et Doumbia D. (2021). Mesure de l'efficacité technique des riziculteurs de la région de Segou au Mali. *Revue Malienne de Science et de Technologie*. 2(25), 107-125.
- Togbé C. T. (2021). Rationalités locales d'utilisation des engrais et pesticides chimiques dans la production du coton conventionnel à Djidja au Bénin. *Actes des journées scientifiques du CBRSI*. 144-154.
- Togbé C. T. (2022). Rationalités locales structurant des pratiques non-agroécologiques de production de crinclin dans l'arrondissement d'Atchannou au Sud du Bénin. *Revue Dezan*. 10(1), 7-22.
- Togbé C. T., Bédié V. D., Houinato B., Imorou A.B. (2019). La riposte des acteurs étatiques et locaux a la menace des changements climatiques au Bénin. *Revue BenGéo*. Volume thématique, 215-235.
- Togbé C. T., Botchi G. J.-M. et Koné I. (2015). Logiques paysannes face aux représentations sociales de la promotion de la culture du riz dans le département du Mono au Bénin. *Revue Ivoirienne des Sciences du langage et de la Communication*. 2(9), 485-496.
- Trabelsi M. (2017). Comment mesurer la performance agroécologique d'une exploitation agricole pour l'accompagner dans son processus de transition ? Thèse pour l'obtention du grade de Docteur. École Doctorale ED60 Temps, Territoires, Sociétés, Développement et de l'unité de recherche UMR GRED : Gouvernance, Risque, Environnement, Développement. Université Paul-Valéry Montpellier 3 - France.
- Traore B., Coulibaly A. et Coulibaly A. (2021). Productivité et rentabilité financière des cultures maraichères au Plateau Dogon : cas de l'Echalote. *Revue Malienne de Science et de Technologie*. 2(25), 4-13.
- Yili D. L. N. (2013). La production de l'oignon hivernal: quelles opportunités pour les pôles d'entreprises agricoles du Burkina Faso. Mémoire du diplôme de master professionnel international en innovation et développement en milieu rural. Burkina Faso. Université de Ouagadougou.
- Zalkuw J., Singh R., Pardhi R., Gangwar A. (2014). Analysis of technical efficiency of tomato production in Adamawa State, Nigeria. *International Journal of Agriculture, Environment and Biotechnology*. 7, 645-650.