
Perceptions and Logics of Appropriation of the Practice and Use of Compost in Agricultural Production Systems in Western Burkina Faso

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DOI- <http://doi.org/10.37502/IJSMR.2022.5422>

Abstract

Observations of the degradation of the environment and the vegetation cover have led rural populations to become aware of the harmful effects of chemical fertilizers. More and more voices call for the abandonment of these fertilizers of chemical origin and their replacement by those resulting from the bio-organic decomposition of bio-vegetable elements. This process is known as composting. Even if it is beneficial, composting is nevertheless little practiced by peasant populations. If so, one wonders what the current perception of this practice is.

This research has made it possible to travel through thirteen villages in the Hauts-Bassins region using qualitative approach. Four focus groups, twenty semi-structured interviews, and observations were carried out with various actors from the rural world. A documentary review was also used. This research shows that farmers place great trust in the use of compost, to the detriment of other chemical fertilizers. However, they face several difficulties related to this practice. The provision of a mobile crusher and the training of farmers will solve a large part of the difficulties they encounter.

This study demonstrates that farmers put a high premium on compost at the expense of other chemical fertilizers. However, they do confront several issues because of this behavior. The provision of a mobile crusher and training for farmers will alleviate many of the issues they face.

Keywords: Composting, perception, production systems, shredder, Burkina Faso

1. Introduction

Burkina Faso is a country whose economy is mainly based on agriculture. This activity occupies almost 86% of the population and contributes just over 30% to the Gross Domestic Product (GDP). However, this sector is facing enormous difficulties. These difficulties are, among others, climatic hazards, low mechanization, soil depletion... Soil depletion is a problem, mainly due to the advance of the desert and the use of chemical fertilizers. As a result, composting is now suggested as a practice.

Composting is a technique that consists of transforming fermentable waste into fertilizers (compost) that can be used for agricultural production. Composting is the biological

process of breaking down organic compounds from the waste stream into end products (compost) used in fertilizing agricultural land. Composting is qualified as biological by the intervention of microorganisms to degrade the organic matter contained in the waste and as hygienic by the rise in temperature, which destroys pathogenic germs and viruses [1; 2]. Several studies have shown that the use of compost by farmers allows, among other things, to increase the levels of organic matter in the soil, the cation exchange capacity, the biomass of microorganisms and their activities. [3].



Figure 1: Women's participation in a composting session, March 2021

There are varieties of materials that go into making compost. These include manure, bio-solids, pulp and paper waste, yard waste (green waste), soiled fibres, and food waste. However, some categories of organic materials are more difficult to compost than others. Therefore, the type of installation and the composting process chosen will determine the materials that can be composted [4].

Compost, as we can see, is very beneficial for crops. However, Kitabala et al. [5] report that high use of this process can cause adverse effects. Indeed, if the quantity of fertilizing elements contained in the compost is greater than the needs of any crop, this will cause a drop in yield linked to the antagonism between the nutrient elements. This is why it is not inappropriate to say that there is a limit to fertilizers and, in general, to all growth factors [6].

This technique of waste recovery (composting) directly and indirectly generates a significant benefit but remains very underdeveloped. What are the possible reasons for this

state of affairs? Is it a fundamental ignorance on the part of the actors or a lack of means necessary for the practice of composting? Do farmers know the benefits of composting? What are the difficulties associated with the preparation of composting? Are there socio-cultural representations that hinder the method of composting? To answer these questions, it seemed relevant to us to conduct a study on farmers' perception in the villages of the Hauts-Bassins region towards the practice of composting. This investigation aims to clear the ground to facilitate establishing a composting system by shredder in the localities concerned.

The following few lines will describe the process utilized to acquire the data. Then, we will present and debate the data collection findings. Finally, strategies and/or suggestions will be developed to ensure the project's success.

2. Materials and methods

This technique of waste recovery (composting) directly and indirectly generates a significant benefit but remains very underdeveloped. What are the possible reasons for this state of affairs? Is it a fundamental ignorance on the part of the actors or a lack of means necessary for the practice of composting? Do farmers know the benefits of composting? What are the difficulties associated with the practice of composting? Are there socio-cultural representations that hinder the method of composting? To answer these questions, it seemed relevant to us to conduct a study on the perception of farmers in the villages of the Hauts-Bassins region towards the practice of composting. This investigation aims to clear the ground to facilitate establishing a composting system by shredder in the localities concerned.

In the following lines, it will first be a question of exposing the methodology used for data collection. Then, we will present and discuss the results of the data collection. Strategies and/or recommendations will finally be formulated for the success of this project. We borrowed the "social representation theory" (TRS) of Moscovici [7] to analyse and determine the perception of farmers towards the practice of composting. Indeed, according to Moscovici [7], the concept of "social representation" is a transversal and interdisciplinary concept whose origin lies somewhere between the psychological and the social. This author defines the notion of social representation as "a way of interpreting the world and thinking about our daily reality, a form of social knowledge that the person constructs more or less consciously from what he is, from what she has been, and what she projects and which guides her behaviour." In addition, correlatively, (SR is) the mental activity deployed by individuals and groups to fix their positions on situations, events, objects, and communications that concern them. However, note that not all perceptions are subject to social representations.

Consequently, an object of study must fulfill several conditions before being treated as a "social representation." The object would have to ensure the function of a concept in which a whole series of objects can be found. In addition, the entity will have to occupy a recurring space for communications and habitation. Finally, there should be standard practices in the population's environment concerned that relate to the object of study [8]. Authors such as Molinier [9] and Molinier, Rateau, and Cohen-Scali [10] think that it is necessary to add to these conditions above the question of identity, social cohesion, and the dynamic that prevails within the geographical sphere of study...

Considering these various parameters will allow us to achieve the goal of this research, which is to capture farmers' perceptions of the practice of composting in the study area. The study concerned thirteen villages in the Hauts-Bassins region of Burkina Faso and took place from January to March 2020. These thirteen villages are spread over the three provinces of the region. In the province of Houet, four villages (Baré, Kuakualé, Farakoba, and Tolotama) and one rural commune (Dandé, Koréba, and Tougan Koura) served as fields of investigation. In the province of Tuy, the localities visited are Ouakuy, Boho-Béréba, and Dimikuy. Regarding the three villages in the province of Kéné Dougou, they are Djigouera, Kassanga, and Soubagagnedougou.

The methodological approach of this study is purely qualitative. Three survey tools were used for data collection. It is essentially the interview guide, the focus group guide, and the observation grid. Data collection focused on a variety of actors, including farmers practising or not practising composting (men and women), customary people (village chief, customary chief), and resource persons (agricultural technician, information and technical animation agent, phytogenic engineer, researchers, etc.).

At the end of the collection, four focus groups were carried out in the villages of Baré, Ouakuy, Djigouera, and Soubagagnedougou. These focuses were formed based on eight to twelve participants per village and made it possible to grasp the overall logic and the repertoire of justifications for their behaviour with the practice and use of compost. As part of the individual interviews, twenty farmers (men and women) were asked about their perceptions related to the practice of composting and the use of compost in their production systems. These interviews were triangulated with seven other interviews conducted with resource people (agricultural technicians and researchers). Twenty-seven individual interviews were conducted. It should be noted that the perspective is intended to be qualitative. The representativeness of the sample was due less to statistical volume than to respect for the heterogeneity and diversity of the composition of the social body. Thus, no number had been fixed in advance as the sample size. The latter, which was intended to be reasoned, was acquired thanks to the double principle of maximum diversity and saturation, as Javeau [11] teaches us in his lesson 116. The representativeness of the research will depend on saturation, which consists of stopping the interview process as soon as the researcher, in a subjective way, considers that, for a given problem, he no longer has anything new to learn from an additional interlocutor. After a while, everything happens as if a new light was no longer possible within the same group of people approached.

All interviews (individual and focus group) were fully transcribed. Then we carried out a manual analysis using a thematic analysis grid. Interviews were carefully read so that the main themes and recurring themes could be found, as well as convergences and differences in the different ways people talked about the same thing.

For the analysis, we chose content analysis because it is suitable for "the study of the unsaid, of the implicit" according to Quivy and Campendhoudt [12] in the data collected from the formulated hypotheses, those obtained and by using the written sources of the literature review. Furthermore, the analysis was made following our epistemological posture, "understanding." According to Max Weber in Montoussé and Renouard [13], "the sociologist

can understand a social action from the inside by questioning the intentions of the individual who committed it." It is an approach that uses causal analysis, which establishes causal relationships between different actions and links each phenomenon to its cause or each cause to its effects. Montoussé and Renouard [13].

The content analysis was done according to the "qualitative trend", which is based, according to Zagré [14], on "the presence or absence of a characteristic or how the elements of discourse are articulated." The analysis will consider the main themes addressed in the theoretical framework and the objectives and assumptions. Attention will be given to the manifest content and, above all, to the latent content of the discourse.

3. Results

3.1. Typology of composting and farmer preferences

The types of composting enumerated by the respondents are two in number. These are pit composting and heap composting. Most of the farmers interviewed practice pit composting. They feel that this composting breaks down faster and is easy to do. According to one respondent, "Composting in a pit is easier. On the other hand, because it is enough to add water to the excrement and other stems contained in the pit, composting in piles requires many precautions. You must have a tarp to cover the pile. Then the water poured into it does not stay; it flows away. Apart from the ease, some respondents say that composting in pits seems more profitable in yield than composting in heaps. Like this other respondent who maintains, "It (composting in a pit) is richer and provides a better yield than composting in a heap."



Figure 2: composting in a heap at the Farakoba research station, March, 2020

On the side of the resource people, it is rightly admitted that pit composting is predominant. This is what emerges from the words of the Provincial Director of Agriculture of Houet: "Composting in pits is the most practiced because farmers are unfamiliar with composting in heaps. Heap composting is not well mastered or practiced by farmers. Although it is admitted that pit composting is the most commonly practiced by farmers, the argument that it is easy to carry out is not shared by technicians in the field. According to a senior agricultural technician, "The production of compost is becoming part of the habits of farmers. Pit composting is more common, but the current trend is to switch to heap composting because it is easier. Another technician agrees with the previous one. Composting in piles is, according to him, easier to carry out because it is easier to handle. For the latter, laziness could explain the use of pit composting by farmers. These farmers, according to him, do not return the biomass once it is in the hole.

3.2. What advantages does compost have over other fertilizers?

Farmers say the benefits of compost are enormous. Several reasons contribute to this assessment. Farmers first mention the long duration of compost action compared to chemical fertilizer. According to a farmer, "When you put in compost, you can go for three years without putting in another fertilizer." This is not the case for chemical fertilizers. «Others then focus on the effectiveness of compost. To this end, a respondent points out that "we combine compost with chemical fertilizers." Nevertheless, compost has more benefits than fertilizers. For fertilizers to work effectively, you need compost. The effectiveness of compost also lies in its function of regenerating the soil. Several respondents mentioned poor soils caused by the use of chemical fertilizers. From their point of view, only compost would be able to restore the soil. For this respondent: "Nowadays, our floors are tired. Therefore, compost helps us regenerate the soil. The soils are poor; if they are not composted, we will not be able to survive."

The other advantage that finally emerges from the respondents' comments concerns performance. Indeed, compost seems to be unanimous in terms of a good yield. According to the words of one respondent, putting the compost in a substantial quantity in the field gives more outcomes. Another retort by arguing that the harvests are always good with the use of compost. The benefits of using compost in crops are on several levels.

In any case, it should be remembered that although compost offers many advantages, some of which last for several years after application, its use first requires that you have a good knowledge of this product and the soils. This will help improve its perception among consumers and allow its replacement instead of other fertilizer products or in combination with them. This task will not be easy because habits always die hard.

3.3. The practice of composting is a "burden" for farmers.

What emerges from the respondents' comments in this study is several difficulties with the practice of composting. This state of affairs makes it difficult to categorize these difficulties. Similarly, each respondent's difficulties are not housed in the same boat. Thus, according to one respondent, the major problem concerns the lack of water, while another respondent finds that cutting the stems into small pieces is very tiring, so he only cuts the branch in two.



Figure 3: Stem cutting session but for composting at the Farakoba research station, March, 2020

The lack of a means of transport is also one of the difficulties. Many respondents mentioned it. For this respondent: "In my opinion, transport to the field is the main difficulty. In addition, there is a lack of water and the availability of beef droppings if you do not have any. This lack of means of transport forces some to rent motorcycle tricycles to bring the compost to the fields.

Some difficulties are related to the composting that farmers practice. On the other hand, on the level of pit composting, geographical challenges have been reported. On this point, a technician points out that: "There is a village of Dandé (Koreba) where the geographical situation is not favourable for pit composting... Digging the holes is very painful. " During the focus group in Ouakuy, the participants mentioned that "at the level of pit composting, we often encounter pebbles, making it difficult to achieve." In addition, the texture (or layer) of the soil is not the same everywhere. While digging the pit, it can happen that some collapse and spoil all the work done.

Moreover, pit composting is perceived as a source of danger and causes accidents. Witness the words of this technician: "I also learned that a farmer dug his pit, and an animal fell in there and broke its legs." The other difficulty that cannot be ignored, according to one respondent, is that the animals are in the process of destroying the pits that had been dug for them by the project. Without being inflexible in his position, the last respondent maintains on this question: "It can cause accidents if the hole is not protected. So to avoid all that, I don't practice composting first.

Conversely, a technician points out that the producers are often held accountable for these unfortunate situations. He states that within the framework of certain projects, the producers were accompanied with cement and a sum of 65,000 Frcs, but with this sum and much more, the cement found other destinations and other purposes. The respondent certainly

recognizes that composting in a pit with an activator and granulated compost has failed given the difficulties of investment and stability that this recommends.

Regarding heap composting, the respondents point out the large quantity of water that this process requires, among other difficulties. Indeed, there is a lack of water in terms of heap composting because the water poured on the heap runs out, according to a farmer. Moreover, some respondents did not omit to point out that animals can destroy the heap if there is no fence to preserve it. This causes animals to ravage the compost. The practice of heap composting is very harsh from a farmer's point of view. To highlight this hardship, this respondent said, "The tarpaulin that we use to cover the composting heap can be destroyed if we do not take care of it properly each time." Finally, some respondents noted difficulty composting in heaps and cases of theft of the tarps used to cover the heap.

3.4. Are composting and digging pits socially acceptable practices for people who make things like food?

Composting is a process that is generally done in rural areas by farmers. However, as we can see, this environment is, above all, under the influence of certain socio-cultural constraints that could hinder the practice of composting and/or the digging of wells. From this observation, we polled the respondents on the existence of such prohibitions. Contrary to all expectations, all of the farmers interviewed affirm that there is no prohibition linked to composting in general and to digging wells in a specific way. On the side of the customary chiefs interviewed, we agree with the peasants by asserting the non-existence of a rite before the digging of the pits. Nevertheless, a farmer interviewed told us that she does not get involved in these issues as a woman. She tells us: "I am a woman, and I don't know if there is a tradition that forbids it."

If the peasants of the villages participate, they do not admit the existence of customs that hinder the practice of composting. The resource people interviewed point out that it is not advisable to dig a hole in some regions, such as the centre-west and the south-west. One of the resource people says: "In some villages, we are told that it is forbidden to dig pits. For me, it may be so as not to discover certain hidden things that we would not like to see". This assertion deserves, in our view, to be taken into account in the implementation of a project on composting. Concerning the villages where the investigations were conducted, some people working in the Ministry of Agriculture explain how the digging of holes is a societal problem in the villages of Kuakualé, kôrô, and Koréba. Therefore, even if these cases have not been reported by those concerned, that is to say, the targets are unacknowledged and unacknowledged brakes, which can compromise the appropriation of the pit composting system. A regional service manager for hydro-agricultural developments and agricultural production in the Hauts Bassins region shares his thirty years of experience in the Hauts Bassins region: "I worked for a long time in certain villages with projects on composting. We worked in kouakoualé, kôrrô, and Koréba, especially where women are unfavourable to pit composting. They feel that hole digging is not women's work. Therefore, they cannot practice it. «This declaration backs up the words of a woman I met in Kouakoualé, "dinguê sôgô yèna yéli magni." Nii môgô ladjennaKato ka woo sôgô, a bi komi kabourou loo, "translated," "hole digging is not good to see when people gather around a hole, it gives the impression of being gathered around a grave." In essence, we note that certain social representations of the hole can

slow down all innovations in pit composting. This reality remains difficult to apprehend given the silent reality of actors reserved for conserving habits and customs. The discourse of this respondent increases when he confides that digging a hole in the open air without putting anything in and without giving the impression of a grave is difficult, which is why, when digging a hole, you hang a stick over the hole so that you know that it is not to bury someone. Besides digging a hole, you can also go to an old grave and dig up a dead person. If he dies of infectious disease, this disease will affect the whole village and decimate the people, so really it is not at all recommended.

3.5. Sociodemographic aspects and appropriation of the practice of composting

Several determinants are considered in the factors of adoption or not of compost. Some factors make it hard to decide if you should use compost or not. Others are sources that encourage you to use them.

Contrary to what one should expect, this study did not show a negative effect on whether the practice of composting is acceptable or not. Indeed, the farmers interviewed, whether young or old, engage in the course of composting. One of the respondents even maintains that he was introduced to composting by his father. However, we point out that he has benefited from training in this direction.

Apart from the age of the farmers, the size of the farm in this research has a negative effect on the use of compost. This influence is all the greater when composting is carried out manually. As for the farmers we interviewed, it appears that the size of the household plays a considerable role in the practice of composting. In these cases, some respondents say they resort to labour. This labour also generates additional costs for them.

Regarding the gender variable, we find that respondents of both sexes engage in the practice of composting. Indeed, whether they are formed in an associative group or individually, women also practice different types of composting. However, the task is more difficult for women. According to one respondent, "As a woman, I would say that the work is challenging and composting requires a lot of water." If we win barrels to draw water in large quantities, it will relieve us. Currently, we use 20-litre cans. The other difficulty is that the animals are destroying the pits dug for us".

3.6. Introduction of a shredder-based composting technology into a farming environment

The introduction of new grinding technology as part of the project "Improving the Production and Efficiency of Use of Organic Manure in Production Systems in Western Burkina Faso (APEUFO)" through a shredder composting system finds its relevance in the difficulty of the task, which consists of cutting the stems of all kinds. Indeed, this cutting into small pieces as required by the technical sheets does not promote the good practice of composting by the farmers. In addition, we were able to note that the cutting of the stems creates generational conflicts.



Figure 4: Demonstration and training of agents in the use of shredders for decoupling at the Farakoba research station, February 2022

According to one farmer, children do not always understand the need to cut branches. They find it tiring and often do not hesitate to sulk or do as they see fit.

Many farmers, as well as resource people, think that this project will be welcome. For example, the village chief of Kassanga understands that: "For me, it is a public good, but someone has to be given responsibility for management because, as the saying goes, when a horse has ten grooms, he will always be thirsty." You also need to be trained in how to use this grinder. We must agree on the cost and provide remuneration to the person responsible for managing the crusher". Several respondents emphasized the need to make the crusher movable and ensure it operates on diesel fuel to facilitate their task.

At the level of resource persons, the Provincial Director of Agriculture of Houet says this: "The project is a good initiative because, as I said, it is the cutting into small centimetres that is tiring. Its success will depend on the price, because farmers are beginning to perceive the benefits of compost. The project will be welcome, and I ask that we make the shredders available to farmers as soon as possible. In the end, this may lead to the purchase of shredders individually or collectively by farmers. We must also emphasize farmers' training on composting (especially composting in piles)." Regarding encouraging the purchase of grinders individually or collectively, the Provincial Director of Agriculture was right. Djigouera is where the focus group took place. One participant wanted to know whether the project could help them buy this crusher at a reduced price on a personal level.

4. Discussion

In the literature, various terms are used to categorize types of composting. According to the FAO [6], it is possible to classify composting under two categories: anaerobic composting and aerobic composting. Anaerobic composting occurs when oxygen is absent or present in a limited quantity, while aerobic composting occurs in the presence of a large amount of oxygen [6; 1]. According to Zongo [15], aerobic composting is the most widespread type of composting in rural Burkina Faso.

According to Matteau [16], "The biological decomposition of organic matter can take place in two ways: with oxygen (anaerobic process) and without oxygen (anaerobic process). In the presence of oxygen, the process is called "composting," while the process without oxygen is called "anaerobic digestion."

Furthermore, and still according to the FAO [6], the third category of composting can be obtained by the enzymatic degradation of organic matter, which passes through the digestive system of earthworms. This process is called vermicomposting. The term "vermicomposting" (or "vermicomposting") refers to the use of earthworms to compost organic residues. Savadogo [17] lists three types of composting: composting in heaps or the Andes; composting in pits, and composting in bins.

The benefits of composting are numerous. Zongo [15], for his part, thinks that "the use of compost allows a reduction in the quantities of mineral fertilizers used and makes the fertilizers more effective (...)." This reduces production costs and contributes to the development of sustainable agriculture. The potential offered by composting to transform agricultural harvest residues into organic manure is proving to be an exciting alternative for improving production and maintaining soil fertility " according to Sanon [2].

Still, by the same logic, Savadogo [17] maintains, "the composting of urban solid waste is an alternative for agricultural recovery that makes it possible to raise the level of soil fertility and contribute to the food and nutritional security of populations" (). As a result, the benefits of compost are at four levels, according to Savadogo [17], including the improvement of the structure and the structural stability of the soil. Indeed, according to Matteau [16], "compost is also recognized as a material for erosion control because it gives the soil better structural stability." Then there is water retention and porosity. Furthermore, the influence of compost on soil chemistry can be mentioned. Finally, there is the phytosanitary effect, which increases the resistance of plants to certain pathogens.

For Charland [18], for example, well-made compost, even when applied at low doses, increases the yield of the soil where it has been used compared to soil that has not had fertilizer. Compost is valued in different ways by farmers. Generally, these assessments refer, for the most part, to the intrinsic quality and, above all, to its quality compared to mineral fertilizers. In his diagnostic study of compost production in the province of Yatenga, Zongo [15] arrived at the following results: in fact, 80% of the producers he surveyed think that the productivity of compost is better compared to that of chemical fertilizers. At the same time, 76% of these respondents believe that compost reduces the density of weeds compared to the direct use of manure. The author says that we should not forget that some people think the two fertilizers work together.

According to Kitabala [5], "The use of compost has a double interest." It makes it possible to improve the productivity of agriculture. Still, the collection of products that go into its manufacture cleans up the environment and improves the population's living environment.

The FAO [6] also points out that composting has several advantages along the same lines. First, it improves the fertility and quality of the soil. This then causes an increase in agricultural productivity. Composting finally allows better soil biodiversity, a reduction of ecological risks, and a more favourable environment through the materials that go into its composition.

Chouinard [19] share the same vision regarding the benefits of the use of compost by producers. Indeed, composting has the advantage of allowing the recycling of the nutrients present in the organic residues. It is also a way of managing organic waste that is more respectful of the environment. Anything that promotes ecological agricultural practices [19].

According to the FAO [6], compost finally allows farmers to reduce their expenses in terms of purchasing mineral fertilizers. However, the main advantage of thermophilic composting is embodied in the fact that the temperatures reached during the process are high enough for the satisfactory elimination of pathogens. In the same perspective, Matteau [16], citing CRIQ, states that "adding compost to soil increases its organic matter content." As it represents a food source for microorganisms, it promotes their presence and diversity, thus participating in the protection of plants against certain infections and the fight against weeds.

According to Paul [1], the main reasons cited by Guadeloupean farmers for using compost are diverse. There is, in particular, the contribution of organic matter, the contribution of nutrients, and the replacement of mineral fertilizers. Moreover, some adopters mentioned reasons similar to those listed by the FAO [6] and Kitabala [5]. This contributes to the recycling of waste, reducing pollution, and preserving the environment. Regarding the conservation of the environment, Paul [1] specify that this environmental concern prevailed over the reason for replacing chemical fertilizers.

According to Zongo [15], despite the many advantages of using compost, there are still several difficulties associated with its practice and its use. These difficulties mainly concern the low availability of crop residues [20 ; 21 ; 22] and the consumption of large quantities of water, difficulties in collecting animal waste, excessive working time due to the duration of composting, and the low availability high cost of activators [8 ; 4 ; 2 ; 23].

Kitabala [5] share that the difficulties of composting depend on the type of compost produced. Thus, the problems that can arise during anaerobic composting essentially concern the length of the process, which can cause the loss of nutrients, the frequent turning of the materials, the reduction in the size of the materials to increase the surface area, and the heterogeneous product obtained. As for vermicomposting, even if the product received is homogeneous, it should nevertheless be noted that the temperature reached is not high enough to eliminate pathogens properly [3]. Therefore, it is recommended to combine vermicomposting with traditional composting for better final product quality.

In the case of farmers in Guadeloupe, Paul [1] report that the primary constraint to composting is the difficulty of the practice. Second is the constraint related to the cost of the

practice (product + transport + spreading). The third and final constraint mentioned by these authors concerns access to technical information on the benefits of compost and the methods of application.

According to Alexander quoted by Matteau [16], Quebec users still perceive compost as a technically complicated product. This could be explained, according to him, by the massive use of chemicals for the last fifty years. In this sense, he maintains that "these products are known, recognized, and widely used." In addition, the use of chemical fertilizers is more straightforward than that of compost. Their composition is precise, the quantities to be applied are easy to determine, and the expected results are more easily predictable. "[4]

Along with previous authors, Chouinard [19] deal with the difficulties and constraints of composting in their study in terms of obstacles. For them, "The main obstacles to the use of compost by farmers remain the lack of knowledge about the use of compost and the high cost of the product, particularly associated with transport costs." Moreover, producers are not convinced that they will be able to sell their fruits and vegetables at a higher price even if they adopt healthier practices for the environment "[19]. On this last point, Chouinard [19] report that consumers are increasingly demanding organic quality products but are not ready to pay more for the purchase of these products. This situation is referred to as "paradoxical consumer expectations" as consumers demand "the imposition of high environmental and social standards on agricultural production while often seeking the lowest price for food." Pronovost [24].

At the level of Guadeloupean farmers, compost is not used for the whole farm. Its use is targeted at certain crops and plots. According to Savadogo [17], the low use of the compost produced at the CTVD is mainly explained by the lack of knowledge of the product, its high cost, and its quality. For this author, 79.0% of the respondents he questioned do not know about the compost produced at the CTVD, while 11.3% consider that its acquisition cost is too high. Another 3.2% of the respondents have doubts about its quality. Indeed, and on this last point, Savadogo [17] affirms that: "The producers who buy this compost all negatively appreciate its quality. 66.66% of them underlined that this compost causes burns on the plants, and they all note that it would act negatively on the properties of the soil, which would crack, dry out quickly and require regular watering." [17].

Regarding the determinants having a positive influence on the adoption and use of compost, they are the question of education and information and membership in an agricultural organization. For Paul [1], these three variables would represent 29% of the adoption rate of compost among Guadeloupean farmers.

Then, family labour also has a positive impact on the use of compost since it reduces the intensity of the farmer's work (arduousness). This is also the case for farmers making their compost on the farm, as placing compost piles and turning them is a time-and effort-consuming activity [2].

5. Conclusion

At the end of this research, we note that composting is a practice that is beginning to become part of the habits of the farmers surveyed. In addition, this is thanks to training initiated by various structures (INERA, Prosol, PNGT2, etc.), and above all, through the sharing of

experience between farmers. The most common type of composting is composting in pits, even if none, especially technicians in the field, share the argument for its ease.

The benefits of composting are numerous and well known by farmers. However, difficulties related to this practice persist and remain. To solve these problems, logistical and technical support are the main things that need to be done. This includes transportation, a grinder for cutting the stems, water supply, and training and supervision.

This study revealed through farmers' comments that the habits and customs of the study area did not constitute obstacles to the practice of composting in general and specifically to the digging of pits. As some people who work with resources have said, though, there are places in the country where digging pits is not welcome and is even banned.

6. Acknowledgements

The author expresses his gratitude to the consortium of the project "Improvement of Production and Efficient Use of Organic Manure in Production Systems in Western Burkina Faso" (APEUFO) represented by the Provincial Union of Agricultural Professionals of Houet (UPPA/H), The Institute of Environment and Agricultural Research / Western Regional Directorate (INERA/DRREA-O), the Center for International Cooperation in Agronomic Research for Development (CIRAD) and Green Cross Burkina Faso (GCBF), for funding the study.

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