**International Journal of Science and Research Development**
Vol. 01, Issue 02, pp.045-050, May, 2022
Available online at http://www.scienceijsrd.com

ISSN: 2583-4231

**Research Article**

# SOCIAL REPRESENTATIONS OF PHYTOSANITARY PRODUCTS BY MARKET GARDENERS IN THE DISTRICT OF ABIDJAN

**TANO Kpélé Brah Hortense and *TRA Fulbert**

Félix Houphouët-Boigny University, Ivory Coast

**Received** 25th March 2022; **Accepted** 27th April 2022; **Published online** 30th May 2022

**Abstract**

Phytosanitary products are products increasingly used for vegetable crops in the district of Abidjan precisely in the communes of Port-Bouët, Cocody and Bingerville. However, the standards indicated on the packaging are not respected in the mode of use by market gardeners in these localities. From this observation, a question arises: what justifies this risky practice? In other words: what are the different representations that market gardeners have of plant protection products in these localities? The objective of this article is to analyze the different representations that the market gardeners of Port-Bouêt, Cocody and Bingerviville have of phytosanitary products. The data collection techniques used here are direct observation, literature research and semi-structured interview. Thematic content analysis and statistical analysis are chosen as methods of data analysis. The results of the study indicate that plant protection products are represented as a means to develop crops, a danger to human health and the environment and also a means to increase production.

**Keywords:** Phytosanitary products, Social representations, Environment, Human health, market gardeners.

## INTRODUCTION

Pesticides have been known since ancient times in the use of tobacco for its insecticidal properties, but it is in the twentieth century, with advances in organic chemistry that synthetic molecules appear (Cruz, 2015). They constitute a progress for modern agriculture by increasing production and develop even for domestic use. From three million tonnes of pesticides used worldwide in 2001, we rose to four million in 2016, an increase of 50% in 15 years (Deluzarche, 2016). While the use of these products is often necessary for production, it remains important to remember that phytosanitary products are toxic and, as Mougel estimates, that each year more than 3 million people are intoxicated by pesticides (Mougel, 2012). Their use cannot therefore be accepted or encouraged. Plant protection products are also implicated in environmental degradation and the reduction of terrestrial biodiversity around the areas of its use (Queyrel, 2014). According to the FAO, although developing countries account for 25% of global pesticide consumption, they account for 99% of deaths due to pesticide use. Africa is therefore not spared by the use of pesticides in its agriculture. It has become systematic to optimize the yields of cash crops and vegetable crops for the supply of urban areas due to the lack of low yields of traditional agriculture (N'gom, 2013). Reuse, burial and abandonment of empty pesticide packaging, proximity of waterways to the field, rinsing treatment equipment in water channels is a significant source of environmental contamination (Tchamadeu *et al.,* 2017). In Côte d'Ivoire, urban market gardening plays an important role in the supply of fresh vegetables in large cities such as Korhogo, Bouaké, Yamoussoukro, Abidjan. To control pests and increase their yield, market gardeners use pesticides whose dangers they are often unaware of. To control pests and increase their yield, market gardeners use pesticides whose dangers they are often unaware of.

***Corresponding Author:** ***TRA Fulbert***
Félix Houphouët-Boigny University, Ivory Coast

They settle on all available sites suitable for vegetable crops: shallows, swampy areas, sandy areas, and even around houses and unfinished houses, use phytosanitary products to increase their production and they ignore or are not aware of the dangers due to their behavior. These dangers are accentuated by a chemical treatment that is not sufficiently controlled. The objective of this article is to analyze the different representations that market gardeners have of phytosanitary products in the municipalities of Port-Bouët, Cocody and Bingerville. The social representations of these products are identical in the different study areas study: Port-Bouët (43rd BIMA, airport) Cocody (M'pouto and M'bando village) and Bingerville (Anna village and Korhogobougou district). They use all phytosanitary products in advance, they spread the products on the crops even in the absence of plant infections. For us, the justification for these practices lies in the representations that market gardeners make of phytosanitary products. They are therefore increasingly the subject of sociological surveys (Doise, 1992), so as to allow the understanding of the meanings that users give to their practices.

## METHODOLOGY

### 1-site and survey participants

The agglomeration of Abidjan, economic capital is located in the south of Côte d'Ivoire, on the edge of the Gulf of Guinea and crossed by the Ébrié lagoon. It covers an area of 57735 ha. It represents, as the crow flies, an expanse of a dozen kilometers from north to south and from a dozen east to west. This area still contains islets, increasingly rare, where abundant vegetation reigns. This district includes the ten communes of the city of Abidjan and three communes: Anyama, Bingerville and Songhon. The choice of respondents was made according to a mixed sampling: quantitative and qualitative. Two categories of market gardeners were distinguished: owners and employed market gardeners. The data collected during the

survey allowed us to count two hundred and forty (240) owners and three hundred and twelve (312) market gardeners employed in the plantations at the six sites of the three survey areas. As not all owners are market gardeners, we have targeted market gardeners. Since this is a descriptive study, the biostatistical formula for determining the size of our sample is as follows:

$$N = \frac{£2(P \times Q)}{D2}$$

£a= threshold value read in the reduced deviation table (normal distribution)
P = percentage of the population affected by the research problem
(P = estimated prevalence)
Q = percentage of the population that is not concerned with the research problem

P + Q = 100% = 1 if P + Q = 1 then P = 1- Q

And Q = (1- P)
D = desired or desired accuracy (margin of error)
For a confidence interval of 7%,
£a= 1.812 according to the reduced deviation table (normal distribution).

Here, the estimated prevalence of market gardeners is not known. In this case, P = 50% according to the WHO model (if we do not know). This process leads us to simply say that the number of market gardeners exercising this profession is not known. That is why we opted for the WHO model.

If P = 50% then Q = 100% - 50% = 50%
Hence Q = 50%

Let's calculate the size of our sample (N):

$$N = \frac{£2(P \times Q)}{D2}$$

$$N = \frac{1.8122\ (50\% \times 50\%)}{(7\%)\ 2} = 167.51 \text{ market gardeners}$$

N = 168 market gardeners

Thus, we have 168 market gardeners to investigate in the three study areas. This number is distributed among the different sites of the areas to be studied. To know the number of people to be investigated at each site, we will proceed as the results are contained in the following table:

**Table 1. Number of market gardeners selected by site**

| | |
|---|---|
| Port-Bouët (Airport) | $\frac{192 \times 100}{312} = 61.53\%$ Or 61.53% x 168 = 103 market gardeners |
| Port-Bouët (43rd BIMA) | $\frac{36 \times 100}{312} = 11.53\%$ Or 11.53% x 168 = 19 market gardeners |
| Cocody (M'pouto) | $\frac{33 \times 100}{312} = 10.57\%$ Or 10.57% x 168 = 18 market gardeners |
| Cocody (M'badon) | $\frac{18 \times 100}{312} = 5.76\%$ Or 5.76% x 168 = 10 market gardeners |
| Bingerville (Anna) | $\frac{21 \times 100}{312} = 6.73\%$ Or 6.73% x 168 = 11 market gardeners |
| Bingerville (Korhogobougou) | $\frac{12 \times 100}{312} = 3.84\%$ Or 3.84% x 168 = 7 market gardeners |

Source: Field Survey – 2020

To respect the randomness of the sampling, once on the site, we investigate the first plantation encountered and we skip an owner and then we investigate the next owner. So on until the end of the site. Then we start the process again until we reach the number of individuals per site that must be part of the sample.

The individuals we investigate are drawn from diverse communities, social status and different levels of study. It should therefore be taken into account in the choice of individuals in the sample, in order to be able to highlight the different factors of environmental degradation and population health. There are two selection criteria for market gardeners:

- **Inclusion criteria**: Inclusion criteria involve market gardeners who work for different owners or owners who work themselves in their plantation.
- **Exclusion criteria:** Exclusion criteria are market gardeners who work for the same owner.

For qualitative sampling, we opted for non-probability sampling by reasoned choice. Here, subjects are chosen deliberately by relying on our own judgment, that is, people who hold knowledge. To this end, we interviewed the management structures of plant protection products, the producers/distributors of plant protection products, the growers of the crops market gardeners, controllers of phytosanitary products, management structures for market gardeners, local elected officials. These subjects have in-depth knowledge of plant protection products, so they are in a better position to provide enriching information that will help carry out this study. Thus, we interviewed officials of structures such as MINADER (Ministry of Agriculture and Rural Development), MINEDD (Ministry of Environment and Sustainable Development), as well as ANADER (National Agency for Support to Rural Development). We also interviewed the heads of the technical services of the Town Halls, of companies manufacturing plant protection products, of those responsible for the distribution of plant protection products as well as the delegates of the areas studied.

For this purpose, here is the summary table of the respondents.

**Table 2. Categories of actors interviewed**

| Categories Sociological | Designations | Staff |
|---|---|---|
| Institutional actors | -MIMADER management<br>- direction of MINEDD<br>-management of ANADER | 1<br>1<br>1 |
| Local actors | - Town Hall<br>- Company for the manufacture of phytosanitary products<br>- Distributors of phytosanitary products<br>- market gardeners | 3<br>3<br>4<br>10 |
| TOTAL | 23 | |

Source: Field Survey – 2020

These subjects are leaders who have knowledge about the use and management of plant protection products, so they are in a better position to provide us with enriching information that will help carry out our research.

**Data Collection Techniques**

The techniques used in this article include literature search, direct observation, semi-structured interviewing and questionnaire survey.

**Literature search:** This approach allowed us to have writings on the theme of research. This research was carried out at the Centre de Recherche et d'Action pour la Paix (CERAP), at the Institut de Recherche et de Développement (IRD) and the library of the Faculty of Letters, Arts and Human Sciences (FLASH). Then, we got in touch with some documentation centers belonging to the structure and development body (INS "National Institute of Statistics", ANADER, MINADER). Finally, we did some research on the internet.

**Direct observation:** This survey technique, which consists in looking at plants, soil, water, etc., has made it possible to understand the impacts of phytosanitary products on the environment as well as human health.

**Maintenance:** For the purposes of this article, the semi-directive interview has been chosen. The interviews were conducted using a guide with the various actors involved in this study. The interview guides developed provided a better understanding of the problem under study.

**The questionnaire survey:** This survey technique was used to gather information in the field. This choice is guided by the quantitative approach in which we are also part of it.

**Data analysis method**

To understand the social representations of plant protection products by market gardeners, methods of thematic content analysis and statistical analysis are adopted as an approach. The method of analysis of thematic content is a process that consists in a transversal division of the corpus from which the theme is used as a unit of division. This method made it possible to highlight the perceptions of market gardeners on each theme relating to the objectives of the study. To this end, reference was made to:

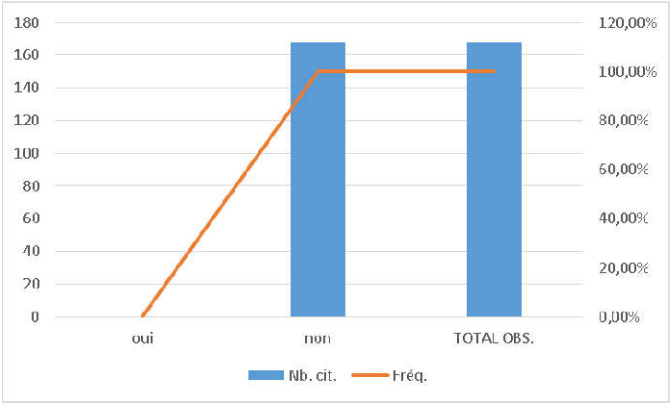
- List the units of meaning or significant ideas contained in the respondents' speeches. It is the place to identify the segments of discourse in relation to the object of study.
- Categorize the ideas identified: this is the categorization of discourse segments in order to analyze them.

The thematic analysis made it possible to highlight the ideological, symbolic and relational aspects, which refer to the social representations of the phytosanitary products of market gardeners. As far as the method of statistical analysis is concerned, it tries to reconcile qualitative and quantitative approaches, the rational and the sensory. These are statistical calculations that will be used to describe, to visualize the particular characteristics of a collection of facts on which we have figures. In this research, this analysis relates to descriptive and explanatory statistics. Descriptive statistics are useful because they allow grouping the data, to organize and structure them for the analyses, The explanatory statistics made it possible to look for a correlation link between the variables.

## RESULTS

**Plant protection products as a benefit for crops and a means to increase production**

The survey revealed that the behaviour and attitudes of market gardeners in the use of plant protection products are guided by their cultural background and gain, which determines their behaviour. Products Phytosanitary products are considered a remedy for crops and a means to increase production. Thus, market gardeners see in these phytosanitary products a life-saving solution for crops. They cannot imagine crops without these products. Also all the actors involved in the management of phytosanitary products are unanimous that these products are an opportunity for crops given the degradation of the environment in general and soils in particular.




Source: Field Survey – 2020

**Figure 1. Distribution of market gardeners according to the fate of crops without plant protection products**

Reading this figure, not all market gardeners consider crops without phytosanitary products. Plant protection products are therefore considered a necessary good for crops.

Mr. O. Phytosanitary Officer MINAIDER says:

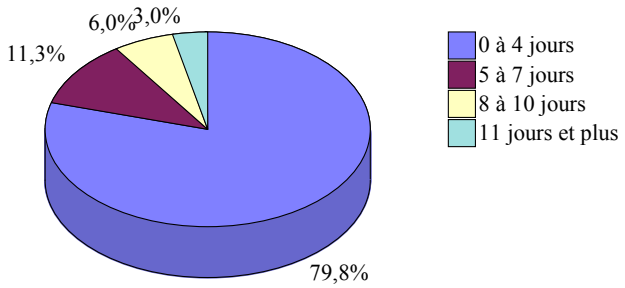
*« We cannot envisage in this current world, crops without phytosanitary products. The world may not be self-sufficient. Plant protection products allow farmers to increase production, so in turn promotes food self-sufficiency. If by chance, the sale of products were suspended, it would be a humanitarian disaster. The problem with plant protection products lies in their use. »*

One of the market gardeners says:

*« If we grow without the products there, it's death. We will not be able to harvest even a plant. These products save us from disaster. »*

From these words, we can say that phytosanitary products are important for good food production. Above all, it is essential for global food self-sufficiency. But these products last often in the environment before being degraded. And in addition there are approved products that are used a few years and later withdrawn from the market for their harmful effects on the environment and on humans.

It is therefore a manifest will of the States and the industrial Lobis to maintain humanity in this dynamics of the use of plant protection products rather than finding an adequate solution to remedy them. In the same dynamic of increasing their production, they adopt behaviors such as the application of phytosanitary products between zero and four days. This implies that they do not read the leaflet on the packaging of the products because the mode of application, the duration between each application is mentioned. The waiting period is not respected. Market gardeners act as they have learned. The figure below illustrates this point.




Source: Field Survey-2020

**Figure 2. Distribution of market gardeners according to the duration between each application**

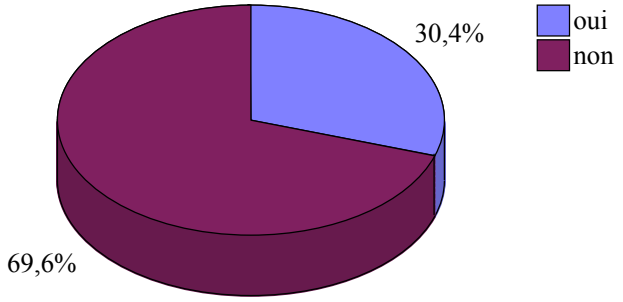
It is the knowledge they have inherited from their parent for generations. On this subject, here are their words: *«That's how we were shown, since then we started doing this work. Our parents told us that there the harvests lasted before rotting and that also the crops had a good color and shone. That way the buyers are happy because the vegetables are fresh and came directly from the fields. ».* Another adds this : *«This is to prevent the animals from eating the crops. If we wait before harvesting more than half of the harvest would no longer be good. So we spray and harvest».* This illustrates that market gardeners see these products as a solution to fight pests. Photo 1 illustrates this:

**Photo: tomato harvested just after spreading the products**

Source: Field Survey – 2020

Knowledge of plant protection products is an imperative for proper handling. From this study, the majority of market gardeners have knowledge of phytosanitary products. But they use banned products. This use of prohibited products is guided by its availability, its cost. This choice is voluntary and guided by profit gain. Market gardeners use these products because they are more advantageous for them. One of them says : *« I don't think the products are banned otherwise we weren't going to sell or they weren't going to walk around the country and then, they're cheaper and you can find them everywhere and detail them. ».* The phytosanitary manager explains: *«Fraud is truly a problem for the country. Because there are products that are banned in Côte d'Ivoire and are not banned in neighboring countries hence their proliferation within the country».*

**Plant protection products as a hazard:** The survey revealed that the behaviour and attitudes of market gardeners in their use of plant protection products pose risks to the environment and human health.A priori, market gardeners do not seem to know the dangers associated with the use of these products. The figure below tells us about the knowledge they have of these products.




Source: Field Survey – 2020

**Figure 3. Distribution of market gardeners according to knowledge of the dangers caused by plant protection products**

The observation made allows us to say that a third of market gardeners are not aware of the dangers caused by phytosanitary products. But in reality, market gardeners are aware of the dangers involved in the use of phytosanitary products given the speech made by one of them: *« we follow the direction of the winds during the spraying of the products to prevent them from touching us».* This implies that market gardeners know that the products are dangerous. It must also be said that given the fact that these products guarantee a good yield during production, market gardeners minimize its consequences on their health in favor of gain. Thus, market gardeners are aware of the dangers that threaten them during the use of phytosanitary products.

This awareness of the dangerous nature of phytosanitary products on health is also reflected in the precautions that market gardeners take after spreading. A market gardener says : *« I drink the red cap milk when I finish pumping the products to protect myself from the toxic effects of the products we use. At home when you drink poison, we drink milk or red oil so that the poison disappears into the body. Also the leaves there that we use, protects our body. It remove the products that are poured on us ».* Market gardeners use decoctions, bleach or milk to remedy possible poisoning or to protect themselves from the harmful effects of phytosanitary products. They hope that these bath products will lessen the toxic effects of plant protection products. Free movement of prohibited and prohibited plant protection products allows its use on the market. Asked why they use the prohibited products, a market gardener answers: *«I do not know that there are products that should not be used. But I say if it is forbidden why we sell products there. We don't make oh, we are advised and we buy. It's very efficient and cheaper and you can win anywhere».*

## RESULTS AND DISCUSSION

**Plant protection products: a way to increase production**

The study carried out on the social representations of market gardeners reveals that they represent phytosanitary products as

a remedy for crops, a benefit to increase their production. Representations are not mirrors of reality but of operational units, individuals and Built. Market gardeners use pesticides in vegetable crops to optimize the yield of their crops. They use them to control pests, increase the productivity of their farms and better ensure crop stability. It must also be said that given the fact that these products guarantee a good yield during production, market gardeners see in these products phytosanitary a life-saving solution for crops. They cannot imagine crops without these products. These results corroborate with those of N'gom, indeed Ngom (2013), explains that market gardeners use pesticides in advance, for the profitability of their crops. They hope to have a good harvest and protect their investment. The perception that market gardeners have of its phytosanitary products corresponds to the integration of information of the situation and leads to the construction of a representation. They select certain (perceived) characteristics of the situation to build a representation, while obscuring others. This representation of the situation is structured into a coherent unity directed towards action. The representations are therefore different from one individual to another, according to their own individual characteristics. (Life history, state of health, professional experience, knowledge etc.). Going in the same direction, (Kanda et al, 2013), in his study explains that in the application of pesticides in agriculture, the practices, attitudes and knowledge of market gardeners in relation to the use of pesticides depend on the representations they make of these products. For him, 98% of market gardeners surveyed admit that the use of pesticides reduces losses related to pests and ensure good performance.

**Plant protection products: a danger to human and environmental health**

This study reveals that plant protection products represent a danger to the environment and human health. This representation has an important place in the prevention of risk and makes it possible to understand the orientations of market gardeners, actors of their own health in a given context, in terms of prevention when carrying out their activity. The field survey revealed that market gardeners have no knowledge of the dangers caused by plant protection products. But in reality, they are aware of the dangers involved in the use of plant protection products given the discourse they are making. It must also be said that they use decoctions, bleach or milk after the products have been applied to protect against the harmful effects of these products. This behavior informs us that market gardeners are fully aware of the dangerousness of phytosanitary products. They hope that these baths will lessen the toxic effects of plant protection products. Raising awareness and informing market gardeners about the dangers associated with non-use responsible for these products, are the source of inappropriate practices, sources of chronic and acute intoxication of the users themselves, consumers and environmental pollution. These results corroborate with those of Garrigou *et al.* (2015), who explain that farmers believe that the dangerousness of products is subjective and global. The hazard identification step does not seem to them not necessary as they say they take the same precautions regardless of the products, because "all products are dangerous". Thus, a protection with variable geometry depending on the product applied, would be too time-consuming and would risk increasing the risk of preparation error. They therefore prefer to "globalize" their prevention and implement the same level of protection regardless of the product. Thus their representation of the exposure seems frozen in time and space: to the processing phase and to the direct use of the products. It is more related to the product itself than to its contact. Going in the same direction, Zouhri and Garros-Levasseur (2016), say that pesticides are presented as powerful, toxic products, which can destroy all the life of the soil, in a more or less profound way, touching the litter, the first layer of the soil, or spreading further. These are presented as being dangerous for nature. The position on the toxicity of pesticides in speech varies according to the perception of their (in)ability to target, what must be destroyed from what must be preserved. Some mention plant protection products as being able to target certain plants, certain species or argue that the spread is a function of the know-how, how to apply the product. Conversely, the harmful effect of pesticides is related to the representation of pesticides as something non-selective, which destroys everything massively in the soil, without distinction, which imbalances the environment.

**Conclusion**

At the end of this study on the attitudes and social representations of plant protection products by market gardeners in the municipalities of Port-Bouët, Cocody, Bingerville, we can say that the data collected through field surveys, documentary research and content analysis Thematic have made it possible to see that market gardeners represent phytosanitary products as a remedy for their crops and a solution to increase production. These products are a life-saving solution for crops. They guarantee a good yield for crops despite the danger they represent for humans and the environment. In short, from our research, the diagnosis carried out in the field notes that the attitudes and social representations of products phytosanitary by market gardeners are linked to the representations they make of its products.

**List of abbreviations**

ANADER: National Agency for Rural Development Support
CERAP: Centre for Research and Action for Peace
FLASH : Faculty of Letters, Arts and Human Sciences
INS: National Institute of Statistics
IRD: Research and Development Institute
MINADER: Ministry of Agriculture and Rural Development
MINEDD: Ministry of Environment and Sustainable Development

## REFERENCES

CRUZ Marie Justine, 2015, Study of pesticide contamination of water, air and soil environments Development of new tools and application to the Gironde estuary, University of Bordeaux

De Villers Juliette, Squilbin Marianne, Yourassowsky Catherine, 2005, Indicators for assessing the risks associated with pesticide use, Lavoisier, London, Paris, New - York, 278 p, 2- 7430- 0747- 8

Deluzarche Céline, 2016, Calculation based on FAO data, Futura planet

N'GOM Saliou, 2013, Study of the evolution of pesticide residues in horticultural products of mass consumption in Senegal, Rev. Ivoir. Sci. Technol., P 31- 44

GARRIGOU Alain, THERY Laurence, CHASSAING Karine, EFFANTIN Élise, MERCIECA Pascale, 2015, A

multidisciplinary approach to the social construction process of CMR risk prevention, electronic archivers

KANDA Madjouma, DJANEYE-BOUNDJOU Gbandi, WALA Kpérkouma, GNANDI Kissao, BATAWILA Komlan, SANNI Ambaliou and AKPAGANA Koffi, 2013, Revue électronique en sciences de l'environnement, Vertigo, vol.13, N°1

MOUGEL Ruth, 2012, The devastating effects of pesticides in Latin America, article, inti solidarité Nicaragua Central America QUEYREL Wilfried, 2014, Modelling the fate of pesticides in soils from an agronomic model: long-term evaluation, PhD thesis of the Pierre and Marie Curie University

TCHAMADEU Ngameni Norbert, 2017, Assessment of environmental risk factors related to pesticide misuse by market gardeners in Cameroon: the case of Balessing in West Cameroon, Africa SCIENCE 13(1) 91 - 100 91

ZOUHRI Bouchar, GARROS-LEVASSEUR Elodie, WEISS Karine and VALETTE Armance, 2016, When farmers and students think about the pesticide object: discursive analysis of social representations, Psychological Practices, Volume 22, N°3, Pages 221-237

*******