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Original Paper

Farmers' Accessibility to Pesticides and Generalization of Farming Practices besides the Legal Framework in Northern Bafou, in the Bamboutos Mountains (West Cameroon)

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Abstract

The use of pesticides improves farmers' potential yield, but handling them with inexperienced hands increases the risk of human contamination and environmental pollution, and also reduces any prospect of sustainable agricultural development. Based on semi-structured interviews with pesticides dealers and other resource persons on the one hand, and a questionnaire administered to 120 households in the locality of Northern Bafou, this study highlights the environmental challenges posed by the widespread uncontrolled use of plant protection products. There is a wide range of pesticides found in Northern Bafou, marketed by dealers in different categories, ranging from authorized and unauthorized shops to unskilled street vendors, whose essentially mercantile objective has led to the availability of these products even to peasants not always aware of the dangers incurred by their misuse. This dysfunction contrasts with the existence of an expanded legal and institutional framework in Cameroon for the management of pesticides, that is not implemented effectively.

Keywords

pesticides, legal framework, farming practices, Northern Bafou, Cameroon

1. Introduction

Africa remains with Asia the most rural continents in the world today. It counts amongst the largest population settlements. At annual growth rates, the average population situated around 2.5% is currently twice the world average of 1.2% (Leridon, 2015). Estimated at 860 million inhabitants in

2010, this population, particularly that of sub-Saharan Africa could reach 1.5 to 2 billion inhabitants by 2050 (Guengant, 2011). Also, urbanization rates on the continent are amongst the highests in the world. This urbanization is, with other factors, the consequence of an increasing dynamic mobility between the city and the countryside. The tendency noticed is that the countryside's population is emptying to the benefit of that of the cities. This way, the continent's cities will receive 300 million new inhabitants over the next twenty years. More than one in two Africans will reside in a city by 2030 (Bebien, 2013). This population accumulation, which is both large and urban, calls for a surplus of foodstuff production from agricultural origins. In many African countries for example, there is a daily need to increase yields and productivity to meet demand in local and sub-regional markets, and this increase necessitates, amongst others, the improvement of production techniques as the use of pesticides.

In Cameroon, and particularly in the major agricultural production basins, the use of pesticides has become widespread. With restricted access to land (Tchekote et al., 2018), rapid urbanization and the need to supply the country's major cities, particularly Douala and Yaounde, the "millionaire cities", farmers do not hesitate to massively use pesticides. New generation agriculture is gaining more and more space, with the modernization of production systems and the use of agricultural inputs, including these pesticides.

In Northern Bafou, one of the large agricultural production basins located on the Southwestern slope of the Bamboutos Mountain, the use of pesticides continues to increase. We even talk of the "*race for pesticides*" (Siyapdje, 2017), in a region where the soils have not only been impoverished over time as a result of repeated agricultural practices on the same surfaces, but also, attacks of harmful insects and fungi have become recurrent and resistant especially because of inefficient treatment (Tchekote et al., 2018). The frantic and widespread use of pesticides without sufficient training on its dosage, duration of application and type of product according to plant and disease, have not only rendered certain pests resistant to existing products but also destroyed natural predators of such pests. Yet this largely peasant area has for long been cited as an example of agriculture that has "*increased its agricultural productivity per surface unit to overcome the scarcity of available land and for the preservation of its fertility*" (Courade et al., 1994, p. 164). In view of the above, how has agriculture, once considered one of the models for sustainable production, embarked on a frantic race towards intensification through the use of pesticides? This essential question in a context of pressure on natural resources, particularly water and land (Tchekote et al., 2018) suggests another question that underlies this research: how to deal with the legislative and institutional arsenal of Cameroon, have access to and use pesticides for farmers, while implementing sustainable agricultural development policies. From this question emerges the research hypothesis that uncontrolled pesticides trade causes the generalization of their availability and disproportionate use by farmers in Northern Bafou (the illegal commercialization of pesticides causes the generalization of their availability and disproportionate use by farmers in Northern Bafou).

2. Method

2.1 Methodological Approach

To verify this hypothesis, we chose to work in Northern Bafou, because this locality is one of the largest agricultural production areas in Menoua Division in the Western Region (Figure 1).

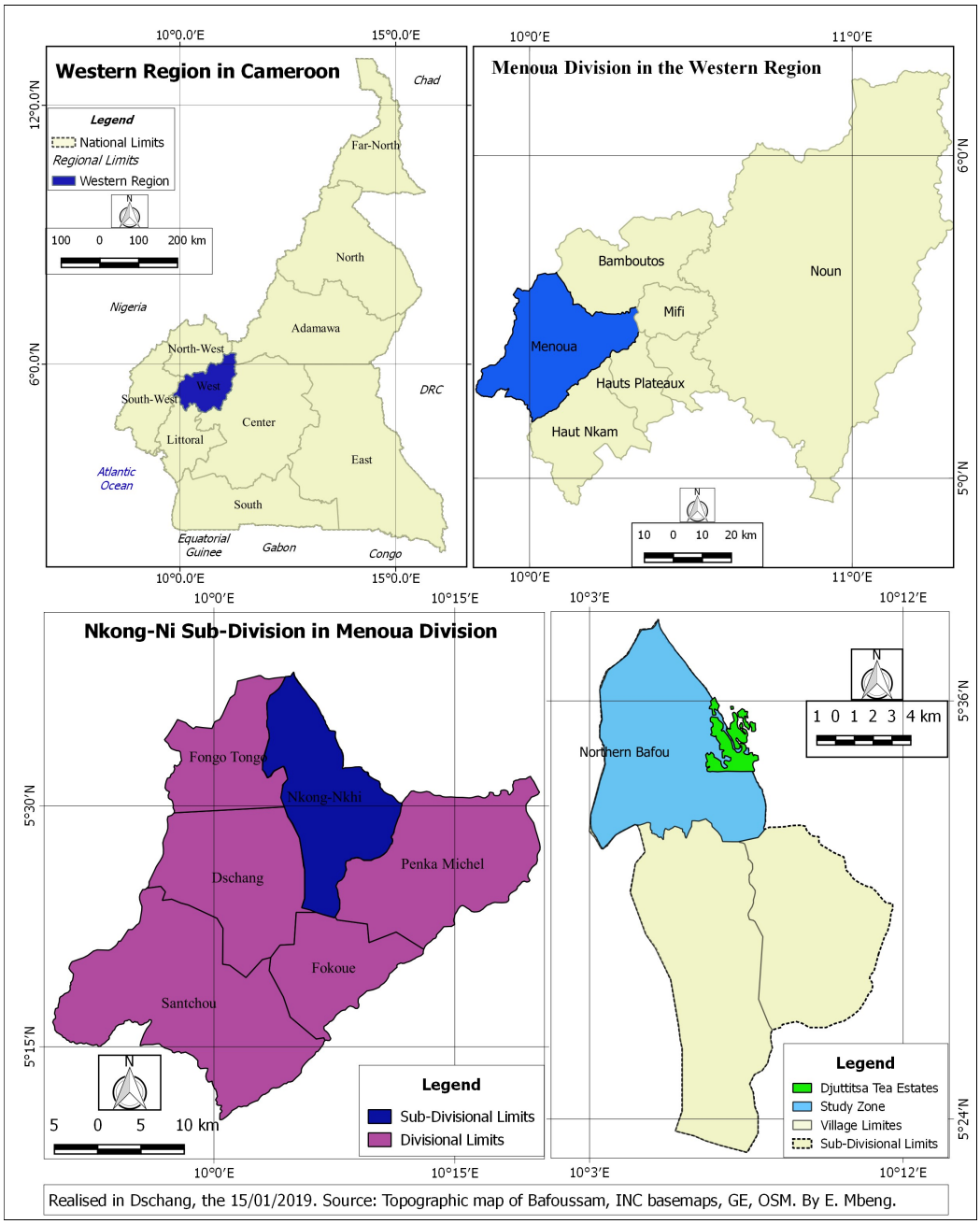

Figure 1. Location of the Study Area

Legislative texts relative to approval and control of pesticides or relative to phytosanitary protection, toxic and other dangerous wastes have been analyzed. Also, field observations were carried out

including semi-structured interviews with resource persons, particularly those in charge of the phytosanitary brigade, the Divisional Delegate for the Ministry of Agriculture and Rural Development of Nkong-Ni as well as 05 pesticide dealers.

2.2 Methodological Analysis

The questionnaires were administered to 120 households in the locality of Northern Bafou. The data resulting from this approach allowed us to structure the analysis around the evolution of pesticides trade and the legal framework as concerns pesticides in Cameroon on the one hand, and on the other hand, the trade of these pesticides outside the legal framework, the use of pesticides without approval, and finally the formulation of alternative solutions to this situation.

3. Result

3.1 The Trade of Pesticides Assaulting the Peasant Milieu

In Northern Bafou, all categories of pesticides are used: insecticides, fungicides and herbicides. Where do these come from? There is a problem of traceability among users. Only a few of the peasants who use them actually know where they come from (Figure 2).

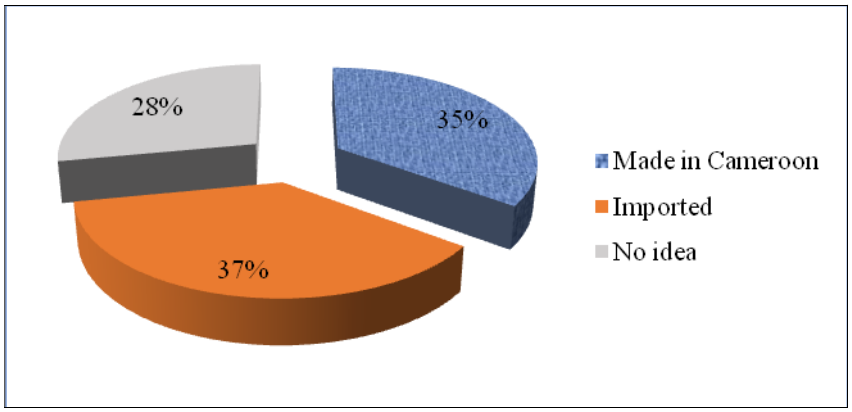

Figure 2. Origin of Pesticides According to Farmers' Opinion

With regard to Figure 2 above, 35% of farmers believe that the pesticides they use are produced in Cameroon, 37% believe they are imported while the rest (28%) have no idea of the origin. This difference in their thinking reflects the lack of information they have about the provenance of the products they use. In fact, as for other African countries, Cameroon imports most of the pesticides used on its territory, the local industries being limited to the formulation of pesticides or to the mixing of fertilizers, as well as to packaging and bagging. The companies operating in the sector in Cameroon are for the most subsidiaries of the multinationals manufacturing these products (Table 1). They only handle the importation and distribution of the goods. The imported pesticides mainly come from France, China, Germany, India and the United States of America.

Table 1. A Few Licensing and Licensed Companies in Phytosanitary Product Distribution and Treatment in Cameroon

N°	Licensing Firms	Licensed companies in the distribution of phytosanitary product	Companies registered in phytosanitary treatment
1	AFRICAWARE	Arysta life science Cameroon	Agro farming Sarl
2	AGRISHOP	Centre de promotion agricole Sarl	Alpicam industries
3	FIMEX	Ets Agro experience	CDC (Cameroon Developpent Corporation)
4	Folivert	Poly phytopharma	Cameroon Agric Technology Company
5	Holland farming	Ste Camerounaise d'hygiène et de services	Delco services
6	Syngenta Agro service	Ste Semagri Sarl	Cameroon Crop Development Organisation

Source: Pesticide Management Plan (PMP), Oct. 2014 combined with survey data, 2016.

Table 1 shows that Cameroonian companies are much more active in the distribution of pesticides. This sector is liberalized to allow farmers easily obtain the necessary products for the maintenance of their fields. From the upstream (enterprise) to the downstream (in the fields), a large distribution network has developed, with pesticides of all ranges that penetrate into the most isolated localities, especially when it is a large agricultural production basin. The locality of Northern Bafou, a large agricultural production basin is a good example of rural areas appreciated by dealers in phytosanitary product (Figure 3).

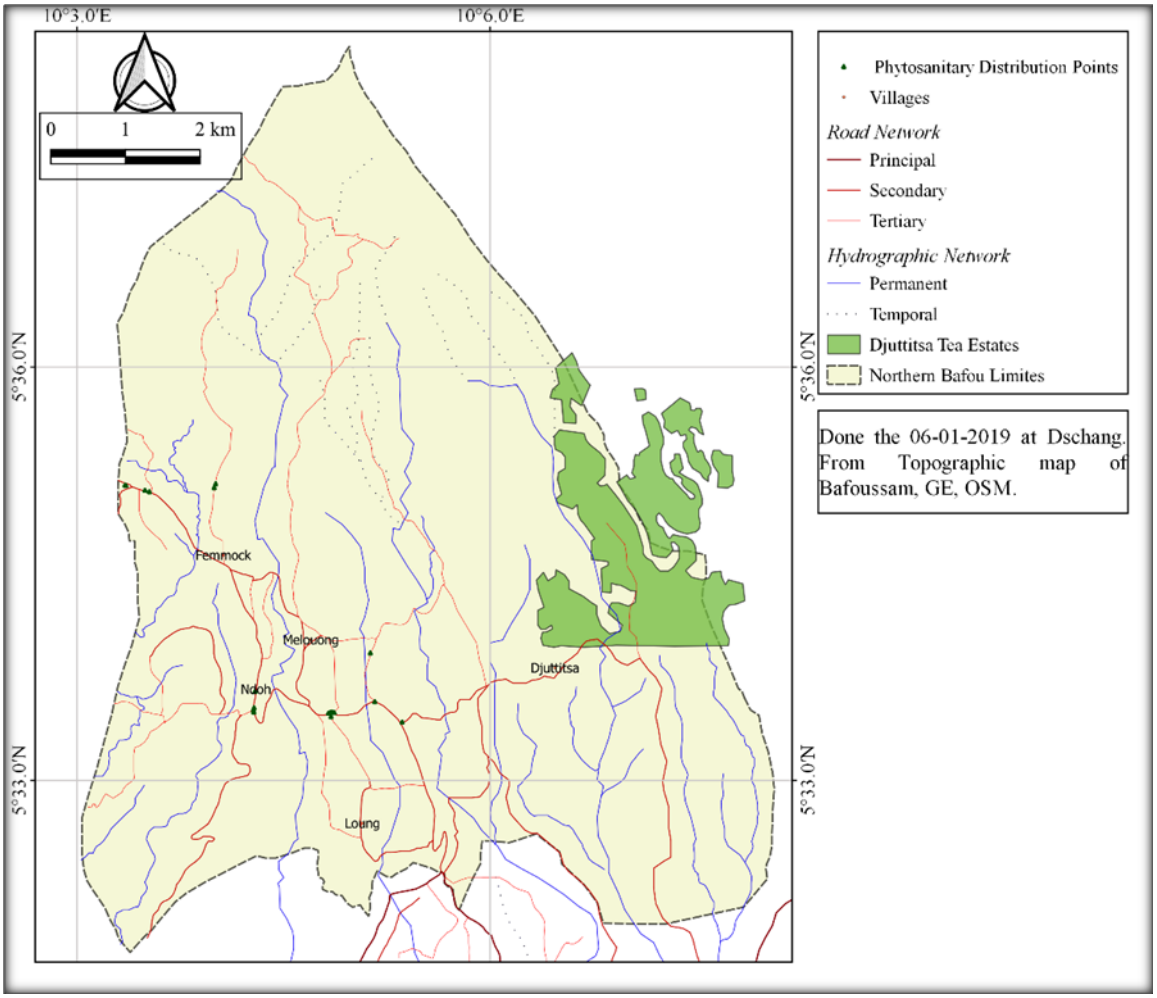

Figure 3. Distribution of Pesticides Sales Points in Bafou North

The rural landscape of Bafou North breaks with that of the other Bamileke countryside. In fact, the pesticides sales points constitute a major element of the rural landscape. Figure 3 above shows a location of the main established sales points of these products. They are characterized mainly by their roadside positions, thus facilitating access to users. The Feumock district, less densely inhabited and mainly agricultural, has 08 sales points, while the Ndoh and Loung districts have respectively 05 and 03 sales points. In addition to these outlets, which serve as supply points for more than 82.5% of the local farmers, there is also a proliferation of sale outlets developing on market days and street vendors who crisscross the villages. An entire network of local commerce is animated by a multitude of actors (Figure 4) for whom the rural area has become a space of economic stake.

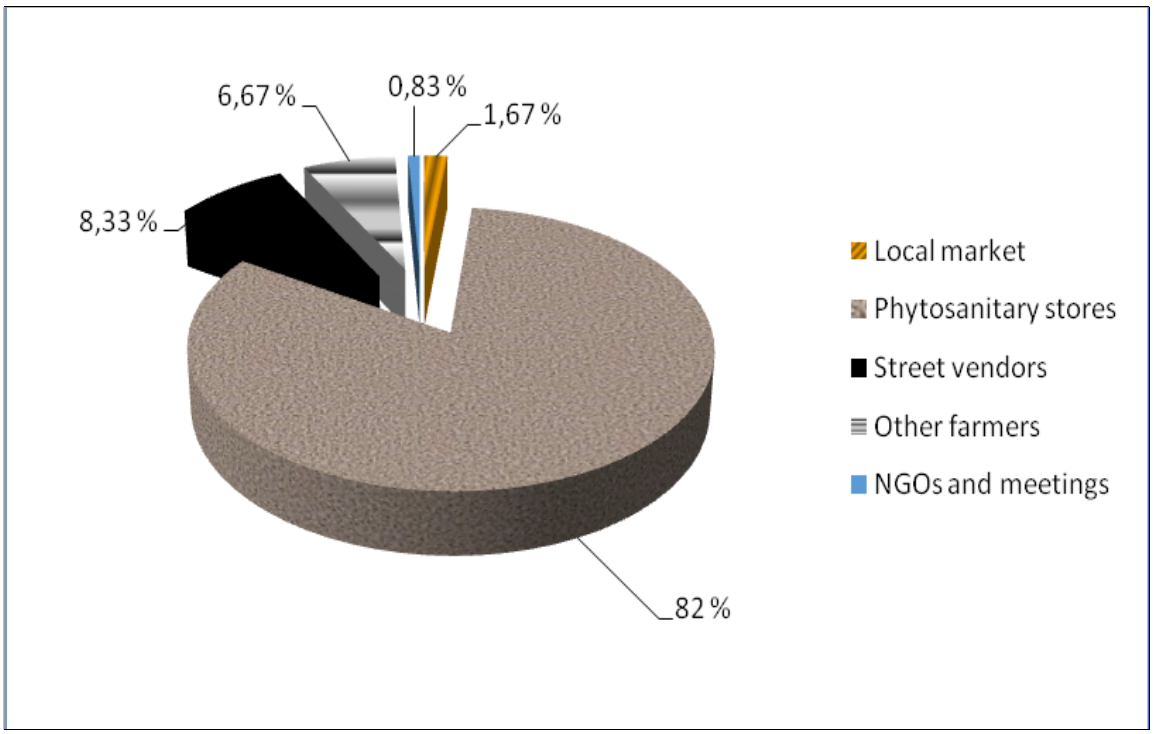

Figure 4. Places of Supply of Pesticides by Farmers

Source: Survey data, Oct 2016.

It is observed from Figure 4 that about 82.5% of farmers buy in the phytosanitary shops in this locality. On the other hand, 01.67% buy in the locality's markets from the big traders. Even closer to the farmers are the street vendors who supply 8.33% of our respondents, they systematically ply the homes and farms to offer their products. The remaining or 6.67% of farmers buy from other farmers. Among these actors, it is important to notice the presence of NGOs but also farmers' associations, that contribute 0.83% to supply them with pesticides. Respectively, the reasons motivating farmers' choice of supply are proximity and the possibility to buy on credit since they are familiar with shop owners; cheaper prices and the certainty to obtain authentic products from the wholesalers; ease of access and cheaper prices coupled with simplified user manuals from ambulant sellers; user manual and possibility of buying very small quantities from other farmers at relatively cheaper prices as other farmers usually sell only their left-overs. The producers' associations receive subventions; buy in bulk and from licensed suppliers while members also have the possibility to acquire the products on credit.

These supply dynamics stand out from those previously observed in the region before the liberalization of the economy during the 1990s. In fact, in Northern Bafou, as in the rest of the Bamileke Region, pesticides were distributed to farmers by the Central Union of Agricultural Cooperatives of the West (CUACW) and some approved centers that provided technical supervision for their use. Also, the need for the use of the products by the farmers was controlled. However, with liberalization, the technical supervision component has given way to the mercantilist logic where the client's wallet remains the

priority of these traders, with practices very often outside the legal frameworks as far as pesticides are concerned.

3.2 An Important Legal and Institutional Framework for the Management of Pesticides in Cameroon

The use of plant protection products is legally regulated in its marketing and distribution by national laws and regulations and by international conventions. At the national level, there are texts that organize the registration and the use of pesticides. Among these texts, Law No. 2003/003 of April 21st 2003 on plant protection is of particular importance. It provides in Articles 33, 34 and 35 that:

"***Article 33:*** *Anyone who commits the following offenses is liable to a fine of fifty thousand (50,000) francs:*

- *absence of presentation of phytosanitary efficacy;*
- *absence of declaration of plants, plant products and pesticides;*
- *failure to report obsolete pesticides;*

Article 34: *Is punished with imprisonment of one to three months and a fine of one hundred thousand to one million CFA francs or one of these two sentences only, anyone who introduces regulated plants or biological control agents without an import permit.*

Article 35: *Is punished with imprisonment of one to three months and a fine of one hundred thousand to one million CFA francs or one of these two penalties only anyone who violates the provisions of articles 20 to 26 of this law*".

Also, in Article 36 it is foreseen that:

"*(1) is punishable by the penalties provided for in Article 261 of the Penal Code, the person who, by clumsiness, negligence or non-compliance with the regulations, causes pollution before, during or after a phytosanitary treatment..., (2) is punishable by the penalties provided for in Article 289 (1) of the Penal Code, the one who in the circumstances described in paragraph 1 above, causes another intoxication generating disability*".

Furthermore, in pursuance to Decree No. 2005/0772/PM of April 6th 2005 laying down the conditions for the approval and control of pesticides, all pesticides are subject to the approval procedure, prior to import, distribution and use. To these important national texts are added the following:

- Law No. 89/027 of December 29th 1989 on hazardous waste,
- Law No. 96/12 of August 05th 1996 on a framework law on environmental management that sets the framework for environmental management in Cameroon.
- Decree No. 2005/0771/PM of April 06th 2005 laying down the procedures for executing plant quarantine operations;
- Decree N 2005/0770/PM of April 06th 2005 laying down the procedures for phytosanitary control;
- Decree N 2005/0769/PM of April 06th 2005 on the organization of the National Phytosanitary Council;
- Decree N 042/06/MINADER/CAB of May 10th 2006 instituting a phytosanitary certificate;

- Order No. 003/06/A/MINADER/SG/DRCQ/SDRSQV/SQV of April 03rd 2006 laying down the procedures for the treatment and stamping of packaging materials and wood-based packaging intended for international trade;
- Decree No. 0274/MINADER/CAB of March 19th 2013 approving the printed forms of phytosanitary certificates and laying down the procedures for their issue.
- At the international level, it should be made clear that Cameroon has ratified international conventions that apply in its internal legal order. They are :
- The African Convention on the Conservation of Nature and Natural Resources, adopted in Algiers on September 15th 1968;
- The Cartagena Protocol on Biosafety to the Convention on Biological Diversity, more commonly known as the Cartagena Protocol on Biosafety, signed on January 29th 2000 within the framework of the UN;
- The Basel Convention on toxic and hazardous waste, adopted in Basel on March 22nd 1989;
- The RAMSAR Convention of 02/02/1971 on Wetlands of International Importance;
- The Agreement on the Application of Sanitary and Phytosanitary Measures, or "SPS Agreement", enforced with the establishment of the WTO at the beginning of 1995;
- The Stockholm Convention on Persistent Organic Pollutants, adopted on May 22nd 2001 in Stockholm.

In view of the preceding examples, it can truly be said that Cameroon has an important legal arsenal for the approval and hadling of pesticides of both national and international sources. Rural communities and farmers who live and work in the context of pesticides have been taken into account by the lawmakers with the aim of promoting sustainable agriculture and food safety, since the rural areas do not only produce for themselves, but also for the cities.

Also, pursuant to Article 20 para.1 of Law No. 2003/003 of April 21st 2003 on plant protection, any person wishing to carry out phytosanitary treatments in a professional capacity, must first be approved by the competent authority. Being registered is therefore a legal obligation for anyone wishing to pursue a professional activity in the sector of pesticides.

According to the Ministry of Small and Medium Sized Enterprises, Social Economy and Handicrafts (2008), people wishing to market these products must submit a file including:

- a stamped application at the current rate;
- a legalized information sheet;
- a diploma or certificate issued by an approved agricultural training institution;
- an attestation of presentation of the original of the diploma or the attestation signed by a competent authority (Diploma of agricultural technician at least);
- a curriculum vitae;
- an authenticated copy of a contract with the supplier of the product for distribution;
- a legal commitment to respect the phytosanitary legislation and regulations in force;

- a record of the premises written and signed by a sworn agent of phytosanitary protection with territorial jurisdiction;
- an employment contract linking the owner to the employees and legalized at a competent territorial labor inspectorate.

At the institutional level, the Ministry of Agriculture and Rural Development which ensures the development, implementation and evaluation of the Government's policy in the fields of agriculture and rural development is the institution in charge of phytosanitary control in Cameroon. It ensures the management of pesticides both at the central level through the Directorate of Regulation and Quality Control of Inputs and Agricultural Products and the Directorate of Agricultural Development, including the Sub-Directorate of Phytosanitary Interventions. At the level of public services, in each region of Cameroon, there is a phytosanitary database and a regional control service. The Ministry of Agriculture and Rural Development also has 29 phytosanitary police stations generally established at the countries' borders. Finally, the Ministry of Agriculture and Rural Development heads the National Commission for the Registration of Pesticides for Agricultural Use. This commission brings together numerous Ministries including the Ministry of Scientific Research and Innovation, the Ministry of Public Health, the Ministry of Finance, the Ministry of Livestock, Fisheries and Animal Industries, the Ministry of Environment, Nature Protection and Sustainable Development, the Ministry of Justice, the Ministry of Transport and representatives of the phytosanitary industry, agribusiness sector, producers' organizations, phytosanitary and sanitation companies and professional exporters of agricultural products.

Internationally, Cameroon is a member of several phytosanitary protection institutions and platforms such as the Interafrican Phytosanitary Council (IPC) and the Pesticides Committee of Central Africa (PCCA). Despite the existence of this important legal and institutional framework both nationally and internationally, trade in pesticides in Cameroon is generally performed outside the regulatory framework.

3.3 Trade in Pesticides outside the Regulatory Framework

"*More than 50% of the imports of pesticides in Cameroon escape the control of the licensed importers. This market, currently worth about CFAF 15 billion for imports and a little over CFAF 20 billion within distribution, remains dangerously plagued by scourges such as fraud, smuggling, as well as direct imports by large local agricultural companies* (Note 1)". Despite the existing legal framework, we note the emergence of counterfeiting in the sector of pesticides. Indeed, this sector "*faces constraints such as delivery of distribution licenses to amateurs, counterfeiting, and administrative operators' harassment in the formal sector while those in the informal sector are free from any constraint* (Note 2)". Also, "*over the past five years, counterfeiting and illegal trade in the pesticide sector has doubled its market share, and represents almost 25% of the supply today* (Note 3)". It shall be noted that this sector is so open and sometimes escapes the authorities in charge of its control. There is therefore a fierce competition, especially in rural areas where "*when ministerial decrees are made public on the*

ban of some pesticides, farmers are still not informed (Note 4)".

Some banned pesticides even when well known by the farmers are still sold and distributed. This is because the forbidden products are more satisfying to the farmer in terms of results. For example we have "gramoxone" a herbicide of massive destruction of vegetation. Its inconvenience relies on the fact that even important plants for soil fertility and microorganisms are destroyed and require more than the necessary time lapse to recolonise the same spot. Meanwhile, farmers' greatest will is to eradicate weeds from their crops. This explains the increasing demand of such a product even though banned many years ago.

In Northern Bafou, out of the 16 vendors of pesticides regularly listed, only 05 are approved by the Ministry of Agriculture and Rural Development. In addition to these unauthorized salesmen, there is a large number of hawkers and sellers on makeshift stands (Figure 5).

Figure 5. Places of Supply of Pesticides by Farmers

Figure 5 shows a variety of pesticides, displayed on a table waiting for potential buyers. Most traders have never received any training in this domain. Some former food traders have simply converted to merchants of pesticides (Figure 6).

Figure 6. Agri-Food Shop Converted into a Sales Point for Pesticides

3.4 The Use of Pesticides in Connection with the Approval

Table 1. Approval and Use of Some Pesticides in Northern Bafou

Types pesticides	Names of product	Authorized use	Use by farmers
Herbicides	ROUND UP 360 SL	Oil palm	Various crops
	ACTION 80 DF	Cotton	Leeks
	GLYPHADER 500	Various cotton pests	Irish potatoes
	LADABA 480 SL	Oil palm	Market garden crops
	ALMOXONE SUPER	Oil palm and Cocoa	Various crops
	PARACOT SUPER	Oil palm	Market garden crops
	SUPER MACHETTE 88 WG	Oil palm	Various crops
Insecticides	CYPERCOT	Cotton	Various crops
	EAGROWKILL	Coffee	Tomatoes
	PYRIFORCE	Coffee	Irish potatoes
	SUPERCOT 35 EC	Cocoa	Various crops
	BAOBAB	Banana/plantain	Irish potatoes
	BALEAR	Banana/plantain	Market garden crops,

			vegetables and fruits
Fongicides	TRIMANEB	Market garden crops	Market garden crops
	APROMIL 72	Cocoa	Various crops
	BANKO 720 SC	Banana/plantain	Irish potatoes and cabbage
	TROPIK	Banana/plantain	Various crops
	EAGROWCARE 720 WP	Cocoa	Market garden crops
	NORDOX SUPER 75 WP	Cocoa	Food crops
	RIDOMIL GOLD PLUS 66 WP	Cocoa	Market garden crops
	CALLOMILLE PLUS	Cocoa	Various crops
	TALONYL	Banana/plantain	Market garden crops

Each type of crop has a range of recommended pesticides. It is strictly forbidden for farmers to use a product on speculations others than those for which it has been approved. But in practice, the farmers of Northern Bafou create combinations. For example, an herbicide such as ACTION 80 DF for cotton is used to treat leeks and other market garden products. PYRIFORCE, an insecticide for coffee processing is also applied to vegetable crops (Table 2). They justify this by past success stories, others even formulate mixtures themselves without being aware of the dangers they might incur which generally lead to powder inhalation, cough and most especially eye irritation and skin burns.

It can be seen from Table 2 that farmers in Northern Bafou do not actually use all the pesticides for the purpose indicated by the registration and instructions for use. We find products recommended for either cocoa, oil palm, banana, cotton and coffee, used by farmers for the cultivation of market garden products and fruit. Far from being simple isolated actions and little thought, these behaviors demonstrate above all, a calculation of interest for the peasants who are supplied, in many cases, on the black market where they acquire products with close expiry dates or that have already expired. In their defense, some farmers put forward the argument that pesticides intended for market garden crops are not only expensive but also ineffective against the forms of resistance developed by pests. Also, some farmers think the resistances of pathologies force other farmers to diversify treatments, and when their crops are “saved (Note 5)”, they do not know which of the pesticides they used produced the desired effect on plants.

3.5 Alternatives to an Adequate Management of Pesticides for a Sustainable Development of Agriculture

3.5.1 Towards Less Polluting Pesticides

The regulation on the circulation of pesticides has a great influence on the competitiveness of the Cameroonian agricultural sector. Restricting import of high polluting pesticides to those with the least pollutants through effective subsidy mechanisms could make them more competitive and reduce or even eliminate the use of dangerous pesticides. It is certainly true that the import of foodstuffs from

foreign countries with heavy pesticide usage should be prohibited on the national territory. For this, the large gap between the number of pesticides allowed in Cameroon and those of other countries should be avoided.

3.5.2 Promotion of Organic Farming

The challenges of the implementation of organic farming in Cameroon are increasingly being felt. Northern Bafou as one of the main agricultural basins of the Western Highlands in Cameroon is not left out. If for the moment the techniques seem not to be very effective for the treatment of a variety of harmful pests that ravage crops, it is worth the trouble to continue the struggle, as precise examples of success in other countries (France, China, Canada, etc.) are very illustrative. The constraint will be to apply similar techniques that allow large-scale production for market needs. the general objective is to obtain a better life quality with less negative effects on the environment. It is possible to develop large-scale organic production by teaching all the biologically possible alternative solutions in schools and training centers and through massive training for young farmers.

The control of porous boundaries as between Nigeria and Cameroon which runs from the north to the South shall be enhanced. Most of the pesticides that circulate here are not checked upon at the custom level or other control points to ensure they are legal or not. Hence, such areas should benefit from more vigilance on the verification of the goods transiting into Cameroon.

Existing laws and actions to address the problem of pesticide residues are important, but not sufficient. The major concern in our context lies much more in the effectiveness of the laws adopted. The penalties set out in Articles 33 to 36 of the 2003 law are quite severe for the rural population, but the ignorance of the latter and the poor application by the prosecution authorities favor the pollution of spaces and food products, thereby exposing the health of consumers to various pathologies.

4. Conclusion

Farms in Sub-Saharan Africa today face tough real estate, technical and environmental realities. Farmers through their unorthodox practices in pesticide management have a significant responsibility in the progressive degradation of the environment. An overview of the distribution and use of pesticides in Northern Bafou leads us to confirm our initial hypothesis, which postulated that the marketing of pesticides, outside the legal frameworks is at the origin of the generalization of their access and disproportionate use by farmers in Northern Bafou. Through this study, it is noted that Cameroon has put in place a legal framework for the approval, management and marketing of pesticides. However, many practices of storage, marketing and use of these products are developing in Northern Bafou out of the existing legal framework. It is becoming essential not only to set up alternatives to the reasoned management of pesticides for a sustainable development of agriculture but also to question the health and environmental impact of phytosanitary practices in this locality, today considered as one of the largest food crop production basins in Western Cameroon.

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Notes

Note 1. https://fr.allafrica.com/stories/200702210988.html

Note 2. Henri Fosso, President of Croplife Cameroun (association bringing together the operators of the health products sector in Cameroon). https://www.investiraucameroun.com/agriculture/1204-4115-les-fabricants-et-distributeurs-de-produits-phytosanitaires-aux-aboi

Note 3. https://www.237online.com/article-23626-25--de-faux-produits-phytosanitaires-recenses-au-cameroun.html

Note 4. https://www.voaafrique.com/a/des-produits-dangereux-pour-la-sante-des-agriculteurs-et-consommateurs-au-cameroun/3862020.html

Note 5. Term used by farmers to mean the phytosanitary treatment of their crop in case of strong attack by diseases, insects and fungi.