

## IPEN AFRICA HHPs PROJECT – Toxics-Free SDGs Cameroon Country Situation Report on HHPs

*Aligned to the IPEN Strategy to phase out HHPs in Africa, this report documents the list of HHPs registered and being used in Cameroon using Pesticide Action Network's HHPs criteria, in addition to the Food & Agriculture Organization (FAO) – World Health Organization (WHO) criteria in the definition and identification of HHPs; the list of pesticides homologated for importation and use in Cameroon; and the pesticide registration process. It also highlights cases of health and environmental impacts by HHPs, and flags existing opportunities to phase-out or ban HHPs and promote agroecology in Cameroon.*

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CREPD



**“Cameroon’s national development strategy, when forging a wise pathway towards sustainable agriculture as a driver for its emerging economy, should consider phasing-out highly hazardous pesticides”**

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## Acronyms and Abbreviations

FAO	Food and Agriculture Organization of the United Nations
CEMAC	Central African Economic and Monetary Community
CNHPCAT	National Commission of Pesticide Registration and Certification of Sprayers
CREPD	Centre de Recherche et d'Education pour le Développement
DNA	Designated National Authority
DSCE	Strategic Document for Growth and Employment/Document de Strategy pour la Croissance et l'Emploi
FCFA	African Financial Community Franc/ Franc Communauté Financière Africaine
GDP	Gross Domestic Product
GEF	Global Environment Facility
HHPs	Highly Hazardous Pesticides
IPEN	International POPs Elimination Network
IPM	Integrated Pest Management
IRAD	Institute of Agricultural Research for Development/Institute de Recherche Agricole pour le Développement
MINADER	Ministry of Agriculture and Rural Development
MINEPDED	Ministry of Environment, Protection of Nature and Sustainable Development
MINEPIA	Ministry of Livestock, Fisheries and Animal Industries
MINFI	Ministry of Finance
MINRESI	Ministry of Scientific Research and Innovation
PAN	Pesticide Action Network
POPs	Persistent Organic Pollutants
SAICM	Strategic Approach to International Chemicals Management
UNEP	United Nations Environment Programme (UN Environment)
WHO	World Health Organization

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## 1. Introduction

Highly Hazardous Pesticides (HHPs) are synthetic chemicals used to control pests in agriculture and for public health. HHPs pose serious threats to human health and the environment, with significant impacts economies in developing and transition countries with less resources, training and capacities to deal with them. For these reasons and others, HHPs are a topic of global concern that needs global response. Many international initiatives are currently ongoing to address the global concern posed by HHPs, including the FAO/UNEP/WHO strategy towards the reduction of HHPs, which is the one on which this work is grounded. This strategy consists of the four components:

- Awareness raising
- Identification of HHPs
- Capacity building in government
- Piloting and mainstreaming alternatives

To support this strategy, IPEN developed a global strategy to phase out HHPs that is further subdivided into regional strategies (African strategy, Latin American strategy, etc.) that promote agroecological alternatives to synthetic HHPs. IPEN believes that phase out of HHPs and the promotion of agroecological alternatives is consistent with and would contribute to the United Nations' Sustainable Development Goals (SDGs) call for, inter alia, efforts to promote sustainable agriculture (goal 2), healthy lives and well-being (goal 3), sustainable management of water (goal 6), decent work (goal 8), and the sustainable use of terrestrial ecosystems and halt of biodiversity loss (goal 15). In each of these goals, a call for a reduction in the use of highly hazardous pesticides would make a significant contribution by reducing exposure to these pesticides, and the related adverse impacts on health and the environment.

### 1.1 General overview of the country and its agriculture activities

In Cameroon, agriculture is regarded as the engine of the country's economy, accounting for 23.6% of GDP in 2012, and enrolls about 62% of the active population. Agriculture and mining are the two main immediate assets identified in the national strategic development document (DSCE) as drivers to transition from a developing economy to an emerging economy by 2030. For this end, the strategic document recommends special attention on the development of intensive agriculture with the speculation that it can generate growth and jobs.

### 1.2 Main crops produced in the country

The main crops produced in Cameroon comprise cacao, coffee, cotton, bananas, tomatoes, plantain, potatoes, pineapples, papayas, corn, soya beans, beans, sugar cane, rice, carrot, cabbage, various other vegetables and leguminous plants, etc. A lot of pesticides are currently used on these crops

and the government strategy to shift towards intensive agriculture infers an exponential increase in the use of pesticides. Cameroon's climatic conditions are conducive to the proliferation of pre- and post-harvest pests and diseases. This causes annual crop losses in excess of 40%. To control these pests, Cameroon imports an estimate of 25,000 tons of solid pesticides, and 3,000,000 litres of liquid pesticides annually that represents about FCFA 12.5 billion (USD 12 billion) every year. The table below indicates the main crops for which pesticides in the current list of registered pesticides (homologated) in Cameroon are to be used.

Table: List of crops for which the registered pesticides in Cameroon are used

<b>Number</b>	<b>Crops</b>	<b>Number of pesticides registered</b>
1	Pineapple	05
2	Banana and Plantain	85
3	Cocoa	102
4	Coffee	25
5	Sugar cane	45
6	Carrot	02
7	Cabbage	02
8	Tomato	113
9	leguminous plants and fruit trees	07
10	Corn	41
11	Palm oil tree	75
12	Rice	12
13	Soya beans	02
14	Cotton	112
15	Rubber tree (Hevea)	09
16	Storage of food stuffs	12

For each use, the regulator indicated the dose, and restricted conditions of use when applicable; unfortunately, the practices on the field show that farmers do not follow these indications. All the pesticides registered are of free sale, including those specified to be used only by professional or trained applicators. A considerable proportion of registered pesticides fall in WHO classes Ia and Ib acute toxicity classification criteria; and the majority belongs to classes II and III. Some pesticides and pesticides formulations of classes II and III might be or might contain highly hazardous

pesticides (HHPs) using the criteria established by the FAO/WHO Joint Meeting on Pesticide Management (JMPM) in 2008<sup>12</sup> and the Pesticide Action Network (PAN) criteria.

The JMPM recommended that highly hazardous pesticides should be defined as having one or more of the following characteristics:

- Pesticide formulations that meet the criteria of classes Ia or Ib of the WHO Recommended Classification of Pesticides by Hazard; or
- Pesticide active ingredients and their formulations that meet the criteria of carcinogenicity Categories 1A and 1B of the Globally Harmonized System on Classification and Labelling of Chemicals (GHS); or
- Pesticide active ingredients and their formulations that meet the criteria of mutagenicity Categories 1A and 1B of the Globally Harmonized System on Classification and Labelling of Chemicals (GHS); or
- Pesticide active ingredients and their formulations that meet the criteria of reproductive toxicity Categories 1A and 1B of the Globally Harmonized System on Classification and Labelling of Chemicals (GHS); or
- Pesticide active ingredients listed by the Stockholm Convention in its Annexes A and B, and those meeting all the criteria in paragraph 1 of Annex D of the Convention; or
- Pesticide active ingredients and formulations listed by the Rotterdam Convention in its Annex III; or
- Pesticides listed under the Montreal Protocol; or
- Pesticide active ingredients and formulations that have shown a high incidence of severe or irreversible adverse effects on human health or the environment.

The PAN builds on the JMPM criteria for HHPs to develop a more comprehensive set of hazard criteria, which is used by recognised authorities, such as the EU and the US Environmental Protection Agency (EPA). It also aims to develop a list of HHP active ingredients based on these selected criteria to provide a basis for action to implement the progressive ban of highly hazardous pesticides and replace them with safer, agro-ecological and other appropriate non-chemical alternatives.

### 1.3 National pesticide registration and control policy framework

Cameroon pesticide registration (homologation) and control policy framework is controlled by the Prime Minister's Decree N° 2005/0772/PM of 6 April 2005, on registration and protection of phytosanitary products in line with the national constitution stipulating in its preamble that every

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<sup>1</sup> <http://www.fao.org/agriculture/crops/core-themes/theme/pests/code/hhp/en/>

<sup>2</sup> SAICM/RM/Afr.5/INF/14

citizen has the right for a safe environment, and on the Law N° 2003/003 of 21<sup>st</sup> April 2003 on phytosanitary protection and its subsequent Decrees and Orders.

The pesticides registration (homologation) process itself encompasses the following steps as set out in the Prime Minister's Decree N° 2005/0772/PM of 6 April 2005, on registration and protection of phytosanitary products:

- a. Chemical analyses done by an accredited national laboratory or in recognized foreign laboratory on a sample taken from the pesticide targeted for registration;
- b. Tests of bio efficacy done by a research institute on the uses indicated on the product during one (1) to two (2) agricultural cycles for:
  - i. News phytosanitary products;
  - ii. Extension of registration (homologation) of an already registered phytosanitary product to control pests other than those for which it was previously registered.
- c. Pulverisation tests during at least one (1) agricultural cycle, done by the Service of Crop Protection of the ministry in charge of agriculture, if the test on bio efficacy was positive.
- d. Joint bio efficacy and pulverisation tests during at least one (1) agricultural cycle for:
  - i. Phytosanitary products with well-known and registered active ingredient(s), but presented under a different formulation;
  - ii. New products that tested positive in bio efficacy tests during the first experimental year;
  - iii. The modification of a known commercial speciality or concentration of active ingredients in a given commercial speciality.

The national commission of pesticides registration and certification of sprayers holds 02 (two) ordinary sections per year; but extraordinary sessions can be convened as deemed necessary. Registered pesticide validity is 05 (five) years renewable by tacit renewal 01 (one time).

#### 1.4 Authorities responsible for the registration of pesticides, role of different Ministries in the country

At the national level, the authority responsible for the registration is the National Registration Commission of Phytosanitary Products and Certification of Sprayers (CNHPCAT) established in 1996. It is an inter-ministerial body comprised of the representatives of the ministries in charge of Environment, Health, Research, Transport, Finance, Livestock, Trade, and Mine and Water. The CNHPCAT is responsible for ruling on pesticides registration applications and giving its opinions on the restriction and use of phytosanitary products in Cameroon. A second body created in 2006 called the National Phytosanitary Council (CNP) is a multistakeholder body comprised of experts from relevant government ministries, the pesticides industry, farmers, trade unions, sprayer companies, exporters of agriproducts, NGOs and consumer associations that is nominally



responsible for coordinating all pesticide management activities in the country, but it is not yet functional, and has never met.

In terms of ministerial responsibilities, since 2005, the Ministry of Agriculture and Rural Development (MINADER) is responsible for pesticide management, through its technical agency Sub-Office for the Regulation of Pesticides, Fertilizers and Application Equipment (SDRP) and the National Laboratory for the Analysis of Agricultural Products and Inputs. Operationally, the government has established 10 Provincial Inputs and Agricultural Products Control Services and 10 Provincial Phytosanitary Bases with members from the Departmental Phytosanitary Brigades; as well as 32 Phytosanitary Police border posts (airports and road). Cooperation between customs border agents and Phytosanitary Police is ineffective, leading to gaps in border control and poor information exchange. The Ministry structure includes 80 sworn-in Phytosanitary Inspectors and Phytosanitary Controllers, although many of these have retired or are not actually sworn in.

The Ministry of Environment, Nature Conservation and Sustainable Development (MINEPDED) is responsible for the implementation of Cameroon's national waste management strategy, which aims to enhance the living conditions of the population through: implementing efficient waste management through better collection in urban areas; the promotion of appropriate methods of waste processing and recycling and beneficiation; management of hazardous wastes produced by the households, medical facilities and the private sector; promotion of incentives to spur voluntary stakeholders' commitments to efficient waste management; and strengthening of international cooperation in the management of trans-boundary movements of hazardous wastes.

The Ministry of Health (MoH) is responsible for management of pesticides used in public health (vector control and domestic hygiene), and, following a WHO-Gates Foundation-supported initiative in 2008, established a Steering Committee and National Strategy for Integrated Management of Pesticides Used in Public Health in Cameroon (June 2013). Many of the seven axes of this strategy align closely with the proposed project outputs (including legislation, behaviour change communication, stakeholder engagement, capacity building, and post-registration control). The new MOH organogram established by Decree N°2013/093 in 2013 gives responsibility for registration of public health pesticides to a new unit, the Health Promotion Unit in the Environmental Hygiene service; MOH is also represented on the national pesticide registration committee mentioned above. In terms of post-registration control, a Ministerial Decision in 2012 established decentralised Regional Centres for Prevention and Control of Epidemics (CRPLE), which are responsible for some aspects of control, monitoring and distribution of public health pesticides. There is one Poison Centre and some health statistics are maintained on intoxications.

The Ministry of Scientific Research and Technological Innovation (MINRESI) is responsible for scientific research undertaken by scientists at the Institute of Agricultural Research for Development (IRAD).

The Ministry of Livestock, Fisheries and Animal Industries (MINEPIA) is in charge of animal diseases prevention and sanitary protection, and promotion of good practices in pesticides uses to prevent the risks inherent to their uncontrolled uses.

The Ministry of Finance, through its Division of Customs, is in charge of the control of the importation of only registered pesticides at the Cameroon borders.

### 1.5 International chemical conventions the country ratified and the name of the Designated National Authority (DNA) for each convention, and a focal person for SAICM

At the international level, Cameroon ratified the three following Conventions: Rotterdam (May 20, 2002), Basel (February 9, 2001) and Stockholm (May 19, 2009). It is also contributing to the Strategic Approach for the International Chemical Management (SAICM) since its adoption in 2006.

At the sub-regional level, Cameroon is a member of the Common Regulation Binding the Homologation of Pesticides in Central Africa (CEMAC, 2006). This is a common, regional pesticide registration scheme for the six members states of CEMAC that is intended to replace the national registration schemes, when applicable (in fact, in the sub region, only Cameroon has had a well-established pesticides registration in place since 2005). The executive body of the Common Regulation is the Central African Inter-state Pesticides Committee (CPAC), has its secretariat in Yaoundé, Cameroon, and is in the process of building technical and administrative capacity. To date, CPAC held two pesticide registration sessions (last on May 9<sup>th</sup>, 2017) during which five (5) pesticides (almost all of them HHPs) were registered at the community level. Cameroon continues to hold its own national pesticides registration process.

## 2. Status of pesticide use in the country

### 2.1 The list of nationally registered pesticides

There are currently about 421 pesticides registered (homologated) in Cameroon to control pests on crops and woods and for public health uses. The full list is attached as annex 1 to this report.

### 2.2 The list of HHPs amongst the list of nationally registered pesticides

In order to produce this report about Cameroon's situation on HHPs, we used the PAN International List of Highly Hazardous Pesticides (HHPs) March 2018; the 2018 list of registered pesticides in Cameroon developed by the National Registration Commission of Phytosanitary Products and Certification of Sprayers, an inter-ministerial body established in 1996 responsible for import/registration of pesticides in Cameroon; the FAO project document materials and activity

reports; and the International Code of Conduct on Pesticide Management - Guidelines on Highly Hazardous Pesticides (FAO & WHO). We exchanged emails, correspondences, phone calls, and held a few face-to-face meetings with officers from the Ministry of Agriculture, and pesticides industry or distributor representatives.

According to the WHO classification, the determination of an active ingredient (a.i) as belonging to a particular class (Ia, Ib, II, III, U) depends on the amount of that a.i in the final formulation. In this reasoning WHO does not regard a diluted hazardous product as still hazardous. The JMPM criteria for HHPs follows this approach, too.

PAN has taken a different approach on the ground that even a diluted highly hazardous pesticide (as in a formulation) is still highly hazardous. In this study, we have used the PAN classification methodology for HHPs by including all active ingredients that are WHO Class 1a or 1b regardless of the strength of any formulation. Part of the decision to do this was because of the presence of unknown adjuvants in the formulations which may increase toxicity, as POEA does with glyphosate in Roundup formulations (see the introductory notes to the PAN List).

The PAN List of HHPs was re-tabulated into an excel sheet to facilitate the comparison with the list of registered pesticides in Cameroon. Comparison was done by using the search option in the excel menu of the PAN HHPs re-tabulated list to search for each pesticide included in the list of registered pesticides in Cameroon. The list of HHPs amongst the list of nationally registered pesticides based on PAN criteria is shown in table 2 below.

### 2.2.1 Active ingredients

The table below contains the list of 46 HHPs' actives ingredients (a.i) found in the list of pesticides registered in Cameroon in 2018.

**Table 1: List of active ingredients in HHPs registered in Cameroon based on PAN criteria (Version of March 2018) (details in Annex 1)**

	<b><i>Active ingredients (a.i)</i></b>
1	Abamectine
2	Aluminium phosphide
3	Atrazine
4	Brodifacoum
5	Bromodiolone
6	Cadusafos
7	Chlorantraniprole
8	Chlorpyrifos-Ethyl
9	Chlorpyriphos /Chlorpyriphos-ethyl
10	Cypermthrin
11	Emamectin benzoate
12	Ethoprophos
13	Fipronil
14	Flocoumafen
15	Glufosinate-Ammonium
16	Glyphosate
17	Imiprothrin
18	Indoxacarbe
19	Ioxynil
20	Lambda-cyhalothrin
21	Linuron
22	Lufenuron
23	Malathion
24	Mancozeb
25	Metribuzine
26	Oxamyl
27	Paraquat
28	Pendimethaline
29	Phenamiphos
30	Pirimiphos-methyl
31	Prallethrin
32	Temephos
33	Terbufos
34	Terbutryn
35	Tetramethrine
36	Thiacloprid
37	Thiamethoxam
38	Thiodicarb

39	Triadimenol
40	Triazophos

### 2.2.2 Crops using HHPs

The list of crops that HHPs are used on was derived from the information contained in the table containing the list of registered pesticides in Cameroon. These crops are shown in the table 2 below:

Table 2: List of crops using HHPs

	Type of crop on which HHPs are used in Cameroon	Example of HHP used per crop
1	Banana and Plantain	Abamectine
2	Cocoa	Thiamethoxam
3	Coffee	Chlorpyrifos
4	Sugar cane	Ioxynil
5	Carrot	Linuron
6	Cabbage	Beta-Cypermethrin
7	Tomato	Mancozeb
8	leguminous plants and fruit trees	Pendimethaline
9	Corn	Atrazine
10	Palm tree	Glyphosate
11	Rice	Pendimethaline
12	Cotton	Beta-Cypermétrine
13	Storage of food stuffs	Aluminium Phosphide

### 2.3 General data on the volume of use of HHPs for agriculture

There are no records on the volume of use of HHPs for agriculture in Cameroon.

### 2.4 General data on the volume of use of HHPs for non-agriculture (household and public health) purposes

There are no records on the volume of use of HHPs for household and public health in Cameroon.

### 2.5 List of HHPs banned in other countries but in use in the country

Glyphosate-based formulations are banned in France, but are still used in Cameroon.

Atrazine is banned in France, but still registered and used in Cameroon.

## 2.6 Human health and environmental impacts of HHPs in the nation

From the rare documentation existing on the human health and environmental impacts of HHPs in Cameroon and known but undocumented cases of pesticides poisoning/fatalities, Roundup (glyphosate-based herbicide), Gramoxone (paraquat-based herbicide) and Atrazine appear as the most incriminated pesticides based on their impacts on farmer health through the following exposure routes: cutaneous, inhalation, ingestion and eye contact (Pouokam and others, 2017). Mocap (an ethoprophos-based pesticide formulation) killed two children that used the abandoned empty containers to keep their food. There are probably many other cases that went unrecorded.

## 2.7 National provisions to phase out HHPs, ban pesticides and deregister the already registered pesticides

The specific national provisions to phase out HHPs, ban pesticides and deregister the already registered pesticides are set out in the Prime Minister's Decree N° 2005/0772/PM of 6 April 2005, on registration and protection of phytosanitary products.

Cancellation (periodically or permanently) of registration is achieved through an ordinance signed by the Minister in Charge of Agriculture or its Deputy Minister (the Chair Persons of the commission) based on the recommendation from the national commission of pesticides registration and certification of sprayers, or recommendation from an expert group within the Division of Pesticides Regulation and Quality Control. The reasons for which recommendations for registration cancellation have been made vary and are not exclusively based on health and environmental consequences, but on economic interests. For instance, in 2015, further registration of glyphosate-based, malathion-based and diazinon-based pesticides were temporarily cancelled due to the fact that there were many formulations with glyphosate, malathion and diazinon active ingredients already registered in Cameroon. Note that in the same year, France banned the registration of about 135 glyphosate-based pesticides formulations for their adverse environmental impacts.

## 2.8 Companies/associations representing the pesticide industry in the country

The list of the main companies importing pesticides in Cameroon was obtained from the representative of the pesticides industry in Cameroon (GM of CropLife Cameroon) upon request after we explained the project and its expected outcomes. The approximated declared quantities or volumes of pesticides imported in 2017 by each importer is also shown on the list (see table 3 below).

Table 3: List of pesticides importing companies in Cameroon (2017)

	<b>Pesticides importing companies in Cameroon</b>	<b>Declared volumes (L/KG)</b>	<b>Tonnes</b>
1	LOUIS DREYFUS COMMODITIES	5257694	5258
2	ARYSTA LIFESCIENCE CAMEROUN	3444913	3445
3	KESAI EAGROW CAMEROUN SARL	3033845	3034
4	AFCOTT CAMEROUN SARL	1998273	1998
5	JACO S.A.	1177943	1178
6	HORIZON PHYTO PLUS	993557	994
7	FIMEX INTERNATIONAL S.A	726321	726
8	VELIA SARL	603475	603
9	AGROCHEM SARL AC	520117	520
10	HOLLAND FARMING CAMEROUN SARL	258800	259
11	AGROMAF CROP PROTECTION SARL	236310	236
12	SINOCAM SARL	189180	189
13	AGROPRO SARL	186215	186
14	PHYTOGRAINES-CAMEROUN SARL	184800	185
15	VOLCAGRO SARL	125815	126
16	AGRI-SHOP SARL	118200	118
17	GROUPE KOBYCAM	111096	111
18	PHYTOCHIM-CAMEROUN	100000	100
19	GRENIER DU MONDE RURAL	92340	92
20	SIACA SARL	78800	79
21	SOCIETE DE DEVELOPPEMENT AGRONOMIQUE CAMEROUN	74160	74
22	FOLIVERT SARL	61920	62
23	SOPIA-CAMEROUN	39000	39
24	THE FARMERS HOUSE LTD	35000	35
25	AGRO BUSINESS COMPANY SARL	31468	31
26	SEMAGRI SARL	6000	6
27	Ets MUSA TOURAY	3902	4
28	SCIERIE DU MBAM	3750	4
29	AFRICAWARE	1500	2
30	ROYAL CHEMICAL S.A	25	0
	<b>Total tonnes of pesticides imported in 2017</b>		<b>19694</b>

Source : CropLife Cameroon

Though it is well known that the use of pesticides in agriculture in Cameroon is low compared to developed countries, the total volume reported here may be underestimated since it is based on declarations made by the importers. But this is already a good basis for information, because in the

Cameroon chemicals profile (2013), the volume of imported pesticides in Cameroon was not determined, due to the lack of data.

### 3. National endeavors to phasing out HHPs

#### 3.1 Projects/programs and campaigns to phase out HHPs

To our knowledge, there is only one project in Cameroon with specific components, activities or aim to phase out of HHPs: the FAO/GEF ongoing project “**Disposal of POPs and obsolete pesticides and strengthening sound pesticide management in Cameroon**” in its component 4 “Promotion of alternatives to conventional pesticides and communication strategy” and output 4.1 “Potential alternatives to POPs and other hazardous pesticides identified.” Though not explicitly mentioned in the project document, one of the tasks towards this output is to develop a list of HHPs in circulation in Cameroon.

CREPD has undertaken several activities on HHPs in Cameroon. In 2011, a rapid survey of pesticides used in the three northern regions of Cameroon showed that 15 percent of them were HHPs (class Ib in WHO’s classification). In 2016, CREPD established a list comprising 14 endosulfan-based pesticide formulations registered in Cameroon and successfully advocated for the termination of their registration by the national registration commission of pesticides through the Focal Point of the Stockholm Convention on POPs. Still in 2016, Ngamo and others (2016) published a list of 09 HHPs in use in Central African Countries (all of them at that time used the list of registered pesticides in Cameroon as reference). In 2018, CREPD carried out a project entitled “**Production durable et formulation de deux plantes aromatiques insecticides alternatives aux pesticides chimiques dangereux /Sustainable production and formulation of two insecticide aromatic plants as alternatives to hazardous chemical pesticides**”.

#### 3.2 Main challenges in the process of campaigning to phase out of HHPs

Within the present project, CREPD has not carried out a campaign for phasing out HHPs in Cameroon. But based on previous experience, the main challenge towards the phase out of HHPs in Cameroon is the identification and recognition of which pesticides in the list of registered pesticides are HHPs apart from those listed in the UN Conventions (Stockholm and Rotterdam). The industry lobbies the national pesticides regulators to just limit themselves on a.i listed in the international conventions as “the main” basis to identify HHPs to be removed from the national registration list if alternatives exist. This poses the serious problem of being selective in using the commonly agreed HHPs criteria.



### 3.3 Recommendations and project ideas that support the national HHPs phase out

- Organize proactive awareness campaigns on HHPs and their health, economic and environmental impacts, targeting pesticides regulators, pesticides users, NGOs, representatives of Development or Aid Agencies (they may have donations or are subsidizing programs on pesticides supply in Cameroon), media and the general public;
- Open a national consultation of stakeholders on the current list of HHPs for its refining and adoption; and
- Develop a national strategy on HHPs phase out.

## 4. Report on alternatives to HHPs

### 4.1 National policy frameworks that support ecosystem approaches as alternatives to synthetic pesticides

#### 4.1.1 National IPM policy framework

To our knowledge, there is no specific national IPM policy framework in Cameroon. However, the Law N° 2003/003 of 21<sup>st</sup> April 2003 on phytosanitary protection has provisions that can be exploited to promote IPM in Cameroon.

#### 4.1.2 National organic agriculture policy framework

To our knowledge, there is no specific national organic agriculture policy framework in Cameroon. Again, the Law N° 2003/003 of 21<sup>st</sup> April 2003 on phytosanitary protection has provisions that can be exploited to promote IPM in Cameroon.

#### 4.1.3 Policy frameworks that support the manufacture, import, distribution and use of bio-pesticides

Understanding biopesticides as bacteria, fungi, viruses, nematodes and plant extracts-based pesticides that can be used for crop protection, the specific national policy framework in Cameroon that can be relevant is the Prime Minister's Decree N° 2005/0772/PM of 6 April 2005 on registration and protection of phytosanitary products, which includes the registration of biopesticides. But the national commission of pesticides registration in Cameroon regretted during our interview that the main issue with the proposition of biopesticide formulations is the lack of

key information like, for example, the dose to be used on the crops. This limits the industrial production of those biopesticides.

## 4.2 National implementation of crop-specific, pest-specific alternatives to HHPs

### 4.2.1 National IPM implementations

To our knowledge, there is no formal national implementation of IPM as alternatives to HHPs. However, within the framework of the FAO/GEF project highlighted earlier in this report, there are propositions of IPM approach for some specific HHPs.

Within the framework of the project “Cameroon - Third Phase of the Community-driven Development Program (PNDP)” funded by the World Bank, it’s recalled that one of the ten operational policies of the World Bank deals with pest control as part of funded projects. The objectives of this policy are to: (i) promote the use of biological or environmental control and reduce dependence on chemical pesticides of synthetic origin; and (ii) strengthen regulatory and institutional capacity to promote and support a pest safe, effective and sustainable control from the environmental point of view. This can be a lever to promote alternatives to the extremely hazardous pesticides.

### 4.2.2 National organic agriculture implementation

To our knowledge, there is no formal national implementation of organic agriculture as alternatives to HHPs. However, within the framework of the FAO/GEF project highlighted earlier in this report, there are propositions of IPM approach for some specific HHPs.

### 4.2.3 Practices based on indigenous knowledge that are being used to replace HHPs

Traditional pest control methods include several techniques and ancestral knowledge. There are some success stories in the use of indigenous knowledge that are recognized as alternatives to some HHPs in crop protection in Cameroon.

Table 4: Traditional knowledge available as alternatives to HHPs

Traditional Knowledge	Techniques or product	Remarks /references
1. Alternatives to terbufos, cadusafos, ethoprophos, oxamyl and phenamiphos used against nematodes on banana tree		
Preparation of shoots before planting	Soak the shoots in a hot water 52-55°C for 15-27 minutes	Realised in Cameroon by IRAD/PNVRA
Products self made in the farms	Biomass ashes to be spread periodically around the crop	Implemented in Cameroon
	Soak the shoots in neem oil	Tested by research
	Soak the shoots in the decoction of <i>Chromolenaodorata</i> leaves, before planting	Tested by research
	Soak the shoots in the decoction of <i>Carica papaya</i> leaves, before planting	Tested by research
	Soak the shoots in the decoction of <i>Alium sativum</i> leaves, before planting	Tested by research
	Spread powder from the leaves of neem or from nut crabs periodically around the crop	Brasil and Yagoua by the University of Maroua
Farming history	Crop rotation 1 to 2 years with crops with less susceptibility to nematodes (for instance: Brassicaceae, pineapples, sesame, peas, certain varieties of sugar cane)	
2. Alternatives to cadusaphos and Aluminium phosphides (HHPs active ingredient) used against weevils for conservation of dry corn grains		
	<i>Eucalyptus grandis</i> leaf powders at 20 g per 2 kg	Tested in Cameroon
	Powder of aromatic <i>Occimumgratissimum</i> plant	Tested in Cameroon
	Powder or essential oil of <i>C. ambrosioides</i>	Tested in Cameroon
Local plants with pesticide characteristics	Parasitoïd : <i>Dinarmusbasalis</i> ; <i>Anisopteromaluscalandrae</i> ; <i>Eupelmussp</i>	Ngaoundere University, Cameroon
3. Alternatives to flocoumaphen and brodifacoum used against rodents on corn grains and others		
Good storage practices	<ul style="list-style-type: none"> <li>▪ Elimination of all residues from the previous storage;</li> <li>▪ Build crop storage reservoir and keep it in safe place in the compound;</li> <li>▪ Exposure to the sun: exposure of food, thin, intense solar radiation promotes the departure of adults who can't stand the heat or intense light (in stock, insects are confined often in dark areas);</li> <li>▪ Smoking: is to store the grain on the cob above homes. Standing smoking (sometimes wrongly called fumigation) does not kill insects but removes them and prevents re-infestation;</li> <li>▪ Use of repellent plants: in some areas it is common to mix with grain the plants that act as repellents;</li> </ul>	

	<ul style="list-style-type: none"> <li>▪ Use of inert materials: in storage containers in bulk (jars, barrels, granaries) are mixed sometimes with ash or sand, seeds according to the proportions and practices that vary depending on the region of Cameroon. These powdery materials fill the voids between the grains and constitute a barrier to the progress of females seeking the space to lay eggs. These fine materials would also have an abrasive role on the insects and would speed up their dehydration;</li> <li>▪ Conservation in confined atmosphere: It aims to oxygen-impoverish the inter-granul air up to a lethal rate for insects. Buried silo or a 200 litres drum tightly closed are often used.</li> </ul>	
4. Alternatives to oxamyl and ethoprophos (HHPs active ingredients) used against nematodes on tomato		
Crop associations	Sterilisation of the substrat by the heat (sun or other)	
	Association with repulsive plants (garlic, mint, onion, ...) and fertilizing plants (leguminous)	
Products self made in the farms	Powder from the neem grains	
Compost	Healthy manure inputs (compost ...) input to the point of plantation	Recommended by IRAD/PNVRA (MINRESI)
Choice of the farming area	Prefer clay soil and avoid sandy soils; soils rich in organic matters, flat soil with gentle slope, exposed to sun, deep tillage	Recommended by IRAD/PNVRA
Completion operation of the precedent farming period	Destroy quickly (for instance through open burning) all the farming residues and all possible reservoirs, including roots	
5. Alternatives to methomyl, (a.i in HHPs) used against insect ( <i>Tuta</i> , <i>Helicoverpa</i> , ...) on tomato (plant & fruits)		
Product made on the farm	Concoctions extracted from garlic	
	Extract from pepper	
	Biomass ashes	
Crops association	Trap plants in association or on the borders of the cultivated area	
Environment of the plot	Avoid proximity to sensitive crops or crops suspected to be the contamination source or reservoir	
Hygiene of the farm	Removed rotten fruits from the soil and destroy them. Remove plants that are no longer productive.	Recommended by IRAD/PNVRA

### 4.3 National initiatives in agroecology implementation

#### 4.3.1 Organizations that support and initiate agroecological implementations in the nation

The implementation of agroecology in Cameroon is supported by the Ministry of Agriculture and Rural Development through its division of Promotion of Agriculture (as from our exchange with an expert at the Division of Pesticides Regulation, MINADER).

#### 4.3.2 Main national challenges in the implementation of agroecology in the nation

The main challenge in the implementation of agroecology in Cameroon is the low level of awareness among decision makers who believe that agroecology cannot sustain food sovereignty in the context of increasing population in one hand; and the scientific (understanding of the interactions between biosphere, hydrosphere and soil systems) and cultural barriers among farmers in the other hand.

#### 4.3.3 Recommendations and project ideas emerging from the challenges

- Create awareness among decision makers concerning agroecology, including the promotion of the FAO's document on scaling up agroecology, the PAN document on agroecology, etc.;
- Develop a national strategy on agroecology with SMART indicators;
- Develop pilot small projects on agroecology in all the four agroecologic zones in the country; and
- Promote organic farming by setting performance indicators to achieve in short, medium and long terms.

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# ANNEX 1

List of HHPs (based on PAN criteria) among the pesticides registered in Cameroon (2018)

Pesticides	G1	Group 2:						Group 3:				Group 4:							
	A.T	Long termeffects						Environmentaltoxicity				Conventions							
HHPs by Active Ingredients (a.i)	Toxicology Class (WHO Class Ia and Ib)	EPA carc	IARC carc	EU GHS carc (1A, 1B)	IARC prob carc	EPA prob likelcarc	EU GHS muta (1A, 1B)	EU GHS repro (1A, 1B)	EU EDC (1) or C2 & R2 GHS	max = 1	Very bio acc	Very pers water, soil or sediment	Very toxic to aq. organism	highlytoxicbees	max = 1	Montr Prot	PLC	POP	max = 1
Ethoprophos						x													
Flocoumanfen	Ia							x											
Bromodiolone	Ia							x											
Brodifacoum	Ia							x											
Aluminium phosphide	H330							x											
Terbufos	Ia																		
Abamectine	Ib																		
Cadusafos	Ib										x	x	x						
Phenamiphos	Ib																		
Triazophos	Ib																		
Oxamyl	Ib																		
Fipronil (a.i in formulations)													x						
Thiodicarb (a.i in formulations)						x							x						
Paraquat (a.i in formulations)																x			
Glyphosate (a.i in formulations)					x														
Chlorpyrifos-Ethyl (a.i in formulations)													x						
Pendimethaline (a.i in formulations)										x	x								
Atrazine (a.i in formulations)								x											
Chlorpyriphos /Chlorpyriphos-ethyl (a.i in formulations)													x						
Linuron (a.i in formulations)							x	x	x										
Malathion (a.i in formulations)					x			x											
Indoxacarbe (a.i in formulations)													x						
Lambda-cyhalothrin (a.i in formulations)	H330							x	x				x	x					

