IPEN Toxics-Free SDGs Campaign

Highly Hazardous Pesticides (HHPs) Rwanda Situation Report

ARECO-RWANDA NZIZA

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AHS	Agricultural Household Survey
ARECO	Association Rwandaise des Ecologistes
CASI	Conservation Agriculture-based Sustainable Intensification
CDD	Community Driven Development
CEPAR	Coffee Exporters Processors Association of Rwanda
COMESA	Community and Common Market for Eastern and Southern Africa
EAC	East Africa Community
EDPRS	Economic Development and Poverty Reduction Strategy
EU	European Union
FAO	Food and Agriculture Organization
FDA	Food and Drug Authority
GDP	Gross Domestic Product
HHPs	Highly Hazardous Pesticides
HHs	Households
ICT	Information and Communication Technology
IPAR	Institute of Policy Analysis and Research
IPM	Integrated Pest Management
IPMP	Integrated Pest Management Plan
IPPC	International Plant Protection Convention
LVB	Lake Victoria Basin
LVBC	Lake Victoria Basin Commission
LVEMP	Lake Victoria Environment Management Project

MDG	Millennium Development Goal
MINAGRI	Ministry of Agriculture and Animal Resources
MINICOM	Ministry of Trade and Industry
NGO	Non Governmental Organization
NIP	National Implementation Plan
NISR	National Institute of Statistics of Rwanda
NPPS	National Plant Protection Services
NST	National Strategy for Transformation
OP	Operational Policy
PIC	Prior Informed Consent
PMP	Pest Management Plan
POPs	Persistent Organic Pollutants
PSCU	Project Support and Coordination Unit
PSTA	Strategic Plan for Agriculture Transformation
RAIDA	Rwanda Agriculture Inputs Dealers Association
RALIS	Rwanda Agricultural and Livestock Inspection and Certification Services
RBS	Rwanda Bureau of Standards
REMA	Rwanda Environment Management Authority
RSSP	Rural Sector Support Program
SAP	Strategic Action Programme
SDGs	Sustainable Development Goals
TDA	Transboundary Diagnostic Analysis
UK	United Kingdom
WTO-SPS	World Trade Organization- Sanitary and Phytosanitary

I. Report on pesticides and HHPs

1. Introduction to the country

1.1. General overview of the country and its agriculture activities

Vision 2050 takes Rwanda to high living standards by the middle of the 21st century and high quality livelihoods. The implementation instrument for the remainder of Vision 2020 and for the first four years of Vision 2050 was the National Strategy for Transformation (NST1). NST1 provided the foundation and vehicle towards Vision 2050. Specific priorities and strategies are presented in different pillars. Modernizing and increasing productivity of agriculture and livestock is one of the priority areas of the National Strategy for Transformation 2018-2024 (NST 1, 2017).

Rwanda's agriculture transformation agenda is linked with the successful implementation of the fourth edition of the Strategic Plan for Agriculture Transformation (PSTA 4). In the fiscal year 2018/19 the Ministry of Agriculture and Animal Resources (MINAGRI) promoted economic growth, improvement of livelihoods, and attraction of the private players into the agriculture sector. PSTA 4 sets out ambitious targets to turn around the agriculture sector and transform it into a knowledge-based, value-creating sector that contributes to the national economy and ensures food and nutrition security by 2024 with various interventions in the four priority areas of PSTA 4; namely, (i) Innovation and extension, (ii) Productivity and resilience, (iii) Inclusive markets and value addition and (iv) Enabling environment and responsive institutions. In 2018, the agriculture sector grew by 6% and contributed 29% of the national Gross Domestic Product (GDP) (PSTA 4, 2018). Furthermore, the household food security in the country stands currently at 81.3%, where 42.7% are food secure and 38.6% are marginally food secure. The remaining 17% and 1.7% are, respectively, moderately and severely food insecure. Agriculture sector achievements benefitted from a great contribution of youth and women who participated in various activities towards the agriculture modernization (PSTA 4, 2018).

In order to reduce poverty, Rwanda has expressed the ambition to increase agricultural production. Currently, the country is in the process of replacing subsistence farming by a fully income generating and commercial agricultural sector (NST 1, 2017). Sustainable increases in agricultural performance require farmers to be supported to improve resilience to production, climate, and market risks. Agricultural risks, especially from pest and other diseases but also from erratic rainfall and droughts (particularly in the east), limit national productivity and can have very serious consequences for individual farmers and rural communities (PSTA 4, 2018).

The use of high yielding varieties of crops and intensive input use are expected to contribute to substantial growth of the sector (IPM framework for Rwanda, 2011). However, if pesticide use is not managed properly this may have adverse impacts on human health and the environment. Many intensive agricultural practices depend on the use of broad-spectrum hazardous pesticides

for pest, disease and weed control. Consequences could be adverse effects on the health of the farmers, environmental deterioration and adverse impacts on consumers' health. Misuse and overuse of pesticides may further lead to reduction of agricultural production (e.g. due to increased pest resistance to pesticides or reduction of soil fertility) and poor sustainability of agricultural production in general (IPM framework for Rwanda, 2011).

1.2. Main crops produced in the country

The Rwanda labor market is predominated by agriculture (73 %) (NISR, 2014). In terms of category, food crops include, among others, cereals, pulses, roots, tubers, bananas, vegetables and fruits. Available data shows that food crop production has increased significantly in the country and includes plantains, cassava, beans, rice, maize, sorghum, sweet potatoes, Irish potatoes, wheat and rice. These are the staple foods grown (IPAR Rwanda Report, 2009). According to New Agriculturist, tea and coffee make up the majority of export earnings contributing to 25% and 19% respectively, with quality improving in both sectors. Horticulture crops (avocado, tomato, cabbage), pyrethrum, and animal skins are also exported. Resource-intensive priority crops such as maize, rice and wheat have been readily adopted compared to other crops. The total area under land consolidation has increased by 18-fold from 28,016 hain 2008 to 502,916 ha in 2011. The consolidated production of priority crops brought in a significant increase in yield and food availability. For example, maize production generally increased by 5-fold, wheat and cassava by 3-fold, Irish potato, soybean and beans by 2-fold, while rice increased by 30 % (Kathiresan, 2012). This has, subsequently, caused a paradigm shift from producing subsistence foods to producing surplus for market, which led Rwanda's vision to market-oriented agriculture.

1.3. National pesticide registration and control policy framework

Based on **Ministerial Order no 002/11.30 of 14/07/2016 determining regulations governing agrochemicals** in article 8-15 for registration of agrochemicals**,** any person seeking to register any agrochemical submits to the Registrar a written application for registration of the agrochemical. An applicant that is not a resident in Rwanda applies for registration of an agrochemical through an agent resident in Rwanda. The application form for registration of an agrochemical is prepared by the Advisory Council (Annex 1) along with a dossier component for pesticide registration (Annex 2). Additionally to elements provided for in Article 12 of the Law, the application for registration of an agrochemical is accompanied by: 1) four (4) copies of the label for the agrochemical; 2) two (2) samples of the agrochemical for official testing and evaluation, one of which is delivered to the competent authority responsible for agrochemical testing; 3) proof of related technical knowledge of the applicant with a specialty in agro-chemistry or agronomy or its equivalent; 4) a certified application dosage and prescribed usage of the agrochemical; 5) the manufacture and expiry dates of the agrochemical; 6) re-entry and pre-harvest intervals; 7) corrosive effects of the agrochemical; 8) antidotes and first-aid treatment recommended in case

of accidental poisoning by the agrochemical; and 9) special protective wear required in the use of the agrochemical (Ministerial Order no 002/11.30 of 14/07/2016).

The Registrar, after consulting the Advisory Council, approves the registration of agrochemical(s) and issues the certificate of the registration. The following data are recorded in the register of agrochemicals: (1) the names and composition of the active substance or other substances and the names of agrochemicals; (2) the names of other substances regarded as dangerous under laws of Rwanda or international conventions ratified by Rwanda; and (3) the physio-chemical data concerning the active substance and the agrochemical. The registrar may renew the certificate of registration of the agrochemical in accordance with the provisions of the Law. Any agrochemical dealer may apply for temporary registration of an agrochemical. The Registrar may issue the certificate of temporary registration of agrochemicals.

The Registrar, after consulting the Advisory Council, may issue a certificate of provisional registration of an agrochemical, in a period of fifteen (15) days from the date the applicant submitted the application form and after the applicant pays a provisional registration fee of ten thousand Rwandan francs (10.000 Rwf). The registrar may reject any application for registration of an agrochemical if: (1) the application for registration or the label of the chemical does not comply with the Law or the Order; (2) the information the applicant provides to the Advisory Council is not sufficient to enable the agrochemical to be assessed and evaluated; (3) the use of the agrochemical would lead to an unacceptable risk or harm to things for which the agrochemical is intended to be used, public health, plants, animals or to the environment. Note that all the formats of application for registration of agrochemical are specified by the Advisory Council (Ministerial Order no 002/11.30 of 14/07/2016).

The review of regulations on pesticides use in Rwanda has shown that pesticide regulations are articulated in a legal framework having a root from the 'National Constitution' and building on international and regional conventions, protocols, treaties and agreements on the regulation of the use of pesticides by partnering countries. Therefore, policies and regulations on pesticides are directly connected to the Rwanda environment and climate change policy under implementation.

Pesticide regulations in place in Rwanda have undergone scrutiny and thorough analysis and have been compared with similar policies regionally and in other African countries as well as with international agreements on pesticides and environmental management. In addition, the analysis of pesticide regulations in Rwanda was performed following the guidance on Pest and Pesticide Management Policy Development of the International Code of Conduct on the Distribution and Use of Pesticides under the Food and Agriculture Organization (FAO) of the United Nations. The results revealed that pesticide policies in Rwanda are well developed, embedded in a consistent legal and institutional framework. They are connected from the National Constitution and international/regional pesticide management agreements and environmental protection

policies. They include detailed regulations of pesticides from registration to the disposal of obsolete pesticides and pesticide containers. Implementation of these regulations started in September 2017, that is to enforce regulation of agro-chemicals and agribusiness. Implementation of this regulatory framework is done by the following bodies: Rwanda-FDA, RALIS, RAB, RSB, REMA and the agrochemical Advisory Council. However, some gaps have been noted, mainly on the regulation of the Maximum Residue Levels, use of personal protection gear, preventing pesticide resistance and use and registration of bio-pesticides. Research to collect information on the magnitude of the issues raised above as gaps has been recommended to guide formulation of related regulations towards compliance with international agreements, reducing pesticides poisoning to humans, livestock and the environment as a whole.

The Rwanda Agricultural Policy was conceived taking into account international and regional conventions and protocols and the national Vision 2020, particularly the Economic Development and Poverty Reduction Strategy (EDPRS) and the Plan for Strategic Transformation of Agriculture (PSTA). In addition, institutional arrangements and the connection with government ministries and development policies, hold to it a complementary role (IPAR, 2012). The Ministry of Agriculture and Animal Resources (MINAGRI) has been constantly looking for ways and policies to intensify crop production and raise farmers' income with sustainable use of existing natural resources.

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

The registration responsibilities of pesticides for agriculture purposes are made by MINAGRI through its department of Rwanda Agricultural and Livestock Inspection and Certification Services (RALIS). The responsibilities of this department are the following:

- Enhances safe trade by limiting the introduction and the spread of new pests, and to improve the quality of agricultural and livestock products for export and also resolution and management of trade issues related to animal or plant health in order to meet the International Plant Protection Convention (IPPC) and World Trade Organization-Sanitary and Phytosanitary (WTO-SPS) agreements.
- Responsible for the overall coordination of all the functions that the National Plant Protection Services (NPPS) is supposed to fulfill.
- Coordinates functions such as the enforcement of the Rwanda plant health law and regulations for phytosanitary measures necessary for trade, plant pest/disease monitoring, surveillance and diagnosis, conducting pest risk analysis, and conducting inspection and certification. In addition, it contributes to the preparation and the implementation of agrochemical law.

The health sector is one of the fastest growing in the country, having posted solid pillars such as financing mechanisms, decentralization and community healthcare services. Despite rapid growth levels, pharmaceutical products quality assurance should be properly regulated in order to efficiently protect public health by assuring safety, efficacy and quality of all regulated products. The Ministry of Health, through its authority "Rwanda Food and Drug Authority (Rwanda FDA)," regulates:

- Food and pharmaceutical products including household chemical substances (public health-related pesticides) to build a regulatory system for quality and regulatory best practices, promoting local pharmaceutical production, and facilitating regulated industrial economic growth.

1.5. International chemical conventions related to pesticides the country ratified, their Designated National Authority and a focal person for SAICM

The Republic of Rwanda ratified the following international chemical conventions related to pesticides:

- **The Stockholm Convention on Persistent Organic Pollutants:** This is a legally binding treaty that was adopted in May 2001 and entered into force in April 2004 with the aim to eliminate or restrict the production and use of persistent organic pollutants (POPs) towards protecting human health and the environment from POPs. Rwanda ratified the Convention on 8 July 2002 and has submitted the National Implementation Plan for the Stockholm Convention for COP4 and COP 5.Its National Focal Point is under REMA.
- **The Rotterdam Convention on Prior Informed Consent (PIC) Procedure for Certain Hazardous Chemicals and Pesticides in International Trade:** This is a multilateral treaty with an objective to promote shared responsibility and cooperative efforts among Parties in the international trade of certain hazardous chemicals in order to protect human health and the environment from potential harm. The treaty also aims to contribute to the environmentally sound use of hazardous chemicals and pesticides by facilitating information exchange about their characteristics, by providing for a national decision-making process on their import and export and by disseminating these decisions to Parties. It was adopted in September 1998 and entered into force in 2004. It established a Prior Informed Consent (PIC) procedure, which seeks agreement from importing countries to accept shipments of certain hazardous chemicals. Most of the POPs listed in the Stockholm Convention are included in the Rotterdam Convention. Rwanda ratified it on 24 August 2003 by the Presidential Order n° 28/01. As other environmental conventions, its implementation is under REMA.

- **The Montreal Protocol** is a protocol to **the Vienna Convention for the Protection of the Ozone Layer and it is an international treaty** designed to protect the ozone layer by phasing out the production of numerous substances that are responsible for ozone depletion. It was agreed on 16th September 1987 and ratified by Rwanda on 24th August 2003. In the 28th meeting of the Parties to the Montreal Protocol, negotiators from 197 nations signed a historic agreement to amend the Montreal Protocol in Kigali, Rwanda on 15th October 2016. The Kigali Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer was adopted in 2016 and ratified by Rwanda on 23rd May 2017. Implementation of the Protocol is also under REMA.

- **The Strategic Approach to International Chemicals Management (SAICM**) was adopted by the first International Conference on Chemical Management (ICCM1) on 6 February 2006 in Dubai. SAICM's overall objective is the achievement of the sound management of chemicals throughout their lifecycle so that by 2020, chemicals are produced and used in a way that minimizes significant adverse impacts on the environment and human health. In Rwanda, SAICM implementation is under the responsibility of REMA, which is the National Authority in charge of Multilateral Environmental Agreements (MEAs) to which the country is a Party. The SAICM National Focal Point in Rwanda is the Director of the Department of Environmental Regulations and Pollution Control.

2. Status of pesticide use in the country

Currently, there are common pest control practices in Rwanda which include the use of pesticides in cash crops; resistant varieties in food crops; as well as informal cultural practices for diverse crops. However, pesticides use in Rwanda is very low and limited only to high income crops like coffee, potatoes and vegetables. Pesticides are either not affordable or not accessible in many parts of the country. According to the Ministry of Agriculture and Animal Resource report, 2019, the national averages of pesticides use is below 1kg/ha and it is mainly fungicides that are being used, which are unlikely to cause major dangers when used and disposed of in a precautionary way. In general, pesticide use in Rwanda targets mainly plant diseases management and nearly 75% are fungicides, while the remaining 25% is composed of different insecticides and a few herbicides. Among the fungicides imported until 2011, more than 90% of the products are Mancozeb and Ridomil which are applied to coffee, potato and tomato against the late blight (*Phytophtorapnfestans*), coffee leaf rust and coffee berry disease (IPM, 2011).

Any agrochemical for which the registration certificate has been refused or cancelled or for which the registration certificate has been withdrawn upon request by the manufacturer or his/her legal representative, shall be recorded in a list of agrochemicals that are prohibited in the country. A Ministerial Order "**Official Gazette nº 37 of 10 September 2012, Article 16:**

Publication of the list of registered agrochemicals and list of prohibited agrochemicals" publishes the list of registered agrochemicals and the list of prohibited agrochemicals.

2.1. The list of nationally registered pesticides

Table 1. Registered pesticides

1. Registered insecticides and acaroids ○ Abamectin ○ Acetamiprid ○ Acrinathrin ○ Alphacypermetrim ○ Aluminium phosphide ○ Azadirachtin ○ Azocyclotin ○ Beta-cyfluthrin ○ Bifenthrin ○ Bromopropylate ○ Buprofenzin ○ Chlorfenapyr ○ Clofentezine ○ Cypermethrin ○ Cypermethrin ○ Cypermethrin ○ Cypermetrin ○ Cyromazine ○ Deltamethrin ○ Diafenthiuron ○ Diflubenzuron ○ Fenamiphos ○ Fenaxaquin ○ Fenbutatin oxide ○ Fipronil ○ Flufenoxuron ○ Flumethrin ○ Imidacloprid ○ Imidacloprid ○ Imidacloprid	○ Indoxacarb ○ Lambda-cyhalothrin ○ Lufenuron ○ Magnesium Phosphide ○ Malathion ○ Malathion -Permethrin ○ Methomyl ○ Methoxyfenozide ○ Novaluron ○ Pencycuron - imidacloprid - thiram ○ Profenofos ○ ProsulerOxamatrine ○ Pymetrozine ○ Pyrethrins - PiperonylButoxide (PBO) ○ Pyrethrins II'S and Pyrethrins I'S (Pyrethrum EWC) ○ Pyrethrins ○ Pyrethrins ○ Pyrimiphos-Methyl Deltamethrin ○ Pyrimiphos-Methyl Permethrin, EC ○ Pyrimiphos-methyl ○ Snake repellent ○ Spinosad ○ Spiromesifen ○ Tau-fluvalinate ○ Teflubenzuron ○ Tetradifon ○ Thiacloprid ○ Thiamethoxam
2. Fungicides ▪ Albesilate	▪ Fluzilazole ▪ Fosetyl-aluminium

▪ Azoxystrobin L + Cyproconazole ▪ Azoxystrobin ▪ Benalaxyl + Mancozeb ▪ Benomyl ▪ Bitertanol ▪ Bupimate ▪ Calcium Hypochlorite ▪ Captan ▪ Carbendazim + Chlorothalonil ▪ Carbendazim, ▪ Chlorothalonil, ▪ Copper oxychloride, ▪ Copper + chlorothalonil ▪ Copper + propineb ▪ Copper ammonium acetate ▪ Copper hydroxide ▪ Cuprous Oxide ▪ rust coffee ▪ Cymoxanil + propineb +Cymoxanil ▪ Cyproconazole, ▪ Dichlofluanid ▪ Didecyldimethylammonium chloride ▪ Difenoconazole ▪ Dimethomorphe + maconzeb ▪ Dithianon ▪ Dodemorphacaetate ▪ Epoxiconazole + carbendazim ▪ Fenarimol ▪ Fenhexamid ▪ Fenomidone + Fosetyl- All ▪ Flutriafol ▪ Flutriafol + Thiabendazole ▪ Fluzilazol,	▪ Hexaconazole ▪ Imidachloriprid + Metalaxyl + Carbendazim ▪ Iprobenfos ▪ Iprodione ▪ Kresoxim-methyl ▪ Mancozeb + Metalaxyl ▪ Mancozeb ▪ Mefenaxam + Chlorothhanil ▪ Mefenoxam, methalaxyl + mancozeb ▪ Metalaxyl + Mancozeb ▪ Metalaxyl-M + Chlorothalonil ▪ Metalaxyl-M ▪ Metiram ▪ Micronised Sulphur ▪ Penconazole ▪ Propamocarb hydrochloride ▪ Propineb + Iprovalicarb ▪ Propineb ▪ Pyrimethanil -Spiroxamine ▪ Sulphur ▪ Sulphur, roll; powder, tablets ▪ Tebuconazole ▪ Thiabendazole ▪ Thiophanate methyl ▪ Thiram + Carboxin ▪ Thiram ▪ Tolclofos Methyl ▪ Tricyclazole ▪ Trifloxystrobin ▪ Triforine ▪ Vinchlozoline
3. Molluscicides ✓ Metaldehyde ✓ Mercaptodimethur	**4. Nematicides** ✓ Fenamiphos ✓ Dazomet
5. Growth regulators ✓ Daminozide	**6. Rodenticides** ✓ Brodifacoum ✓ Bromadiolone ✓ Coumatetryl ✓ Difenacoum ✓ Diphacinone
7. Herbicides ✓ 2,4-D Amine	✓ Thiobencarb + Propanil ✓ Dalapon

✓ Clethodim ✓ Diuron ✓ Glyphosate ✓ Linuron ✓ Oxyfluorfen ✓ Terbutryn	✓ Methribuzin ✓ Metolachlor ✓ Propanil + Thiobencarb ✓ Propanil Tembrotrione + bromoxinyl-octanoate + Isoxadifen-ethyl
8. Biopesticides ✓ Azadirachtinl ✓ Spinosad ✓ Bacillus thuringiensis ✓ Beauveriabassiana ✓ Pyrethrins ✓ Trichodermaharzianum	**9. Adjuvant oils** ✓ Alkyl phenol / ethylene oxide
10. Prohibited pesticides in Rwanda o Alachlor o Aldicarb o Aldrin o Alpha Hexachlorocychlohexane o Bifenazate o Binapacryl o Captafol o Chlordane o Chlordecone o Chlorobenzilate o Choldimeforme o Clofentezine o Chloropyriphos-ethyl o Trichloro 2,2 bis (4-chlorophenyl) ethane (DDT) o Diazinon o Dichlorvos/Dichlorphos o Dieldrin o Diethion o Dimethoate o Dinitro-ortho-cresol (DNOC) and its salts (such as ammonium salt, potassium salt and sodium salt) o Dinoseb and its salts o Endosulfan (Thiodan) o Endrin o Ethylene dichloride o Ethylene Oxide o Fenabutatin Oxide o Fenazaquin SC	naphthenate - 1,2 Dibromoethane o 2,4,5-T and its salts&esters o 2,4,5-T and its salts&esters o Hexythiazox WP o Lindane o Malathion except dust Form o Mercury compounds including inorganic Mercury compound, and alkyloxyalkyl and aryl mercury compounds o Methamidophos (Soluble liquid formulations of the subsistance that exceed 600g active ingredient/1) o Methyl-parathion (emulsifiable concentrates (EC) at or above 19.5% active ingredient and dusts at or above 1.5% active ingredient) o Mirex o Monocrotophos, Monocrotophos (Soluble liquid formulations of the subsistance that exceed 600g active ingredient/1) o Nitrophen o Paraquat o Parathion o Parathion (all forms -aerosols, dustablepowder(DP) EC, GR,WP- of this substance are included except capsule suspensions(CS)) o Pentachlorobenzene o Pentachlorophenol and its salts and esters o Phosphamidon

○ Fenthion ○ Fluoroacetamine ○ Hexachloro Hexane ○ Heptachlore ○ Hexachlorobenzene ○ All tributyltin compounds including: Tributyltin oxide, Tributyltin fluoride, Tributyltin methacrylate, Tributyltin benzoate, Tributyltin chloride, Tributyltin linoleateand Tributyltin	○ Phosphamidon (Soluble liquid formulations of the substance that exceed 1000g active ingredient/1) - Pyrimiphos methyl except dust form ○ Thallium (I) sulphate - Tebufenpyrad WP Toxaphène - Dustable Powder Formulations containing a combination of: Benomyl at or above 7%; Carbofuran at or above 10%; Thiram at or above 15%

Others that are not listed on **Official Gazette nº 37 of 10 September 2012** found in the following link:https://www.minagri.gov.rw/fileadmin/user_upload/documents/ALICS/list_of_restricted_chemicals.pdf

2.2. The list of HHPs amongst list of nationally registered pesticides

Out of the registered pesticides in Rwanda, 15% of them are HHPs according to PAN International List of Highly Hazardous Pesticides published in March 2018. The following table shows the HHPs sorted from nationally registered pesticides in Rwanda.

2.2.1. Active ingredients

Table2.Active ingredients

1. Insecticides and acaricides **Active ingredients** ○ Abamectin, 18g/l EC, 20g/l EC ○ Acrinathrin 75EW ○ Azocyclotin, 25%WP, 25%SC ○ Beta-cyfluthrin 2,5 % EC ○ Bifenthrin 0,05 % PP, 25g/l EC ○ Chlorfenapyr, 36%SC ○ Cypermethrin 120g/l + profenofos 600g/l ○ Cypermethrin 40g/l + profenofos 400g/l ○ Cypermethrin, 5% EC ○ Cypermetrin 152g/L ○ Deltamethrin 2,5 % EC, 5%EC ○ Diafenthiuron, 25%WP, 500SC ○ Fenamiphos, 400g/l; 200g/l EC; 10%G ○ Fenbutatin oxide, SC; 25%WP; 50%WP ○ Fipronil, 2.5EC, 5EC, 5SC, 80WG	○ Flufenoxuron, 10%DC ○ Imidacloprid 200g/l SL, 200g/l EC, 70WS, 350FS ○ Imidacloprid, 100g/l + Beta-cyfluthrin, 45g/l OD ○ Imidacloprid, 200g/l EC ○ Indoxacarb, 200g/l, 150SC ○ Lambda-cyhalothrin 50g/l EC, 2.5%EC ○ Lufenuron, 5%EC; 50g/l EC ○ Magnesium Phosphide, 66%MP ○ Malathion 2% w/w, Dust ○ Malathion 2.0% w/w ○ Methomyl, 25%WP ○ Profenofos, 40%EC; 50%EC ○ Pymetrozine, 25%SC, 25%WP, 50%WDG ○ Spinosad, 12%SC, 0.5%G ○ Thiacloprid, 480SC ○ Thiamethoxam 35 g/L FC
2. Fungicides **Active Ingredient**	● Dithianon, 500SC

● Mancozeb 650g/Kg ● Benomyl 50 % WP ● Carbendazim 100g/l + Chlorothalonil 450g/l EC ● Chlorothalonil, 50%WP, 75%WP, 50%SC ● Copper 24% + chlorothalonil 24% WP	● Epoxiconazole 125g/l + carbendazim 125g/l, EC ● Fenarimol, 12%EC ● Iprodione 500SC ● Kresoxim-methyl 50WG ● Mancozeb 80 % WP ● Metiram 70%WG ● Penconazole 10%EC
3. Nematicides **Active ingredient** ○ Fenamiphos 40%EC, 5GR	**4. Biopesticides** **Active ingredient** ○ Spinosad 0,125% Dust, 480SC
5. Rodenticides **Active ingredient** ○ Brodifacoum, 0,005% Baits as Granules ○ Bromadiolone, 0,005% Pellets ○ Difenacoum, 0.005%w/w Baits ○ Diphacinone, 0.001 – 0.005% Baits	**6. Herbicides** **Active ingredient** ○ Diuron 80% w/w WP; EC; 800SC ○ Glyphosate* 480SL, 360SL , 500SL ○ Linuron 50WP ○ Oxyfluorfen, 240EC ○ Terbutryn, 500S
7. Growth regulators **Active ingredient** ○ Daminozide 85%SP, 85WSG	**8. Adjuvant oils** **Active ingredient** ○ Ethylene oxide EC

2.2.2. Crops using HHPs

Among the fungicides imported, more than 90% of the products are Mancozeb and Ridomil, which are applied to coffee, potato and tomato against the late blight (*Phytophtorainfestans*), coffee leaf rust and coffee berry disease (IPM, 2011). In post-harvesting of cereals and pulses, 11.5% of imported fungicides are used mainly in beans, soya beans, pea, maize and sorghum. The types of pesticides used for different crops are indicated below:

a. Pesticides used in potatoes

In the potato crop, the commonly used pesticidesarefungicides, and the most commonly used fungicides are Dithane M45/Mancozeb (contact preventive). Farmers apply Dithane M45/Mancozeb (protective fungicide) when rainfall is not continuous.

b. Pesticides used in beans, soya beans, pea, sorghum

The pesticides used in controlling insect pests in pulses and cereals including beans, soya beans, pea and sorghum are Lava/Imidacloprid, which is mainly common to farmers, and endosulfan. Endosulfan was used by farmers under the Prime Minister's orders no 27/03 of 23/10/2008 of restricted chemical substances that require authorization or temporary permission before sale, importation, exportation and storage with intention to sell or distribute. To comply with the COP5 decision banning endosulfan, its isomers and derivatives among new POPs, Rwanda has added this pesticide on the list of prohibited agrochemicals published in the Official Gazette n° 30 of 25/07/2016.

c. Pesticides used in tomatoes

The tomato crop suffers a large number of diseases. However, the pesticides are used only to control late blight (*Phytophthorainfestans*). The latter is a major constraint, especially during the rainy season. The disease is controlled using fungicides such as Dithane M45/Mancozeb. Similar to potato, the use of fungicides by farmers is considered a good means of control.

d. Pesticides used in coffee

The coffee crop is the largest user of pesticides in Rwanda. During the national pesticide survey in 2005, 90% of imported fungicides (75% of all pesticides) in the country were reported as being used on coffee (IPM, 2011). In this amount, some HHPs are still used such as Mancozeb and Cypermethrin. This amount is used mainly against coffee leaf rust (*Hemileiavastatrix*) and coffee berry disease (*Colletotrichumcaffeanum*) as preventive measures.

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

The current pesticides use in Rwanda is limited because they are either not affordable or not accessible in many parts of the country. During the three years period of 1997–2000 the proportion of different pesticides, fungicides, insecticides and herbicides was 75%, 23% and 2% respectively. The Ministry of Agriculture and Animal Resources is addressing the problem of pesticides by re-enforcing pesticides laws and regulations. However, the current regulatory framework is not yet strong enough to address all problems which may arise during intensification of agriculture without support of capacity building among crop producers (MINAGRI Annual Report, 2019).

In collaboration with the Coffee Exporters Processors Association of Rwanda(CEPAR), pesticides were distributed to coffee growers in the fiscal year 2018/19: 16,730 liters of pesticides, and 100 liters of Cypro for coffee stem borer control and 733 liters of fungicide for coffee berry disease control (MINAGRI Annual Report 2019). From the Strategic Stock of pesticides 2018/2019 fiscal year, around 2,200 litres of pesticides, including Cypermethrin 5% EC, Cypermethrin 4% EC+Profenofos 40% EC, Lambdacyhalothrin 5% % EC, Pyrethrum EWC, and Imidachloprid 200g/L SL, were distributed to farmers in different affected areas of the country and farmers have been shown the best way to apply those pesticides, especially in managing maize stalk borer, fall armyworm and other pests (MINAGRI Annual Report, 2019).

Findings from the Seasonal Agriculture Survey (SAS) 2019 covering all three agricultural seasons in Rwanda (season A that starts in September and ends with February of the following year; season B that starts in March and ends in June of the same year; and season C that starts in July and ends in September of the same year) illustrate that in the 2018/2019 agricultural year, 16.1% of farmers used pesticides. As indicated in Table.3, Dithane M45/Mancozeb, Cypermethrin and Rocket were reported as most used pesticides in 2019 (NISR, 2019).

Table3. Percentage of plots by type of pesticides, per season in 2019

Highly Hazardous Pesticides	**Agricultural Season A**	**Agricultural Season B**	**Agricultural Season C**	**seasonal average 2019**
Dithane M45 /Mancozeb	23.9	32	41.7	32.6
Dimethoate	2.9	2.4	2.9	2.8
Cypermethrin	19.4	22.3	21.1	21.0
Dursiban/ chlorpyrifos	0.2	0.1	0.2	0.2
Others	8	8.6	8.6	8.5
Total				**65.1**
Non-Highly Hazardous pesticides	**46.1**	**32. 7**	**26.0**	**34.9**

Source: NISR, SAS 2019

The Agricultural Household Survey (AHS) conducted in 731 households by the National Institute for Statistics (NISR) in the 2016/2017 agricultural year provides information on the use of pesticides by households during Season A and B (in 2017) per province. Surveyed pesticides were Dithane M45/Mancozeb, Dimethoate, Cypermethrin and Dursban. The following table shows the percentage of HHs that used each pesticide by season and province.

Table4. Percentage of agricultural households by season, pesticide type and province

Province Pesticides	**Season A 2017**					**Season B 2017**					**Rwanda 2017**
	Kigali city	**South**	**West**	**North**	**East**	**Kigali city**	**South**	**West**	**North**	**East**	
Dithane M45 /Mancozeb	47.2	17.7	49.7	44.4	17.2	41.6	24.8	52.2	50.7	12.2	**37.0**
Dimethoate	6.5	0.7	5.1	15.6	7.7	4.3	1.1	4.2	13.9	2.7	**6.2**
Cypermethrin	33.6	57.1	57.0	50.9	44.5	27.3	52.3	49.7	42.7	39.7	**47.4**
Dursiban/ chlorpyrifos	0.7	1.2	4.0	-	1.9	0.8	0.9	0.6	-	1.1	**1.2**
Other pesticides	23.0	5.4	5.5	1.7	23.5	18.6	7.8	6.0	3.0	20.4	**8.2**
Total agricultural	12	89	110	96	51	13	73	115	101	71	**731**

HHs who used pesticide											

Source: NISR, AHS 2017

Table 4 reveals that for both seasons A and B in 2017, South and North Provinces of Rwanda used more Cypermethrin, followed by Dithane in the Western Province. It is also noted that in 2017, more agricultural households used Cypermethrin, followed by Ditane (47.4% and 37.0% respectively). It is observed that Cypermethrin is used in coffee crops which are concentrated in Southern and Northern Provinces. Cypermethrin is also much used in other crops along seasons and provinces because it is recommended for the control of strains that are resistant to other pesticides.

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

According to Malaria Operational Plan 2019/US President's Malaria Initiative (PMI) for Sub-Saharan African countries, deltamethrin and lambda-cyhalothrin pesticides are used to control malaria. Among other applications, deltamethrin is used for the production of long-lasting insecticidal nets (LLINs), which, along with indoor residual spraying (IRS), are the main vector control strategies recommended by the World Health Organization (WHO) for the management of malaria. As such, this insecticide has helped prevent many cases of malaria in Rwanda. Among the other uses of deltamethrin are agricultural use and home pest control. Deltamethrin has been instrumental in preventing the spread of diseases carried by tick-infested prairie dogs, rodents and other burrowing animals. Deltamethrin is neurotoxin, it temporarily attacks the nervous system of any animal with which it comes into contact and it can affect dogs and cats if they eat, breathe, or touch it by causing vomiting, drooling, in coordination, and muscles tremors. It is helpful in eliminating and preventing a wide variety of household pests, especially spiders, fleas, ticks, carpenter ants, carpenter bees, cockroaches and bed bugs.

Alpha-Cypermethrin is a synthetic pyrethroid insecticide used to control major pests harmful to public health, and kills cockroaches, fleas, and termites in houses and other buildings (including public and office buildings; hotels; hospitals and municipal buildings). Those pesticides are generally more used in non-agriculture activities, but there is no recorded data on how they are used. In particular, lack of accurate data on volumes was a limitation factor because the Rwanda FDA was not yet organized enough to have a database and the private sellers were not ready to share information.

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

According to the PAN consolidated list of bans, mancozeb, dimethoate, cypermethrin, chlorpyrifos and endosulfan are the HHPs banned in other countries but not banned in Rwanda.

Azocyclotin is also a HHP not approved in EU orUK, but not banned in Rwanda. Azocyclotin is an organotin acaricide effective against spider mites. It is recommended for the control of strains that are resistant to other chemical compounds (IPMP, 2018). Azocyclotin is used for the control of all motile stages, i.e. larvae as well as adults.

2.6. Human health, environmental impacts or human rights issues related with HHPs in the nation

Reduction or even elimination of POPs is not only going to protect human health and the environment against their harmful effects, but also providesa real commitment of the Government of Rwanda in implementing a national policy according to the conventions it has ratified. REMA has worked out an inventory of persistent organic pollutant pesticides to provide sufficient quantitative information for development of an Action Plan for the update of the National Implementation Plan (NIP) of the Stockholm Convention on Persistent Organic Pollutants (REMA, 2015). The inventory report shows an important exposure to the effects of POPs in particular is via the agricultural areas through the use of pesticides (NIP of the Stockholm Convention in Rwanda, 2007-2025).Different pesticides, including POPs (endosulfan and lindane),have been identified as potential hazards to human health and environment. Lindane, which causes many problems to human health and the environment,(liver cancer, irritation of the nose and throat and environmental contamination) is among POPs banned in the Rwanda market. Endosulfan is still used based on the Prime Minister's orders no 27/03 of 23/10/2008 of restricted chemical substances that require authorization or temporary permission before sale, importation, exportation and storage with intention to sell or distribute.

- Endosulfan creates different hazardous effects to human health and the environment including attack to the central nervous system, causing overstimulation and a range of health harms. Acute exposure to endosulfan causes headaches, nausea and vomiting, seizures, and in extreme cases, unconsciousness and death. The U.S. EPA classifies endosulfan in its most extreme toxicity category (highly acutely toxic) because relatively small doses prove lethal in experimentation. Endosulfan has been reported to cause endocrine disruption, reproductive harms, and abortion. However, carcinogenicity has been confirmed by U.S EPA, as well some studies revealed the association with a breast cancer risk factor for women with elevated adipose tissues. Endosulfan is an organochlorine, an antiquated class of pesticides known for their persistence, toxicity, mobility, and ability to accumulate in organisms and concentrate in food chains (REMA inventory report, 2015).

- Lindane can be found in all environmental compartments and levels in air, water, soil, sediment, aquatic and terrestrial organisms and food have been measured worldwide. Detectable levels in human blood, human adipose tissue and human breast milk indicate

that widespread human exposure occurs because lindane residues can also be found in our daily food such as milk and meat from livestock that has been treated for ectoparasites. Another exposure to significant amounts of lindane occur through household dust in certain conditions. Lindane is the most acutely toxic HCH isomer. It affects the central nervous and endocrine systems. In humans, effects from acute exposure at high concentrations to lindane may range from mild skin irritation to dizziness, headaches, diarrhea, nausea, vomiting, and even convulsions and death. Numerous studies have demonstrated hepatotoxic, genotoxic, reproductive, developmental and immunotoxic effects of lindane in laboratory animals. The International Agency for Research on Cancer (IARC) has classified lindane as possibly carcinogenic to humans (REMA inventory report, 2015).

According to the study of Okonya JS, 2019, routine pesticide application is common in Rwanda where70.8% of farmers use agro chemicals. More than a half of the respondents 54% in Rwanda reported using damaged knapsack sprayers, which could increase chances of body contact with pesticides, therefore contributing to poisoning cases. 40.8 % of pesticides are sold in unlabeled containers (Okonya JS, 2019). Only 17.3% of farmers in Rwanda could read and understand the pesticide label. The proportion of farmers who could tell the toxicity of pesticides from its label were very low (13.4%). Knowledge of negative impacts of pesticide use on the environment was also very low (29.2% of farmers). Killing of domestic animals and killing of beneficial insects such as pollinator bees were the most well-known negative effects of pesticide use to the environment. These were recognized by 45% of the farmers in Burundi and Rwanda, respectively. Farmers also expressed the fear that exposure to pesticides may cause human diseases such as cancer (Okonya JS, 2019).

The increase of insecticide use is of great concern and responsible use of pesticides should be reinforced at all levels. In order to safeguard the environment and protect producers and consumers, and sustain production, pesticides should be applied in a way that minimizes adverse effects on beneficial organisms, humans and the environment. In this case it would mean investing in alternative pest management technology development and adoption (IPM, 2011). The study of Okonya, 2019 shows that there are five commonly reported symptoms after pesticide applications and consequences of pesticide poisoning reported by farmers in Rwanda: runny nose (33%), headache (28%), coughing (25%), nausea (23%), and skin itching (21%). Less common symptoms of pesticide poisoning in Rwanda were stomach ache (2%), heavy sweating (4%) and perceived death of domestic animals after consumption of pesticide treated plants (4%).

2.7. National provisions to phase out HHPs, and ban registered pesticides

The Government of Rwanda has promulgated laws that restrict and ban highly toxic and obsolete pesticides following provisions under the Rotterdam and Stockholm Conventions as well as the Montreal Protocol. Defective or spoiled agrochemicals are regulated by the Prime Minister's

order no 27/03 of 23/10/2008 as published in the official gazette no 21 of 01/11/2008. Rwanda has ratified the major pesticide-related international agreements and is currently working to meet the obligations.

For example, based on provisions in the Rotterdam Convention on the international procedures for transactions of agricultural pesticides and other poisonous products, for all the banned pesticides, Rwanda has put in place measures to comply with the decisions of the Convention. Concerning the Stockholm Convention on Persistent Organic Pollutants, Rwanda has taken the measures to regulate banned pesticides with related restrictions and has elaborated and submitted National Implementation Plans. Finally, through the Ministerial order no006/2008 of 15/08/2008 regulating importation and exportation of ozone layer-depleting substances and equipment containing such substances, Rwanda has banned methyl bromide, which relates specifically to the Montreal Protocol on Substances that Deplete the Ozone Layer.

The functioning of the registration scheme is also effective for the evaluation of applications and allows de-registering or replacement of HHPs by less hazardous pesticides. The challenge is the limited availability of plant protection products and the lack of non-chemical, safe alternatives. Also lacking is the link between biological control products in the current regulations that restrict or ban the use of highly toxic pesticides for the protection of the environment and compliance to international agreements on the use of pesticides.

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

The pesticide industry in Rwanda is not well developed and is mainly represented by importer, exporter and manufacturing companies, including four big companies of pesticides (Agrotech, Balton, Agropy and ITG). Agropy is the only company that manufactures and exports pesticides. Among the manufactured pesticides, there are agro-ecological ones like bio-pesticides and pyrethrum-based pesticides which are naturally occurring pesticides. Many agro dealers (including those mentioned in this paragraph) are members of Rwanda Agriculture Inputs Dealers Association (RAIDA). RAIDA aims to organize the Rwanda dealers sector. Currently, 1000-1200 dealers are active in Rwanda. There is a campaign going on to invite dealers to join RAIDA. This action is supported by the Rwanda government, which aims to increase the public-private sector dialogue. RAIDA's mandate is to provide advocacy and to professionalize the sector as well as providing trainings on using agro-chemical inputs to protect the environment. RAIDA is able to reach many shop owners and dealers and advocates for dealers' responsibility for good practices and compliance to the regulations. This initiative is supportive to the work of the regulators and inspectors of agro chemical inputs.

3. National endeavors to phase out HHPs

3.1. Projects/programs and campaigns to phase out HHPs

Lake Victoria Environment Management Project (LVEMP-2): LVEMP II aimed to implement priority interventions of the Strategic Action Programme (SAP), which address key environmental issues identified in the Transboundary Diagnostic Analysis (TDA) for the Lake Victoria Basin (LVB). The higher development objective of the proposed LVEMP-2 was to contribute to the East Africa Community (EAC)'s Vision and Strategy Framework for Management and Development of the Lake Victoria Basin "a prosperous population living in a healthy and sustainably managed environment providing equitable opportunities and benefits to the riparian communities". The LVEMP-2 was implemented within the entire Lake Victoria Basin and enhanced environmentally friendly economic growth in the Basin through knowledge generation for development, socio-economic development, promotion of effective natural resources management framework, and enhancing public participation and communication. (MINAGRI PMP, 2007).

The LVMP-2 was implemented through a number of institutions and organizations in Kenya, Uganda, Tanzania, Burundi and Rwanda, and also by the Lake Victoria Basin Commission (LVBC), accountable to the relevant focal point Ministries and regionally coordinated by the East African Community/Lake Victoria Basin Commission.

According to Integrated Pest Management (IPM) under LVEMP-2, each implementing country has adopted an IPM framework to reduce reliance on pesticides to control pests and diseases in agriculture, livestock production and forestry. The worldwide excessive use of pesticides has led to problems that threaten production, sustainability, health and the environment on a global basis. Such problems include secondary pest outbreaks, development of pesticide resistance and the destruction of natural enemies. The pest problem in turn causes more losses of yield and income and fails to achieve the vision and objective for LVEMP-2 (MINAGRI PMP, 2007).

The Kagera Transboundary Integrated Water Resources Management and Development Project of Nile Basin Initiative commissioned a study on the preparation of this National Integrated Pest Management Framework for Rwanda. LVEMP-2 adopted this National IPM Framework to guide project implementation activities that may involve the use of pesticides or lead to changes in the practices or intensity of pesticide use. The project was implemented in ten districts: two are of Kigali City, three of Southern Province and three of Northern Province, and two in the Eastern Province in the LVB part of Rwanda (MINAGRI IPM, 2011).

3.2. Main challenges in the process of campaigning the phase out of HHPs

The main challenges in the process of phasing out HHPs include the following:

- Lack of clarity of the policy, law and regulation for less hazardous and non-chemical pesticides and standards of pesticides for enforcing and supporting the manufacturers, importers, smallholder producers and agribusinesses to produce and import non- or less hazardous pesticides.

- Newly established government institutions (RALIS and Rwanda-FDA) in charge of agro and non- agrochemicals that are not yet in place to establish policy, law and regulation supporting non- and less hazardous pesticides.

- Few civil society/ non-profit organizations that operate in the field of chemicals, especially pesticide management, which limits the contribution of the development of activities in this field.

- Lack of funding and self-financing to support the phasing out of HHPs and promote/ advocate the use of less or non-hazardous pesticides at centralized and decentralized levels, *i.e*. central and local government level.

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

Project Support and Coordination Unit (PSCU)-Senior agronomist was responsible to organize annual national IPM workshops for monitoring progress and documenting them, and plan the following year basing on lessons learnt. He/she linked with national, regional and international IPM sources and linked with RSSP2-IPM groups as needed depending on the crop produced. He/she linked up with a pesticides organization and monitored closely recommendations on - responsible use. He planned and reported IPM activities and progress for all RSSP2 operational areas. He/she spent at least 12 days per month in the field and/or IPM activities, an average of three days in each Province (PMP Arrangements for RSSP II, 2007).

Main Recommendations

1.The higher education sector and research institutions should be encouraged and supported in working together to carry out research, development and knowledge transfer activities relevant to the less or non-hazardous chemicals and training to support the development of agro-ecological products.

2. The pesticides industry needs to be more environmentally friendly with more emphasis on agro- ecological products.

3. The government needs to find ways to motivate producers and encourage financing for business start-up in the sector of agro-ecological input.

4. The transport infrastructure needs to be improved to support commercialization of the agro-ecological inputs.

5. The government needs to explore ways to set barriers to the importation of hazardous of agro-chemicals and harmful products to market.

II. Report on alternatives to HHPs

1. National policy frameworks that support ecosystem approaches as alternatives to synthetic pesticides

1.1 National IPM policy framework

Rwanda's economy is agriculture-based with more than 90% of its population deriving their livelihoods from agriculture to attain MDG and poverty reduction. Since agriculture has been identified in vision 2020 and EDPRS as an engine of economy and means to attain MDGs/SDGs and poverty reduction, the National Agricultural Policy and Strategy of Agricultural Transformation has identified crop intensification as a mechanism to attain the above objective. The crop intensification included use of high yielding varieties, increased fertilizer, pesticides use and proper use of available water resources. In order for crop intensification to be sustainable, a sustainable pest management plan to ensure food safety, human and animal safety, and environmental protection needs to be established. This can only be achieved through development and adoption of a participatory, integrated pest management system for all major food and cash crops (MINAGRI IPM, 2011).

Integrated Pest Management (IPM) is applicable because under component 3, watershed management, LVEMP II supported Community Driven Development(CDD)-type sustainable land management activities, which may use pesticides for pests control. The IPM framework supports safe, effective, and environmentally sound pest management. It promotes the use of different methods such as biological and cultural methods, etc. Rwanda's implementation of LVEMP II has included adoption of an IPM framework to reduce reliance on pesticides for controlling pests and diseases in agriculture, livestock production and forestry. The worldwide excessive use of pesticides has led to problems that threaten production, sustainability, health and the environment on a global basis. Such problems include secondary pest outbreaks, development of pesticide resistance and the destruction of natural enemies. The pest problem in turn causes more losses of yield and income and fails to achieve the vision and objective for LVEMP-2 (MINAGRI PMP, 2007).

1.2 National organic agriculture policy framework

There is no single policy for organic agriculture in Rwanda. Different elements of support to organic farming are delivered through a range of sectoral policies, including the national agriculture policy. Given the important contribution of organic agriculture to the national economy, increasing the export potential of agricultural products is considered a high priority.

Agriculture represents the primary engine for economic growth in Rwanda and organic agriculture is seen as a key to add value to Rwandan agricultural exports, and to gain access to new markets. The group work in the agriculture stakeholder consultation meeting identified needs to facilitate the supply of organic pesticides and fertilisers, credits and seeds. According to the meeting report, stakeholders noted that in most crops production it is better to use local organic solutions for nutrient management than to import them for high costs. Also, a number of organic pesticides can be produced by farmers themselves, so caution is recommended before embarking on programmes to subsidize or support input supplies (GoR&ITC, 2008).

The development of the National Agricultural Policy comes against the background of the fact that since the National Agriculture Policy of 2004, the sector has been operating in the context of rapid changes and evolving dynamics in policy and institutional environments at national, regional, continental and international levels. The Ministry of Agriculture, in partnership with a wide range of sector stakeholders, coordinated the preparation of a revised and updated National Agricultural Policy. This update responds to the changes facing agriculture and the food system nationally, regionally and globally. Rwanda's population is growing and the demand for more food, better nutrition and employment, and enhanced resilience is increasing (MINAGRI National Agriculture Policy, 2017).

This update is consistent with the ambitious targets that African leaders have defined under the Malabo Agreement in 2014 for increasing agricultural productivity, reducing food insecurity and increasing trade. Rwanda is working with regional bodies such as East African Community (EAC) and Common Market for Eastern and Southern Africa (COMESA) to expand the opportunities created by agricultural growth and integrated regional trade. Meanwhile, Rwanda is increasingly recognized as a leader in its response to global goals and challenges, such as the Sustainable Development Goals (SDGs) and climate change. In line with Rwanda's commitment to the SDGs process, this policy targets the time frame until 2030.

The revised National Agriculture Policy has identified four main strategic and enabling pillars upon which core policy guidance and actions have been based:

1. Productivity and Commercialization for Food Security, Nutrition, and Incomes
2. Resilience and Sustainable Intensification
3. Inclusive Employment and Improved Agrofood Systems' Skills and Knowledge
4. An Effective Enabling Environment and Responsive Institutions

The new National Agriculture Policy reflects best national and international practices, and focuses on agriculture as a theme, not only as a sector. Recognizing the multi-functionality of agriculture, it builds on a vision that draws –in formulation and execution– on the capacity of actors beyond the Ministry of Agriculture only. It recognizes agriculture as a shared opportunity

and responsibility that requires concerted efforts of a wide range of governmental and nongovernmental stakeholders. This policy is also emphasizing the quality of outputs by observing standards that facilitated all the key players' access to domestic, regional and international markets. The quality of outputs was preserved from the farm through the promotion and implementation of legislation on mechanization, seed, land, fertilizer and pesticide use/management to ensure that correct agricultural practices are enforced (MINAGRI National Agriculture Policy, 2017).

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

The uptake of IPM contributes to sustainable agricultural production in Rwanda for which a broad range of crop protection options and products is needed, particularly biological ones. Currently, in Rwanda there is neither specific policy and regulation for biological control products including bio-pesticides nor specific procedures. The use of bio-pesticides requires a particular regulation, which in Rwanda could be regulated under the environmental law, regulating introduction of animal and plant species in the country. Making biological crop protection products including bio-pesticides in the Rwanda market and defining specific regulations for biological control products are essential. Currently, there is absence of a well-defined policy and regulatory system for manufacturing, importing, distributing and using bio-pesticides in Rwanda.

2. National implementation of crop-specific, pest-specific alternatives to HHPs

2.1 National IPM implementations

Since Rwanda's economy is agriculture-based, any effort to increase its economic growth must give priority to agriculture. The increase in crop production is achieved through increasing productivity rather than expansion of the production area. The maximum productivity would be achieved through a combination of proper use of agricultural improved technologies for reducing crop losses due to pests and diseases. Reduction in crop losses requires that farmers take appropriate, timely pest management actions, and that they have a clear understanding of requirements and techniques for growing healthy plants, pests and diseases problems, their survival mechanisms, and the management methods available to enable making timely, informed, right decisions. This could be achieved through intensification of agriculture and more use of agricultural inputs including precautionary use of pesticides to minimize crop losses arising from pests and diseases. On pest management, the government of Rwanda and the World Bank agreed, during the preparation of RSSP-2, to apply the World Bank's Operational Policy on Pest

Management (OP 4.09), which is an environmental safeguard policy for promoting responsible pesticide use and the use of integrated pest management (IPM) in reducing crop losses due to pest damage (MINAGRI PMP, 2007).

This policy requires to put in place a Pest Management Plan (PMP) and structure for adoption of IPM and cautionary pesticide use during RRSP-2. The PMP under RSSP-2 focused on intensification of five target crops; namely, rice, maize, potato, cassava and tomato. These are important crops produced by small scale farmers in their small plots or under cooperative. The major pest problems include mainly diseases and few insect pests and vectors. The PMP promoted the use of IPM in insect pest management where possible and cautionary use of pesticides as a component of the IPM approach. The PMP is made up of 13 chapters covering all elements of pest management. The three chapters of PMP3, 4 and 5 looks into current status of IPM and pesticides use in the country and pre-requisite for cautionary use of pesticides. The three chapters 6, 7, and 8 cover exclusively different IPM options, pesticide use and their promotion against major diseases of target crops. While chapters 9, 10, 11 and 12 deal with staffing issues, capacity building, awareness creation and monitoring of PMP execution. The last chapter 13 is the tentative plan for the first year RSSP-2 –PMP in the target area (PMP Arrangements for RSSP II, 2007).

2.2 National organic agriculture implementation

National organic agriculture practices are implemented through the Rwanda's agricultural sector governance which appears to be friendly to organic practices. The general aim of the National Agriculture Policy and the Strategic Plan for Transformation of Agriculture (PSTA4) for 2018-2024 is to move from subsistence to a productive, green and market-led agriculture sector to address present and future challenges as well as tapping into the new opportunities created. The sector priorities are to: (a) Promote new strategies that will stimulate productivity growth for a broadened nutritional food production, while embarking on new opportunities for farm income diversification, in order to secure further reductions in rural poverty, and transform the dominant subsistence farming sector into a competitive and market-led agriculture sector; (b) Develop and promote a sustainable agricultural intensification and a resilient agriculture sector to counter environmental degradation and climate change in ways that maintain sustainable agricultural growth; (c) Address the knowledge and skills deficits in the agriculture sector to unlock significant additional agricultural as well as labour productivity gains for high quality produce and services; (d) Enhance policy and institutional coordination and collaboration amongst different relevant stakeholders operating in the sector through the creation of an effective enabling environment to render institutions more responsive. Priorities are implemented in line with commitments under the Malabo Declaration, the Sustainable Development Goals (SDGs), African Union Agenda 2063, EAC Vision 2050 as well the 7 Years Government Program (7YGP) and other government programs in particular NST1, Visions 2020 and 2050.

With regard to organic agriculture implementation, the policies are not specific on the issue but acknowledge the important role of organic farming side-by-side with conventional agriculture. While the Crop Intensification Program (CIP) supports subsidized provision of chemical inputs, the government of Rwanda supports organic agriculture through programs and projects in this sector. The Girinka program – which is the One Cow per Poor Family program- is the cornerstone livestock strategies and program enabling poor families to access a dairy cow for income, nutrition, and organic fertilizer. Projects such as Land Husbandry, Water Harvesting and Hillside Irrigation (LWH), aimed at increasing productivity and commercialization of hillside agriculture, have promoted organic farming for sustainable land husbandry measures for hillside agriculture. LWH was supported by the Global Agriculture & Food Security Program (GAFSP) designed to provide incentives to countries to prioritize strategic, smart, and effective agriculture and food policies and projects towards the implementation of cross-cutting global policies and initiatives like Scaling Up Nutrition (SUN), Committee on World Food Security (CFS), and Comprehensive Africa Agriculture Development Programme (CAADP).

Despite existing policy will, promotion of organic farming remains not strong enough at the production level compared to the subsidization of chemical fertilizers, which puts organics in a disadvantaged position. However, as mentioned before, the Government of Rwanda is fairly positive to the development of the organic production and MINAGRI is involved itself in activities such awareness raising, capacity building among farmers' organizations and decentralized structures, support to the certification process, seeds/seedlings distribution, etc. The government is also supportive to initiatives and has good collaboration with stakeholders involved in organic agriculture sector. In this regard, MINAGRI collaborated with the Rwanda Organic Agriculture Movement (ROAM), and organized the official launching of the Ecological Organic Agriculture (EOA) National Platform for Rwanda on 9th August 2019 in Kigali. At the occasion, the representative of MINAGRI thanked ROAM and all the EOA partners for the great commitment of promoting EOA in Rwanda and expressed government willingness to support the development of an Organic Agriculture Policy in Rwanda in addition to the ongoing lobbing for Organic Agriculture Policy in East Africa. This ceremony brought together public and private stakeholders involved in organic agriculture sectors in Rwanda such as the Ministry of Foreign Affairs and International Cooperation (MINAFFET), REMA, the Rwanda Standards Board (RSB), National Agricultural Export Development Board (NAEB) and the City of Kigali. Private sectors were represented by the Development Bank of Rwanda (BRD), and high learning institutions represented by the University of Technology and Arts of Byumba (UTAB). Other delegates included the French Embassy, the European Union to Rwanda, Action Aid, Regional Research Center for Integrated Development (RCID Ltd), Gardens for Health International, Horizon-AGROPY Ltd, and Horizon-SOPYRWA, among others.

A local organic market is also more or less non-existent but significant progress was made in 2012 to develop export of organic agriculture products such as coffee, tea, fruits, vegetables and

flowers. Most important is to build consumer awareness and recognition and to develop the supply. The existence of the East African Organic Product Standards and the Mark is an advantage that should be built upon. To develop a strong organic network, ROAM should play an important role to create awareness and to engage the government and other stakeholders in building a strong supply value chain from the farmer to the end users, including exportation.

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

Indigenous knowledge practices in pest management (use of ash for seed treatment and locally made pesticides) and control among Rwandan small holder farmers remains less known in literature, but information from local rural communities indicates traditional technologies to replace pesticides which are not affordable. In particular, practices based on indigenous knowledge for replacement of HHPs are encouraged through different studies. Incorporating indigenous knowledge systems and practices in Rwandan agriculture would increase productivity and economically empower rural communities and foster livelihood improvement within households and community, especially women's groups. It is in this framework that the literature on agricultural development emphasizes the need for research institutions to understand indigenous knowledge systems in a bid to adapt their technologies to local knowledge and enhance the acceptance and adoption of these technologies

It was realized that contacted farmers have knowledge about pest and diseases according to the varieties of crops such as Irish potatoes, maize, fruits like tree tomatoes, and vegetables like carrots. Farmers informed about the use of alternatives to pesticides such as solution of plant extracts like tagetes (nyiramunukanabi), tobacco, garlic and hot pepper mixed with soap, urines, plant ashes, which are sprayed on crops against pests. Such local traditional products are efficient, affordable and eco-friendly, as well as scientifically approved (Champs et jardins sains: lutte intégrée, Hugues Dupriez et autres, CTA/Pays Bas, 2001; Pesticides et agriculture tropicale: Danger et alternatives / PAN; CTA, 1993).

Responses from farmers revealed that their understanding of pest control has limitations that need to be improved upon, because their broad knowledge of cultural preventives could explain why they face pest problems. Promoting the use of natural pesticides may be a way to facilitate access to affordable and eco-friendly inputs. In different agri-shows organized by MINAGRI, some traditional knowledge and practices of local famers in use of bio botanical pesticides have been observed, but this practice is not documented and therefore difficult to be disseminated.

3. National initiatives in agro-ecology implementation

3.1. Organizations that support and initiate agro-ecological implementations in the nation

Agro-ecology was adopted by a number of organizations as a basis of sustainable agriculture and improvement of food systems in Rwanda. Agro-ecology aims at protecting the environment, ensuring the sustainable renewal of the natural resources (water, soil, biodiversity, etc.) necessary for production, and making sparing use of non-renewable resources. By gradually eliminating the use of synthetic chemicals, it strives toward implementing organic farming, thus contributing to improving the health of farmers and consumers. Among organizations that support and initiate agro-ecological implementations in Rwanda there is:

- **Food and Agriculture Organization (FAO)**

FAO promotes agro-ecology as an approach that offers promising and innovative solutions, taking into account the central role of smallholder and family farmers that produce most of the food crops. FAO puts attention on linkages between agro-ecology and Sustainable Development Goals (SDGs) to tackle the big challenges of ending hunger, achieving food security and improving nutrition, and promoting sustainable agriculture. This organization assists countries in finding solutions to the challenges faced by global food systems and paves the way to a sustainable future "that leaves no one behind, and become the zero hunger generation."

During various gatherings including the Multistakeholder Consultation on agro-ecology for sub-Saharan Africa held in Dakar, Senegal on 5-6 November 2015, this approach was presented as a solution to harness Africa's social, natural and economic assets as it enhances local biodiversity and the conservation of natural resources. Agro-ecology is recognized for managing pests through natural practices and with increased biodiversity; and focusing on knowledge development and community empowerment at the local level.

In Rwanda, FAO's planned interventions from 2019-2023 support the Government of Rwanda in achieving its goals to improve food security and advance agricultural development based on the challenges in food security, nutrition, agriculture, and climate change through four priority areas:

1. Promotion of innovative approaches to promote sustainable and integrated crop, livestock and aquaculture production systems.
2. Improvement of food security, nutrition and resilient agriculture through sustainable and diversified production systems.
3. Promotion of inclusiveness of agricultural market systems as well as value addition and competitiveness of diversified agricultural commodities in domestic, regional and international markets.
4. Enhancement of enabling environment and responsive institutions for effective and efficient delivery of services.

- **Global Environment Facility (GEF)/Small Grant Program (SGP)**

GEF/SGP is a program hosted by UNDP in Rwanda since 2007.In 2017, GEF/SGP selected agro-ecology as a key priority for SGP in Rwanda focusing on Bugesera District as the geographic focal

point for the period 2015-2019. SGP is currently supporting at least one small scale agro-ecology project in each Sector of Bugesera District in the East Province of Rwanda. Supported projects are promoting practices such small scale irrigation, organic farming, integrated pest control, mulching, agro-forestry, and progressive terracing, all aiming at helping Rwandans to adopt climate-smart and healthy agriculture for food security.

SGP has also supported a research initiative on agro-ecology in Rwanda that was conducted by the University of Rwanda (UR) and the Nile Basin Discourse in Rwanda (NBDF-Rwanda), which is a Civil Society Organization bringing together NGOs operating in the Nile River basin.

- **Rwanda Organic Agriculture Movement**

Rwanda Organic Agricultural Movement (ROAM) is a national umbrella organization which unites producers, farmers' organizations, processors, exporter companies, importer companies, institutions and organizations thatare greatly involved in support of organic production, processing, marketing and export in the organic sector in Rwanda. ROAM's vision is "Increased incomes and improved livelihoods in RWANDA through adoption of organic agriculture."

ROAM was established in 2007 and obtained its legal recognition in 2014 as a national non-governmental organization of public interest. ROAM has about 30,000 members who work in organic production, processing and marketing of organic coffee, tea, fruit and vegetables, potatoes, beans, cassava, essential oil, etc. The main activities are to represent and promote the organic sector in Rwanda; to facilitate the establishment of laws and regulations, as well as technical advice, in the field of production, training, certification and marketing of organic products; to coordinate all activities related to certification services and organic inspection acceptable at the national, regional and international levels; to attract donors and investors to invest in the field of organic agriculture; to lobby and advocate for organic farming; and to participate in the formulation and implementation of organic agriculture policies in Rwanda.

- **Gako Organic Farming Training Centre**

Gako Organic Farming Training Centre (GOFTC) is a Rwandan local NGO that trains farmers in sustainable agriculture for sustained livelihood through organic farming practices. The GOFTC mission is to empower the farming communities to improve their living standards through appropriate, affordable and productive organic farming practices that promote environmental conservation for a healthy, progressive and united people. The Center works with other organizations that educate and train farmers in organic farming for food production and management to support their families and communities.

- **AgriProFocus Rwanda**

AgriProFocus brings together farmers, agri-businesses, civil society, knowledge institutes and the government at different levels. It addresses food security challenges by working together,

learning from each other and jointly pushing for change. Together, members find new, sustainable ways of creating impact with organic farming.

- **Action Aid**

Action Aid and partners have been promoting and developing agro-ecology practices through the Promoting Opportunities for Women's Empowerment and Right (POWER) project. It is supporting women working in a potato plantation with tools and knowledge.

3.2. Main national challenges in the implementation of agro-ecology in the nation

Agro-ecology is based on sustainable use of local renewable resources, local farmers' knowledge and priorities, wise use of biodiversity to provide ecosystem services and resilience, and solutions that provide multiple benefits (environmental, economic, social) from the local to the global level. In Rwanda, this practice could be an important approach to contribute to the implementation of the PSTA4 and the national policy subscribed to a family-farm-centric model, enhancing farmer cooperation and private-sector-led development of the agri-food economy. Major changes are needed to develop sustainable agricultural and food systems to achieve agricultural strategic objectives, and agro-ecology development could be an important approach to meet national agricultural priorities: (1) Productivity and commercialization for food security, nutrition, and incomes; (2) Resilience and sustainable intensification; (3) Inclusive employment and improved agro food systems skills and knowledge; and (4) An effective enabling environment and responsive institutions.

Among other challenges in the implementation of agro-ecology, as advanced by research and activists, include the following:

- The agriculture agency promotesthe intensive use of fertilizers, pesticides and improved seeds with less attention on agro ecology practices.
- Efforts towards the adoption of Conservation Agriculture-based Sustainable Intensification (CASI) practices are refrained by the lack of attention paid to agro-ecological solutions by policymakers and low capacity of farmers to invest in sustainable intensifying technologies.
- Lack of common understanding and interpretation of the concept by different actors because they are involved in different 'agro-ecologies,' which reflect the diversity of contexts. Agro-ecology is often associated to organic agriculture.
- Education and training programs on agro-ecology are still underdeveloped and knowledge sharing amongst farmers, researchers, and educators is still low.
- Mindset on agro-ecology as meaningless productivity, lower yields, and more labor, or that it represents a non-viable alternative to current ways of food production.

- Poor mainstreaming of agro-ecology in agricultural policy to create an environment that enables family farming in the context of increase of productivity and commercialization for food security, nutrition, and incomes.
- Little research to demonstrate the potential of agro-ecology and connections between farmers, science, and policy makers, which are too weak to provide effective local solutions.

3.3. Recommendations and project ideas emerging from the challenges

Without integration of agro-ecological solutions, intensification policy cannot sustainably achieve its goals. Therefore, the project recommendations are:

- Enhanced research on agro-ecology practices to demonstrate its potential to reduce the use of agro inputs, including pesticides;
- Raising awareness and evidence-based advocacy by Civil Society Organizations hand in hand with research to influence policies on strengthening agro-ecology in the agriculture sector to adopt conservation agriculture, agriculture that requires an agro-ecological approach;
- Development, education and training programs on agro-ecology for farmers, researchers, planners, extension officers, schools, civil society organizations and the private sector;
- Production and dissemination of education and training materials on agro-ecology development for sustainable agriculture;
- Dissemination of relevant information through different media including social-media; and
- Workshops and meetings for knowledge sharing on the agro-ecology concept and its different dimensions.

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Annexes

Annex 1: Application Form for Registration of Pesticide

REPUBLIC OF RWANDA

MINISITERI Y'UBUHINZI N'UBWOROZI

MINISTRYOF AGRICULTUREAND ANIMAL RESOURCES

OFFICE OF AGRICULTURE AND LIVESTOCK INSPECTION AND CERTIFICATION SERVICES

APPLICATION FORM FOR REGISTRATION OF PESTICIDE
GUSABA KWANDIKISHA UMUTI UKORESHWA MU BUHINZI

Registrar
Agriculture and Livestock Inspection and Certification Services
Ministry of Agriculture and Animal Resources (MINAGRI)
P.O.BOX 621 KIGALI-RWANDA

I…… representing ……..……hereby apply for pesticide registration as described in table below in accordance with the law N° 30/2012 of 01/08/2012 governing agrochemicals and its ministerial order N° 002/11.30 of 14/07/2016 determining regulations governing agrochemicals made therein.

Njyewe …….. uhagarariye……..……mbandikiye mbasaba kwandika umuti ukoreshwa mu buhinzi nkuko biteganywa n'itegeko rigenga imiti n'amafumbire mvaruganda bikoreshwa mu buhinzi n'ubworozi N° 30/2012 ryo kuwa 01/08/2012 n'iteka rigena amabwiriza agenga imiti n'ifumbire mvaruganda N° 002/11.30 ryo kuwa 14/07/2016.

Name and address of manufacturer/ **Izina n'aderesi by'uruganda**	Name and address of representative/ **Izina n'aderesi by'uhagarariye uruganda**
Name and address of formulator/ **Izina n'aderesi wa nyiri ikivanze gishabutse cy'umuti**	Name and address of authorized re-packer / **Izina n'aderesi by'uwemerewe kongera gupfunyika**
Type of application/**ubwoko bw'ubusabe :** New/**ubwa mbere** ☐ Resubmission/**Kugarura ubusabe bukosoye** ☐ Renewal/**Kongera** ☐	Mode of action/**Uko ukora:** **Systemic** ☐ **Contact** ☐
Type of pesticide /**Ubwoko bw'umuti** **Herbicide** ☐ **Fungicide** ☐ **Insecticide** ☐ Other/**Ikindi**:	Product characteristic (Formulation and state) /**Imiterere y' umuti** **State : Solid** ☐ **Liquid** ☐ **Gas** ☐ Formulation/ **Uburyo uvanze:**
Category /**urwego**:Chemical ☐ Biopesticide ☐ Generic ☐ Specialty ☐	**WHO class** : / **QR code** Yes ☐ No ☐

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OFFICE OF AGRICULTURE AND LIVESTOCK INSPECTION AND CERTIFICATION SERVICES

Trade / brand Name of pesticide / **izina ry'ubucuruzi ry'umuti/ifumbire**			Common name or active Ingredient and concentration / **izina risanzwe/ ry'ikivanze gishabutse/ cy'umuti n'ingano y'ubushabuke**
Nature and size of package/ **Ubwoko n'ingano by'igipfunyika**	Country of origin / **Igihugu bikorwamo**		Shelf life /**Igihe umara**
Intended use/**Icyo uzakoreshwa**			
Crop (s)/ Igihingwa	Pest (s)/ Indiririzi	Recommended Dosage /**Ingano iterwa**	
		Active ingredient/ha (kg or L	Product/ha (kg or L) and rate in 20 ltr of water(other column) / Tbt/ m^3 or g/m^3
Additional information/ **Andi makuru**			
Notice: attach a detailed dossier of pesticide to be registered / **Icyitonderwa : Shyira ku mugereka dosiye y'umuti yo kwandikisha igaragaza amakuru yose**			
Name and title of the applicant / **izina n'icyo usaba akora**			Date and Signature / **Itariki n'umukono**
FOR OFFICIAL USE ONLY/ **HAGENEWE URWEGO RWA LETA GUSA**			
Application N°	Reception date	Decision taken : Approved ☐ Rejected ☐ To be rectified ☐ Date:	
Comments:			Fee receipt N°

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Annex 2: Pesticide Registration Dossier Components

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PESTICIDE REGISTRATION DOSSIER COMPONENTS

1. Details of the Product:

a) Common name /active ingredient of the agrochemical
b) Trade/brand name
c) Molecular formulae of the active ingredient(s)
d) Molecular of the active ingredient weight
e) Structural formulae of the active ingredient
f) Main (+minor) active ingredient(s), contents by weight/volume. .....
g) List of adjuvant name(s) and their content by weight/volume
h) Type of agrochemical (e.g. insecticide, herbicide, fungicide, fertilizer etc)
i) Type of formulation (e.g. wettable powder, dust, emulsifiable concentrate etc)
j) Physical properties
- Solubility of the agrochemical in aqueous and/or organic solvents (metric units)
- Emulsifiability / suspensibility (or emulsion stability)
- Physical description (e.g. colorless crystals)
- Wettability
- Stability/comparability (e.g. hydrolyzed by alkali)
- Spraying/dusting properties
- Moisture content
- Melting point
- Setting point
- Boiling point
- Vapour pressure
- Accelerated storage
- Flammability, etc
- Active ingredient by weight/volume.....
- Acidity/Alkalinity

k) Tolerance limits for the characteristics in (j) above (where applicable)
l) Estimated quantities of the product marketed during last two years and the current year
m) Storage stability
- Solubility in water and solvents
- Suspensibility / emulsifying characteristics
- Known capability/ incompability with other pesticide products or active ingredients
- Flash point and other indicators of flammability
- pH
- Methods of destruction or disposal

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- Analytical methods for constituents

n) certificate of quality analysis
o)

2. Toxicology and other side effects:

a) Classification (in accordance with the WHO guidelines)
b) Estimation of acute oral LD50
c) Estimation of acute dermal LD50
d) Inhalation LC50
e) Skin irritation / Corrosivity
f) Eye irritation
g) Dermal sensitization
h) Allergic sensitization
i) Subchronic toxicity (21 day, dermal):
j) Subchronic toxicity (90 day, oral)
k) Subchronic toxicity (90 day, dermal)
l) Teratology
m) Reproduction
n) Chronic toxicity
o) Oncogenicity
p) Mutagenicity
q) Acute delayed neurotoxicity:
r) Subchronic neurotoxicity
s) Pharmacokinetics (absorption, storage, metabolism and elimination)

3. Human exposure and Safety:

a) Assessment of applicator exposure
b) Assessment of farm worker exposure
c) Signs and symptoms of acute human poisoning
d) Recommended first aid procedures
e) Recommended medical treatment for poisoning, include antidote if any
f) Proposed acceptable Daily intake
g) Protective equipment
h) Other precautions

4. Analytical methods:

(Supply reprints, photocopies or authenticated texts)
Quantitative determination of the pure active ingredient in technical material formulations and in contaminated biological materials

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5. Containers:

a) Type and forms of containers used for storage of the agrochemical
b) Packaging type, sizes and materials
c) QR code

6. Biological Data

a) Description of mode of action or effect on pest for which control is claimed
b) Recommended field of application (mention target pests and crop/animal)
c) Application rate (kg a. I / Ha or % a.i spray dilution for each site/pest listed
d) Suggested methods of applications
e) References of recommended use by authorized bodies in Rwanda
f) Reference of recommended use by authorized bodies outside Rwanda
g) Frequency and timing of application for each site/pest listed
h) Reference where the agrochemical has been used successfully/unsuccessfully showing the dosages applied (metric units)
i) Persistence of the agrochemical in the environment (soil, water, plant and animal products)
j) References of pest resistance to the pesticide product
k) Phytotoxicity
l) Results of laboratory studies, if any
m) Effects on benefial organisms

Environmental effects, fate and transport

a) Avian acute oral toxicity
b) Fish acute toxicity
c) Aquatic acute toxicity
d) Accumulation in fish
e) Avian reproduction
f) Fish reproduction
g) Acute toxicity to honey bees
h) Soil non-target macro / microorganisms
i) Volatility
j) Adsorption / desorption
k) Leaching
l) Degradation in soil
m) Biodegradation
n) Hydrolysis

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- Air and other conditioners.....
- Manufacturing equipment.....
- Disposal of wastes.....

9. Manufacturer profile

- Name
- Address
- P.O.box
- Email
- Research and development department

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o) Aqueous photolysis
p) Analytical method – residue in soil / water

Residues in foods

a) Identity of principal residues, metabolites and degradation products in edible crops, foods or feeds
b) Residues decay curves for residues on crops to be treated
c) Residues of active ingredient and principal metabolite in animals fed on treated feeds or grazed on treated fields or pastures
d) Effects of foods processing or home preparation on residues
e) Analytical method for detection of principal residues, metabolites on treated commodities
f) Proposed maximum residue level for each crops, food, feed or animal expected to contain residues

7. Labelling

a) Trade and common name of the agrochemical;
b) Name and address of the manufacturer ;
c) Manufacturing and expiry date;
d) Batch number
e) Net contents
f) Formulation
g) Hazard symbol and precautionary words
h) Instruction for use
i) Percentages of main nutrient elements and grade;
j) Registered source in case of agricultural lime product;
k) Trace elements content in percentage by weight in whole numbers or to one decimal place for agrochemicals containing only one trace element if applicable;
l) Trace elements of the agrochemical both in words and by appropriate chemical symbols.

8. Premises (Attach Sketch):

- Physical address:.....
- Manufacturing room(s).....
- Storage of: Technical materials.....
- Adjutants.....
- Finished products.....
- Standards.....
- Antidotes.....

Annex 3: Data Collection Questionnaire

I. **Data collection questionnaire for RALIS Rwanda-FDA**

1. What are the main importers and manufactures of pesticides in the country?

(a) Importers: i.
ii.
iii.
iv.
v. ……..,

(b) Manufacturers: i.
ii.
iii. ……,

2. Generally, what are the volume of main imported or manufactured pesticides?

(a) for agriculture

No	Main imported pesticides	Volume (tons or litres)/ year		Importers
		2018	2019	
1				
2				
3				
4				

No	Main manufactured pesticides	Volume (tons or litres)/ year		Manufactures
		2018	2019	
1				
2				
3				
4				
5				
6				
7				
8				

(b) for non-agriculture (household and public health) purposes

No	Main imported pesticides	Volume (tons or litres)/ year		Importers
		2018	2019	
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				

No	Main manufactured pesticides	Volume (tons or litres)/ year		Manufactures
		2018	2019	
1				
2				
3				
4				
5				
6				
7				
8				

II. **Data collection questionnaire for Importers and Manufacturers**

1. Name of Importer:…….
   Name of Manufacturer:……
2. In the following tables

(a) what are the pesticides used for those activities for agriculture purposes?

No	Type of activity	Names of pesticides (within active ingredients)
1	Agriculture	
2	Livestock	

(b) what are the pesticides used for those type of activities for non-agriculture purposes?

No	Type activity	Names of pesticides (within active ingredients)
1	Public health	
2	Household	

3. Generally, what are the volume of pesticides imported or distributed?

(c) for agriculture

No	**Main imported pesticides**	Volume (tons or litres)/ year	
		2018	2019
1			
2			
3			
4			
5			
6			
7			
8			

9			
10			
11			
12			
13			

No	**Main manufactured pesticides**	Volume (tons or litres)/ year	
		2018	2019
1			
2			
3			
4			
5			
6			
7			

No	**Main distributed pesticides**	Volume (tons or litres)/ year	
		2018	2019
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			

(d) for non-agriculture (household and public health) purposes

No	**Main imported pesticides**	Volume (tons or litres)/ year	
		2018	2019
1			
2			
3			

4			
5			
6			
7			
8			
9			
10			
11			
12			
13			

No	**Main manufactured pesticides**	Volume (tons or litres)/ year	
		2018	2019
1			
2			
3			
4			
5			
6			
7			
8			
No	**Main distributed pesticides**	Volume (tons or litres)/ year	
		2018	2019
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			

III. **Data collection questionnaire for agronomists**

3. In the following tables,

(c) What are the pesticides used for those crops for agriculture purposes?

No	Type of activity	Name of crops	Pesticides	Field/Zone
1	Vegetable	Tomatoes, cabagge, all types of paper, white egg, carrot		
2	Cereals	maize,wheat, rice, sorgum		
3	Pulses	beans, soya beans, peas		
4	Root tubers	Irish potatoes, sweet potatoes, cassava		
5	Coffee plantation	Coffee		
6	Fruits	Lemon, orange, avocado, tamarillo, passion fruit		
7	Livestock			

(d) What are the pesticides used for those type of activities for non-agriculture purposes?

No	Type activity	Names of pesticides
1	Public health	
2	Household	

4. Generally, what are the volume of pesticides sold at?

(e) for agriculture purposes

No	Activity	Names of pesticides	Volume (tons or litres)/ year	
	Main used pesticides		2018	2019
1				
2				
3				
4				
5				
6				
7				

8				

(f) for non-agriculture (household and public health) purposes

No	Activity	Names of pesticides	Volume (tons or litres)/ year	
	Main used pesticides		2018	2019
1				
2				
3				
4				
5				
6				
7				
8				

Annex 4: List of contacted persons

No	Names	Function	Institution
1	HAKIZAMUNGU Leon	Inspector	MINAGRI/RAB
2	MUJAWIMANA Florence		MINAGRI
3	KARURANGA Dismas	Pollution Control Specialist	MoE
4	DUHUZE Remy	Director of Environmental Regulations and Pollution Control	REMA
5	RUKWAYA Jean Luc	Environmental Education Officer	REMA
6	UWIMANA Clement	Chemical Products Standards Officer	RSB
7	MUKESHIYAREMYE Athanasie	Director Standards Department	RSB
8	UWAMARIYA Pacifique	Registrar of Medical and Pharmacetical Testing Unit	Rwanda-FDA
9	IRADUKUNDA God Patrick	Registration and Variation Assessment officer	Rwanda-FDA
10	MUJAWAMARIYA Marie Gorette	Registrar of pesticides	RALIS
11	UWAMARIYA Claudine	Inspector	RALIS
12	SEBINEGA Innoncent	General Manager	Agropy
13	UWINEZA Grace	Service Manager	Agropy
14	MBARUBUKEYE Appolon	Agronomist	Agrotech
15	SIBOMANA Jeanne	Agronomist	Gatsata Sector
16	Lise Chantal Dusabe	CEO	ROAM
17	NSENGIMANA J Claude	Agronomist	Gasabo District
18	MANIRORA Gerard	Agronomist	Nyabihu District
20	TWIZERIMANA Eliezel	Farmer	Shingiro Sector
21	UWIMANA Spéciose	Farmer	Kabatwa Sector
22	NIZEYIMANA Placidie	Farmer	Gahunga Sector
23	SENGORORE Faustin	Farmer	Bugeshi Sector
24	MWANANAYO Viateur	Agro dealer	Rutsiro District
25	KALIMWABO Jeanne	Agrodealer	Bugesera District
26	MUTWARE Janviere	Agronomist	RwamaganaDistrrict
27	SHEMA Joel	Agro dealer	Burera District
28	UWERA Doriane	Agronomist	Rusizi District
29	TWAGIRA Justin	Agronomist	Nyaruguru District