Situation Report of Chlorpyrifos in Ethiopia
Pesticide Action Nexus Association (PAN-Ethiopia)
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I. Introduction to the country

1.1 General overview of the country and its agricultural activities

Agriculture in Ethiopia is the foundation of the country's economy. It is estimated that 85% of the 120 million population in Ethiopia are engaged in agriculture. In an effort to increase production and productivity, the agriculture sector considers the use of such inputs as pesticides and fertilizers as a driving force. Input use and distribution is mainly conducted through agriculture development agents who are working at the grassroots level with smallholder farmers.

The use of agricultural inputs in Ethiopia, including pesticides, was introduced by smallholder farmers since the 1960s through agricultural extension systems. Since then, the use of pesticides by smallholder farmers showed a steady increase. Recently, special emphasis given to agriculture investments and the development of the flower sector contributed a lot to the import and use of pesticides. This increasing trend in the use of pesticides as part of development poses threats to human health and the environment.

Moreover, highly hazardous pesticides (HHPs) including persistent organic pollutants (POPs) and chlorpyrifos are widely used by smallholder and commercial farmers in Ethiopia. FAO recommended the progressive ban of the use of HHPs since 2006 due to their confirmed adverse impacts on people, the environment and the threat to biodiversity. However, concerted efforts to identify registered HHPs and ban their use have been minimal in Ethiopia.

This report, hence, describes the import and distribution of chlorpyrifos in Ethiopia as well as for what purpose the pesticide is used and what kind of problems the pesticide causes to human health and the environment. The report also describes the government bodies that regulate pesticides and the policy framework that supports the proper regulation of Highly Hazardous Pesticides in Ethiopia.

1.2 History of registration and use of chlorpyrifos

As indicated above, pesticides were introduced to the Ethiopian agriculture since the 1960s. However, evidence could not be obtained since when Ethiopia started registering and importing this pesticide. However, the use of chlorpyrifos in Ethiopia could be recorded since the 1960s.

II. Status of chlorpyrifos use

2.1 What are the main crops for which chlorpyrifos is used in the country

According to the information from the Ministry of Agriculture of Ethiopia and the experience obtained from farmers and field work, chlorpyrifos in Ethiopia is used for the following four purposes:

A. The control of termites on peppers
B. The control of African bollworm on tomatoes
C. The control of African bollworm in chickpeas
D. The control of African bollworm on cotton

Even if chlorpyrifos is officially registered for the above four purposes, a peer reviewed article from 2022[1] indicated that it is also used by farmers for insect and pest management in maize, onion, cabbage, garlic and khat (a mild stimulant leaf).

2.2 Sources of chlorpyrifos

Ethiopia does not produce chlorpyrifos and is a net importer. In 2021, Ethiopia imported a total of 123.6 tons of chlorpyrifos from Israel, India and China with specific country amounts indicated in Table 1 below.

[1] : Sishu, F.K.; Tilahun, S.A.; Schmitter, P.; Assefa, G.; Steenhuis, T.S. Pesticide Contamination of Surface and Groundwater in an Ethiopian Highlands' Watershed. Water 2022, 14, 3446. https:// doi.org/10.3390/w14213446

Table 1. The amount of chlorpyrifos imported to Ethiopia in 2021 with origin of consignment

Country (Consignment)	# of packages	Net weight (Kg)	Remark
Israel	31	6,742.5	
India	9,398	94,417.7	***2021 Largest importer***
China	1,778	22,409.5	
Total	11,207	**123,569.7**	

Source: Ministry of Agriculture of Ethiopia, September 2022

III. Human health and environmental impacts of chlorpyrifos in Ethiopia

Chlorpyrifos is an organophosphorus pesticide that has broad-spectrum insecticidal action against a number of important arthropod pests. Chlorpyrifos possesses a low water solubility and great tendency to partition from aqueous into organic phases in the environment (log Pow of 4.7). It is characterized by a high affinity to bind to organic matter in the soil and is relatively non-mobile (Koc 8151).

Its movement through and over the soil profile is limited. It has been found to be relatively vertically immobile in soil and has not proved to be a groundwater contaminant. Surface runoff and erosion mobility are also low (Racke, 1993)[2]. Chlorpyrifos has an intermediate vapour pressure and under some conditions, its volatility is a significant mechanism of dissipation.

Chlorpyrifos is a broad-spectrum insecticide, which kills insects upon contact by affecting the normal function of the nervous system. It affects the nervous system by inhibiting the breakdown of acetylcholine (a neurotransmitter). Chlorpyrifos has high acute toxicity for mammals (rats-LD50 64mg/kg), birds (Colinus virginianus), fish (Oncorhynchus mykiss), aquatic invertebrates (Daphnia magna), sediment dwelling organisms (Chironomus riparius) and honeybees. The World Health Organization (WHO) classified it as Class II, a moderately hazardous pesticide.

[2] Racke, K.D. (1993). Environmental fate of chlorpyrifos, Rev. Environ. Contam. Toxicol. 131:1-150.

Concerning human health impacts, there is no clear clinical assessment of chlorpyrifos poisoning in Ethiopia. Some studies, however, indicate farmers' knowledge and practice rather than concrete results. A study conducted in 1998[3], for example, states that the risk factors of pesticide poisoning such as low level of awareness of workers about the toxicity of pesticides, poor personal hygiene and improper use of personal protective devices, are related to poisoning of spray workers by chlorpyrifos.

In relation to environmental impacts of chlorpyrifos, Sishu et.at (2022) indicated that high concentration of chlorpyrifos was found in ground water and surface water samples of the high land water shades of Ethiopia, where it was applied for the pest management of the above mentioned crops.

IV. National policy related initiatives

The project involved consultation with the Ministry of Agriculture of Ethiopia, which registers all pesticides in Ethiopia, and the Ethiopian Environmental Protection Authority (EPA), which is the National Designated Authority (DNA) for most of the chemicals conventions to which Ethiopia is a party. A detailed discussion was conducted with these partners and civil society organizations on the POPs Review Committee (PORC) agreement in January 2022 about chlorpyrifos meeting the Stockholm Convention's screening criteria for persistence, bioaccumulation, adverse effects, and long-range transport. EPA briefed the participants on how the process has been going and the Ministry of Agriculture indicated its commitment to promote alternatives to chlorpyrifos.

V. Communication strategy

In the previous TFSDGs on HHPs, PAN-Ethiopia together with IPEN, PAN International and other partners developed and published information about alternatives to HHPs and the practical implementation of agro-ecological approaches to replace HHPs with non-synthetic pest

[3] K Lakew 1, Y Mekonnen, Ethiop Med J. 1998 Jul; 36 (3):175-84.

management techniques. As a means of communication to policy makers and farming communities, copies of this booklet were disseminated and experiences of PAN-Ethiopia in agro-ecological vegetable farming and organic cotton farming techniques were presented.