Policy Brief

The Danger of POPs in Pesticide in Cambodia: Promoting Integrated Pest Management to Reduce POPs

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Executive Summary

Climate change will fundamentally alter agricultural ecosystems in Cambodia. Higher temperatures will increase pest development rates, and the number of pests surviving through the season. Warmer temperatures will enable certain pests to become active sooner in the season and persist longer (Ameden & Just, 2001). Elevated temperatures and CO_2 levels will lead to changes in pest activity and population levels (IPCC, 1996). In this case, due to climate change, the demand for pesticide use has been increasing in Cambodia which contained Persistent Organic Pollutants (POPs).

POPs represent a serious threat to public health. Where POPs are present in water, they can cause serious diseases, including cancer, endocrine disruption, reproductive and immune dysfunction, neurobehavioral, and reduced birth rates, in both humans and animals (Triet *et al.*, 2013). This Policy Brief presents research into POPs' potential impacts, the levels and future outlook for POPs in the environment and humans, and how we can reduce our use of POPs in Cambodia, recommending the promotion of an Integrated Pest Management approach to control pests without the use of POP-containing pesticides in agriculture.

Persistent Organic Pollutants (POPs): the Situation in Cambodia

An inventory of Persistent Organic Pollutants in Cambodia in 2004 showed that Cambodia has a high potential for generating and releasing POPs from a range of sources, including: agricultural activity using pesticides containing POPs, uncontrolled combustion processes/burning POP-containing fuel or chemicals, medical waste incineration without air cleaning facilities, power generation plants, generating electricity by using oil or autoclave kilns operated by burning waste, and ferrous and non-ferrous metal production (CEDAC, 2006b). Particularly, chemical fertilizers and pesticides have been widely used in Cambodian agriculture for many decades. Over this time, most of them have been imported from other countries, and have contained POPs (CEDAC, 2006a).

POPs are transported long distances through natural atmospheric and water flow, meaning that they can be present across the country and far from their original sources (EU, 2017). Research conducted by USGS showed that all seventeen kinds of POPs were found in water analyses in Cambodia, and indicates that Cambodia has at least 12 'hot spots' of elevated POP concentration in water, including the Lower Cambodian Mekong River Basin in Tonle Sap Great Lake, which receives inflow from the Tonle Sap River and Stung Sen River. This study also pointed out that Mekong Low Land is the most diverse of the POP hot spots found along the Lower Mekong River Basin and showed that there is a correlation between use of wetlands by local people, and presence of POP in the water there (as POPs were found to be less concentrated in open forest sites). Hotspots identified in wetlands such as the Tonle Sap not only had concentrations of DDT and DDE that exceeded Canadian and U.S. benchmarks, but fauna sampled in the area also showed high degrees of bioaccumulation of the same substances. (Triet *et al.*, 2013).

POPs are a Threat to Cambodian Public Health

POPs are organic (carbon-based) compounds which do not break down easily in the environment. They therefore accumulate through the food web, reaching peak concentrations in species at the top of the web, and therefore pose a risk of harm to human health and wild animals (EU, 2017). POP hot spots in Cambodia are located where thousands of Cambodian rural people are living, who depend mainly on fish, water, aquatic crops and animals, water birds, and other aquatic organisms as their important source of food, all of which show higher concentrations of POPs.

This means that humans are exposed to POPs through their diet, by eating and drinking POP-contaminated food and water. POPs threaten Cambodian public health, causing serious diseases, including cancer, endocrine disruption, reproductive and immune dysfunction, neurobehavioral problems, and reduced birth rates, in both humans and animals. Put simply, POPs are damaging to life, are entering the water cycle and food chain through pesticide use, and remain in the water system for a significant period of time.

Could Climate Change Increase Risks to Health from POPs?

As POPs are able to travel long distances through water flows and the air, climate change is a relevant factor in their spread and the risk they pose to health in Cambodia. In a changing climate, several factors could result in an increase in the releases of POPs into the environment. For example, it is anticipated that the range of vector-borne diseases like malaria will increase, which could lead to greater use of pesticides containing POPs. It is also expected that many areas will experience less rainfall as a result of climate change; a drier climate could lead to an increase in wildfires and thus higher emissions of dioxins and furans. Conversely, while measures taken to reduce the release of greenhouse gases could also mitigate the unintentional release of POPs, greater use of biomass for energy production could result in higher POP release as compared with the POP release resulting from the burning of fossil fuels. A warmer climate could result in secondary releases of POPs from soil, water bodies or ice and lead to higher levels of POPs in the air. POPs are a complex factor in climate change mitigation.

Recommendation: Cambodia Currently Needs to Promote IPM to Reduce POPs

The majority of POPs identified to date have been banned or restricted, not only in Cambodia but around the world, owing to concerns about their harm to ecosystems and human health. However, even long-banned POPs still linger in the environment, while others are still in use and are being directly emitted, and new POPs may be identified for which we have limited information at present.

Most POPs in Cambodia have contaminated water and local diets through the use of agricultural pesticide. In this regard, strategies are needed to reduce the use of POPs — strategies which identify safer alternatives to these contaminants.

Traditional approaches to chemicals management gather information on chemical hazards, uses, exposure and risks, and develop risk-management measures, such as restrictions on use or other ways of reducing exposure. These approaches provide an important basis for decision-making and can lead to the production of safer chemicals. However, these measures are time-consuming, and can also prevent the consideration of a broader range of solutions (such as alternatives to chemical use).

The clearest pathway to reducing the presence of POPs in Cambodia is minimizing the amount of pesticide used in Cambodia. An approach that combines different ecologically sound pest control strategies, or Integrated Pest Management (IPM), should be promoted. IPM is an ecological approach to managing rice pests, which would improve the agricultural ecosystem, prevent pest outbreaks and contribute to sustainable crop production intensification by focusing on the education of farmers. IPM aims to enable farmers to increase agricultural productivity and probability in a sustainable manner, leading to better socioeconomic outcomes while safeguarding human and animal health and protecting the natural environment (NIPMP, 2003).

If IPM is promoted in Cambodia, it can be expected to reduce chemical pesticide use, soil and water pollution, pest resistance, loss of beneficial crop-associated biodiversity, and damage to natural ecosystems, thereby maintaining pest populations at less than damaging numbers and reducing yield losses to insect pests (Kimkhuy & Chhay, 2014). As a result, IPM will contribute to climate change mitigation through reducing emissions for the production of POP-containing chemicals by reducing demand for them, and enhancing the removal of POP-containing chemicals from agricultural practice.

IPM is the best choice for Cambodia to reduce POP concentrations in food and water chains, and mitigate the potential for climate change to lead to higher concentrations, and greater use, of POP-containing chemicals.

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