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Emerging policy issues and other issues of concern: other issues of concern: highly hazardous pesticides

Submission from the Pesticides Action Network and the International POPs Elimination Network on highly hazardous pesticides

Note by the secretariat

The secretariat has the honour to circulate, for the information of participants, a report received from the Pesticides Action Network and the International POPs Elimination Network on the need for action on highly hazardous pesticides (see annex). The report is reproduced as received by the secretariat, without formal editing.

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Annex

Why Action on Highly Hazardous Pesticides is Needed

Submitted by: Pesticides Action Network (PAN) and IPEN

Executive Summary

Highly Hazardous Pesticides (HHPs) are a threat to human health and the environment with significant impacts on developing and transition countries. Global concern is clearly increasing every year. At ICCM3, a large number of countries from all UN regions, as well as international agencies and civil society organisations supported actions on HHPs, including developing a priority list of substances for a progressive ban and substitution with safer alternatives. During the recent round of SAICM regional meetings, more than 140 countries reiterated that concern, and called for more information on what HHPS are in use and for more information on safer alternatives.

Action is needed to phase out HHPs because of their effects on human health and the environment, and the costs to society of their continuing use. Safer alternatives are available, especially ecosystem approaches to pest and weed management.

Human Health

Acute effects on health range from seemingly mild symptoms to much more severe symptoms, some leading to chronic disability or death. Other chronic effects may result with no acute symptoms and little outward effect, yet still can undermine a person's health for the rest of their lives, and may also affect future generations.

Some harm results from negligence, lack of awareness, and shortage of resources – for example the death of 23 school children in India in 2013 when their free midday meal was cooked with oil contaminated by monocrotophos, thought to be as a result of storing the oil in an empty monocrotophos container.[1]

Some harm results from the pervasiveness of pesticides in air, drinking water and food, and there is particular concern about the exposure of the unborn foetus or newly born child to neurotoxins such as organophosphate insecticides (OPs), resulting in neurodevelopmental deficits. Numerous studies on animals have shown that *in utero* or neonate exposure to OPs, particularly chlorpyrifos, adversely affects neurodevelopment.[2] Metabolites of organophosphate insecticides have been found in the urine of 94% of farm and non-farm children in the Bang Rieng agricultural community in Thailand.[3]

Some harm results from intentional ingestion of pesticides with suicidal intent. Pesticides account for about one third of the estimated 800,000 global annual suicide deaths making them the single most common means of suicide worldwide.[4] The fatality rate from pesticide ingestion is high, and banning HHPs in some countries has been successful in bringing down the death rate: the banning of monocrotophos, methyl-parathion, methamidophos and endosulfan by Sri Lanka resulted in a 50% fall in the suicide rate, although poisoning with WHO Class II pesticides dimethoate, fenthion and paraquat (the latter with a case fatality rate of 42.7%), remained a problem.[5]

Pesticides have been poisoning farm workers, their families and communities for over 60 years. Yet there is still no accurate estimate of the degree of human suffering from exposure to pesticides. The

[1] Reuters. 2013.World Health Organisation had asked India to ban toxin that killed school children. July 22, 2013. http://www.ndtv.com/article/india/world-health-organisation-had-asked-india-to-ban-toxin-that-killed-school-children-395630; http://tvnz.co.nz/world-news/asked-india-ban-toxin-23-killed-children-5516941

[2] e.g. Flaskos J. 2012. The developmental neurotoxicity of organophosphorus insecticides: A direct role for the oxon metabolites. *Toxicol Lett* 209(1):86-93.

Muñoz-Quezada MT, Lucero BA, Barr DB, Steenland K, Levy K, Ryan PB, Iglesias V, Alvarado S, Concha C, Rojas E, Vega C. 2013. Neurodevelopmental effects in children associated with exposure to 4 organophosphate pesticides: A systematic review. *Neurotoxicology* 39:158-68.

Eskenazi B, Marks AR, Bradman A, Harley K, Barr DB, Johnson C, Morga N, Jewell NP. 2007. Organophosphate pesticide exposure and neurodevelopment in young Mexican-American children. *Environ Health Perspect* 115(5):792-8.

[3] Panuwet P, Siriwong W, Prapamontol T, Ryan B, Fiedler N, Robson MG, Barr DB. 2012. Agricultural pesticide management in Thailand: status and population health risk. *Environ Sci Pol* 17:72-81.

[4] WHO. 2014. Preventing Suicide: A Global Imperative. World Health Organization, Geneva.

[5] Eddleston M, Adhikari S, Egodage S, Ranganath H, Mohamed F, Manuweera G, Azher S, Jayamanne S, Juzczak E, Sheriff MR, Dawson AH, Buckley NA. 2012. Effects of a provincial ban of two toxic organophosphorus insecticides on pesticide poisoning hospital admissions. *Clin Toxicol (Phila)* 50(3):202-9

most authoritative study still today is one published in the World Health Statistics Quarterly in 1990, using data derived in the 1980s – nearly 30 years ago. This study[6] estimated that there are possibly one million cases of serious unintentional pesticide poisonings each year, and an additional two million cases of people hospitalized for suicide attempts with pesticides. The author notes that this necessarily reflects only a fraction of the real problem and estimates that there could be as many as 25 million agricultural workers in the developing world suffering some from occupational pesticide poisoning each year, though most incidents are not recorded and most patients do not seek medical attention.[7] A surveillance exercise in Central America indicated a 98% rate of underreporting of pesticide poisonings, with a regional estimate of 400,000 poisonings per year, 76% of the incidents being work related.[8]

There is no reason to assume that the global pesticide poisoning rate has diminished. The figure of 25 million cited above was based on an average of 3% of agricultural workers in developing countries suffering an episode of pesticide poisoning per year,[9] yet figures from recent surveys and studies indicate the problem may well be much larger than that, with rates of poisoning ranging up to 100% of workers exposed to pesticides:

- Bangladesh, 2014 – 85% of applicators reported suffering gastrointestinal problems during and after spraying, 63% eye problems, 61% skin problems, and 47% physical weakness. Most commonly used pesticides: organophosphate and synthetic pyrethroid insecticides.[10]
- Burkina Faso, 2013 – 82.66% of farmers surveyed reported having experienced at least one ailment during or just after spraying, most commonly central nervous system effects. Of the cases reported to a health care centre, 53% were unintentional ingestion, 28% suicides, and 19% occupational use.[11]
- Pakistan, 2012 – in a small study of female workers picking cotton 3-15 days after pesticides were last used, 100% of them experienced headache, nausea and vomiting.[12]
- Republic of Korea, 2012 – acute occupational pesticide poisoning amongst young male Korean farmers was reported to be 24.7%.[13]
- India – in 2014 a survey by the Calcutta School of Tropical Medicine and the NRS Medical College found that 30% of farmers using pesticides in a district in West Bengal were experiencing neurological symptoms.[14] In 2012 a survey of pesticide-exposed farmers in Punjab, India, reported 94.4% exhibited some symptoms of poisoning.[15]
- Brazil, 2012 – in a small survey in Brazil, 44.8% of rural workers involved in vegetable production reported health problems whilst using pesticides.[16]

These figures only reflect acute effects of pesticides. Chronic health effects are also a significant concern, but no accurate statistics exist for the incidence. Effects include cancer, birth defects, neurodevelopmental delays and behavioural affects in children, adult onset neurological diseases such

[6] Jeyaratnam J. 1990. Acute Pesticide Poisoning: A Major Global Health Problem. *World Health Stat Q* 43(3):139-44.

[7] Ibid.

[8] Murray D, Wesseling C, Keifer M, Corriols M, Henao S. 2002. Surveillance of pesticide- related illness in the developing world: putting the data to work. *Int J Occup Environ Health* 8(3):243-8.

[9] Jeyaratnam, *op cit*.

[10] Miah SJ, Hoque A, Paul A, Rahman A. 2014. Unsafe use of pesticide and its impact on health of farmers: a case study in Burichong Upazila, Bangaldesh. *IOSR-J Environ Sci Technol Food Tech* 8(1):57-67.

[11] Toe AM, Ouedraogo M, Ouedraogo R, Ilboudo S, Guissou PI. 2013. Pilot study on agricultural pesticide poisoning in Burkina Faso. *Interdiscip Toxicol* 6(4):185-91.

[12] Tahir S, Anwar T. 2012. Assessment of pesticide exposure in female population living in cotton growing areas of Punjab, Pakistan. *Bull Environ Contam Toxicol* 89:1138-41.

[13] Lee WJ, Cha ES, ParkJ, KoY, Kim HJ, Kim J. 2012. Incidence of acute occupational pesticide poisoning among male farmers in South Korea. *Am J Ind Med* 55(9):799-807.

[14] Banerjee I, Tripathi SK, Roy AS, Sengupta P. 2014. Pesticide use pattern among framers in a rural district of West Bengal, India. *J. Nat Sci Biol Med* 5(2): 313-6.

[15] Singh A, Kaur MI. 2012. Health surveillance of pesticide sprayers in Talwandi Sabo area of Punjab, north-west India. *J Hum Ecol* 37(2):133-37.

[16] Preza DLC, Augusto LGS. 2012. Farm workers' vulnerability due to the pesticide use on vegetable plantations in the Northeastern region of Brazil. *Rev Bras Saúde Ocup* (37):125.

as Parkinson's disease, and many other effects. Of particular concern are those effects resulting from endocrine disruption (ED). The importance of endocrine disruption is signalled by ICCM3 adopting EDs as an Emerging Issue. All stakeholders agreed "to promote actions on endocrine disrupting chemicals" (EDCs). Within this broader group of EDCs, ED pesticides can be considered a specific group of chemicals meriting special attention because of the way in which they are used, their large impact on developing and transition countries due to the importance of agriculture, and because safer alternatives are readily available. The 2014 PAN HHP[17] list contains 52 pesticides that are EDCs. It must be emphasised that these are only the worst of the ED pesticides: there are many more besides these.

Environmental impacts

Most environmental contamination with pesticides results from the normal methods by which they are delivered to the target pests – largely spraying or seed coating. Both methods result in only a tiny fraction of the material applied reaching the target organisms, particularly in the case of insecticides, and a large proportion of the chemicals are left in the environment to affect other organisms.[18] [19] They leach into groundwater, wash into streams, rivers and the marine environment, drift or after evaporating are carried by the air hundreds, even thousands of kilometres to be redeposited in the Arctic, Antarctic, and on the peaks of mountains such as the Himalayas. Pesticides now contaminate soil, water, air, rain, fog, snow, ice, flora, fauna, and humans throughout the world.[20] The UN's Economic and Social Commission for Asia and the Pacific reported in 2002 that, in Thailand, "an estimated 70 per cent of applied pesticides is washed away and leaches into the soil and water, resulting in excessive pesticide residue contamination in the local ecology and food chain. It is not surprising to find a large amount of land and water in the country contaminated with pesticides".[21]

As a result of their widespread dispersal in the environment, pesticides result in reduced survival and reproductive rates and have been implicated in mass die-offs of marine mammals, birds, and fish,[22] and population crashes of amphibians and alligators.[23] [24]

In 2014 a team of 29 scientists published their analysis of the impacts of systemic insecticides on the ecosystem as a whole. This "Worldwide Integrated Assessment of Systemic Insecticides"[25] found that the neonicotinoid insecticides together with fipronil, are posing a global threat to biodiversity and the ecosystem services on which global food production depends, such as nutrient recycling, soil respiration, leaf litter decomposition, pollination, and biological pest control. These are now the most commonly used insecticides, encompassing 1/3rd of the global market. Because of this widespread use, together with their persistence and solubility in water, they have contaminated agricultural soils, freshwater resources, wetlands, estuarine and marine systems, and non-target vegetation, so that myriads of non-target and beneficial species are now exposed to toxic concentrations of insecticides. Some of the systemic insecticides persist in the environment for years and this, together with their solubility, results in multiple routes of chronic and acute exposure. They disrupt the functioning of diverse biological communities, including soil microbial communities that are the cornerstone of sustainable agriculture. They are causing a significant decline in beneficial insects, are a key factor in the decline of bees, and pose a serious risk to butterflies, earthworms and birds. Aquatic insects are at risk. Residues found in water around the world regularly exceed toxicological limits. Some of the neonicotinoids are up to 10,000 times more toxic to insects than DDT. Through run off and wind-

[17] http://www.pan-germany.org/download/PAN_HHP_List_140527_F

[18] Jepson P. 2009. Assessing environmental risks. In: Radcliffe EB, Hutchison WD, Cancelado RE. 2009. *Integrated Pest Management*. Cambridge University Press

[19] The Task Force on Systemic Insecticides. 2014. http://www.tfsp.info/worldwide-integrated-assessment.

[20] See Watts MA. 2009. Endosulfan monograph. PAN Asia and the Pacific. http://www.panap.net/sites/default/files/monograph_endosulfan.pdf.

[21] ESCAP. 2002. *Organic Agriculture and Rural Poverty Alleviation: Potential and Best Practices in Asia*. Economic and Social Commission for Asia and the Pacific, United Nations, New York.

[22] Köhler H-R, Triebskorn R. 2013. Wildlife ecotoxicology of pesticides: can we track effects to the population level and beyond? *Science* 341:759.

[23] Bruhl CA, Schmidt T, Pieper S, Alscher A. 2013. Terrestrial pesticide exposure of amphibians: an underestimated cause of global decline? *Sci Rep* 3:1135).

[24] Colborn T, Dumanoski D, Myers JP. 1996. *Our Stolen Future*. Little Brown, Boston.

[25] The Task Force on Systemic Insecticides. 2014. http://www.tfsp.info/worldwide-integrated-assessment.

blown dust from treated seeds, they have spread far beyond the farms on which they have been applied, the effects cascading through ecosystems and undermining their stability.[26]

Costs

Estimates of costs are difficult to make, but several studies provide some indications of the economic consequences of HHP use.

In Brazil the costs associated with acute poisoning alone, and only for the state of Paraná, have been estimated at approximately USD 149 million per year. For each dollar spent on pesticides, the external costs from acute poisoning alone were estimated as USD $1.28.[27]

In Thailand, the average external costs of pesticide use was estimated to be USD $27.1/ha, comprised mainly of costs to farm workers health (USD $22.42/ha); but the costs rises to USD $105.75 ha for intensive horticulture.[28]

In developed countries the cost is huge: for the US there is an estimated USD S9.6 billion, per annum, in environmental and societal damages from pesticides, including $1.14 billion for public health impacts: [29]

The UNEP Cost of Inaction Report notes:[30]

- A conservative future risk scenario analysis suggests that accumulated health costs of injury to smallholder pesticide users in sub-Saharan Africa will increase to approximately USD 97 billion by 2020, from USD 4.4 billion in 2004.
- In 2009, the conservatively projected costs of inaction related to current pesticide use alone is greater than the total Official Development Assistance to general healthcare in Africa, excluding that for HIV/AIDS.
- Health costs resulting from pesticides were estimated to be USD 230 million in Uganda in 2005.
- In Europe, there is an estimated monetized value of USD 15 million per year for hospitalisations, and USD 3.9 million from lost work resulting from pesticide poisonings.
- The disappearance of bees and other pollinators would cost the UK economy up to £440 million per year and amount to 13% of the country's income from farming.
- In the USA, acute poisonings, fatalities, cancer and other chronic effects are estimated to have a monetized value of USD 787 million annually.
- The "major economic and environmental losses due to the application of pesticides in the USA", as reported in 2005 amounted to: USD $1.1 billion per year in public health costs; USD $1.5 billion per year in pesticide resistance; USD $1.4 billion per year in crop losses; USD $2.2 billion per year in bird losses; and USD $2.0 billion per year in groundwater contamination. This totals USD $10 billion per year.
- The disappearance of bees and other pollinators would cost the UK economy up to £440 million per year and amount to 13% of the country's income from farming. Although there is no single factor that explains pollinator decline, the factors involved include pesticides.

[26] van der Sluijs JP, Amaral-Rogers V, Belzunces LP, Bijleveld van Lexmond MF, Bonmatin J-M, Chagnon M, Downs CA, Furlan L, Gibbons DW, Giorio C, Girolami V, Goulson D, Kreutzweiser DP, Krupke C, Liess M, Long E, McField M, Mineau P, Mitchell EA, Morrissey CA, Noome DA, Pisa L, Settele J, Simon-Delso N, Stark JD, Tapparo A, Van Dyck H, van Praagh J, Whitehorn PR, Wiemers M. 2014. Conclusions of the Worldwide Integrated Assessment on the risks of neonicotinoids and fipronil to biodiversity and ecosystem functioning. *Environ Sci Pollut Res* [Epub].

[27] Soares WL, de Souza Porto MF. 2012. Pesticide use and economic impacts on health. *Revista de Saúde Pública* 46(2):1-8.

[28] Praneetvatakul S, Schreinemachers P, Pananurak P, Tipraqsa P. 2013. Pesticides, external costs and policy options for Thai agriculture. *Environ Sci Pol* 27:103-13.

[29] Pimentel D, Burges M. 2014. Environmental and economic costs of the application of pesticides primarily in the United States. In: Pimentel D, and Peshin R. 2014. *Integrated Pest Management: Pesticide Problems, Vol 3. Springer*, New York.

[30] UNEP. 2013. Costs of Inaction on the Sound Management of Chemicals.

Safer Alternatives

Replacing one pesticide with a slightly less hazardous one is not going to solve the problems described in the preceding sections. In many countries the persistent organochlorines, like endosulfan and the highly toxic organophosphates, have been replaced by the neonicotinoids – trading one problem for another. The neonicotinoids do not meet the current JMPM criteria for an HHP, although they do meet the PAN criteria.[31] Consequently, at the SAICM regional meetings many countries requested more information on safer alternatives including ecosystem approaches.

PAN and IPEN support the advice from international agencies such as FAO,[32] international studies such as IAASTD,[33] and two UN Special Rapporteurs on the Right to Food,[34] [35] that the best way forward is ecosystem approaches to pest management such as agroecology, ecosystem-based IPM, etc. In 2011, the Conference of the Parties to the Stockholm Convention also agreed that when replacing the HHP endosulfan, priority should be given to ecosystem approaches to pest management. These alternatives are technically feasible and available.

Additionally, the UNEP Cost of Inaction Report notes that:

- In Bangladesh, by using IPM, farmers can increase rice output and thus increase profits, on average, by approximately 17%.
- In Indonesia, from 1991 to 1999, an IPM programme helped farmers reduce the use of pesticides by approximately 56% and increase yields by approximately 10%.
- The total estimated GDP gain from implementing its national IPM programme from 2001 to 2020 is equivalent to 3.65% of Indonesia's GDP in 2000, while the increase in household incomes is 1.5-4.8%.
- In the Philippines, the aggregate value of environmental benefits for the five villages in the Central Luzon, where an IPM research program was centred, was estimated at USD 150,000 for the 4600 local residents.

PAN and IPEN are of the view that countries need assistance with information about and implementation of ecosystem approaches to pest management to assist with their successful phase-out of HHPs.

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[31] See PAN List of Highly Hazardous Pesticides for an explanation of the two different sets of criteria. http://www.pan-germany.org/download/PAN_HHP_List_140527_F

[32] FAO, 2011. *Save and Grow: A Policymakers Guide to the Sustainable Intensification of Smallholder Crop Production*.

[33] McIntyre BD, Herren HR, Wakhungu J, Watson RT (eds). 2009.Agriculture at a Crossroads. IAASTD International Assessment of Agricultural Knowledge, Science and Technology for Development Global Report. UNDP, FAO, UNEP, UNESCO, The World Bank. WHO, GEF. Island Press, Washington, D.C. http://www.unep.org/dewa/Assessments/Ecosystems/IAASTD/tabid/105853/Default.aspx

[34] De Schutter O. 2011. Agroecology and the Right to Food. United Nations Special Rapporteur on the Right to Food. A/HRC/16/49. http://www.srfood.org/index.php/en/component/content/article/1174-report-agroecologyand-the-right-to-food.

De Schutter O. 2014. Report of the Special Rapporteur on the right to food. Final report: the transformative potential of the right to food. Human Rights Council, Twenty-fifth session. United Nations General Assembly. A/HRC/25/57.

[35] In her debut speech as the new UN Special Rapporteur on the right to Food, Professor Hial Elver reiterated the call of her predecessor, Oliver de Schutter, that government must shift their focus from industrial agriculture to agroecology, which she described as offering far more environmentally and socially sustainable methods of production that can still meet the rapidly growing demand for food. In: Ahmed N. 2014. UN: only agroecology can feed the world. **Ecologist**. 23rd September.