

INITIAL SITUATION ANALYSIS FOR DDT

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Introduction

The Stockholm Convention on Persistent Organic Pollutants (POPs)¹ entered into force on 17 May 2004. It aims to eliminate the production, use, and trade of POPs listed in either annex A, B or C, to protect human health and the environment. Dichlorodiphenyl trichloroethane (DDT) is listed in annex B ‘Restriction’, part I. Despite international efforts to develop and deploy alternatives, DDT is still being produced, traded, stockpiled and used for disease vector control.

Parties to the Convention may only produce or use DDT for the purpose of disease vector control and if locally safe, effective and affordable alternatives are not available to the Party in question 2. Such use must be in accordance with the recommendations and guidelines of the World Health Organization (WHO).

Moreover, Parties are requested to notify the Secretariat of the Basel, Rotterdam and Stockholm Conventions (BRS Secretariat) if they intent to use or produce DDT. Stockpiles of DDT and wastes consisting of, containing or contaminated with DDT must be managed in a manner protective of human health and the environment. This implies a number of obligations: Parties are to develop strategies for identifying DDT stockpiles and wastes; identify DDT stockpiles to the extent practicable; manage stockpiles in a safe, efficient and environmentally sound manner; take appropriate measures so that DDT wastes are handled, collected, transported, stored and disposed of in an environmentally sound manner; and endeavour to develop appropriate strategies for identifying sites contaminated by DDT.

At its sixth meeting, held in Geneva, Switzerland, from 28 April to 10 May 2013, the Conference of the Parties (COP) to the Stockholm Convention, through decision SC-6/1 on DDT (dichlorodiphenyltrichloroethane) invited the United Nations Environment Programme (UNEP), in consultation with the World Health Organization (WHO), the DDT expert group and the Secretariat (of the Stockholm Convention), to prepare a road map for the development of alternatives to DDT and to present it to the COP at its seventh meeting in 2015. The key elements of the road map were presented to and adopted at the seventh meeting of the COP.

In preparation of the road map, the Chemicals Branch prepared an initial situation analysis with the aim of gathering and summarizing available information on past and present production, trade, consumption and stockpiles as well as concentrations of DDT in humans and the environment.

Materials and methods

Information evaluated for this report included:

1st, 2nd and 3rd national reports, initial and updated national implementation plans (NIPs)

DDT register, DDT questionnaires and DDT information system

Reports of the DDT Expert Group

GEF projects, a survey conducted by UNEP Chemicals Branch in the preparation of the road map on alternatives to DDT

WHOPES’ 10 Year Assessment; Global Monitoring Plan of POPs under the effectiveness evaluation of the Stockholm Convention.

In a systematic approach, UNEP Chemicals set up a table (MsExcel format) listing the countries in alphabetical order and organized the variables of interest in columns for each country: Therein, several worksheets list the amounts of DDT produced, stockpiled, imported, exported and consumed. The tables were then populated with data from the sources listed above. In many instances, adjustments, assumptions and/or extrapolations had to be made to fill empty cells in the respective columns of interest.

Results

When evaluating the above mentioned sources, key challenges included lack of data; incomplete inventories for production, use or trade; inaccurate reporting in relation to use of units (tonnes vs. kilogram; reporting periods) or source of information, *etc.*

Production of DDT: Quantitative data on the amounts of DDT produced globally was available for nine countries, namely Azerbaijan, Bangladesh, Brazil, the Democratic People's Republic of Korea (DPRK), India, Indonesia, the People's Republic of China (PRC), Serbia and the United States of America (U.S.A.) (Table 1).

Table 1: Historic production of DDT according to country and years of production

Country	Start of production	End of production	Quantity (1,000 tonnes)
India	1955	Ongoing	239
DPRK	1960	> 2010?	21
China	1952	2007	467
Mexico	1959	2004	>93
Bangladesh	1966	1992	8
Indonesia	1986	1991	23
Brazil	1962	1982	76
Azerbaijan	1958	1980	481
Poland	1947	1980	79
USA	1944	1973	1,383
Serbia	1947	1960	2
Total			2,793

DDT production increased at a high rate since the 1940s and reached its peak in the 1960s with a total production exceeding one million tonnes annually (see Figure 1). Thereafter, production quickly and steadily decreased. During the first decade of the new millennium, only three countries continued producing DDT – the DPR Korea, India and China – and production amounted to ca. 68 thousand tonnes.

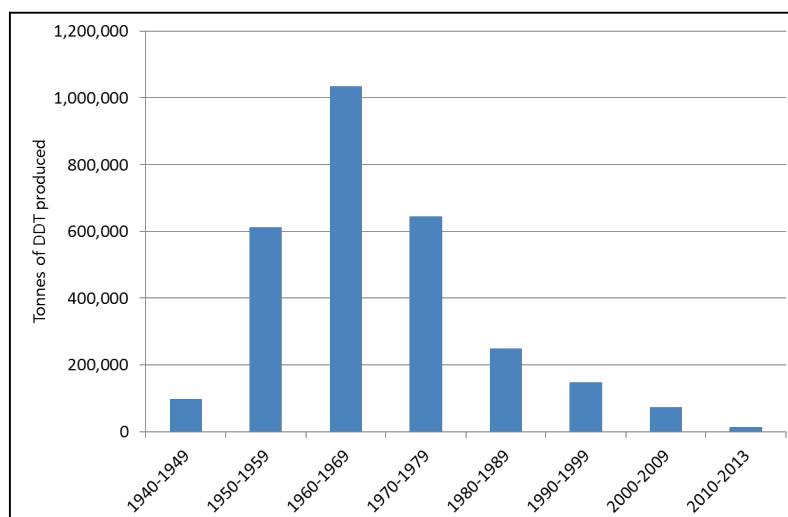


Figure 1: Production of DDT according to decade since 1940

According to the DDT register (as of January 2015), three parties are currently registered for acceptable production of DDT, namely Ethiopia, India and Namibia. In 2006, 2006 and 2009 respectively, Ethiopia, India and Namibia notified the Secretariat that they produce DDT for disease vector control in accordance with the WHO recommendations and guidelines. China had notified the Secretariat of the Stockholm Convention of its production in 2005² but has then ceased production in 2007³. Ethiopia, while registered, has not reformulated or produced DDT since its source of technical grade material from China ceased in 2007. Likewise Namibia, while registered, has never produced or reformulated DDT. In 2015 the only production facility is in India. Recent information on technical grade DDT production in India was used to prepare DDT formulations of 50 % for domestic use; a much smaller share was used to prepare DDT formulations of 75% for export (see Table 1)⁴.

Table 1: Production of DDT in India

Formulation of DDT (in tonnes)	2012/2013	2013/2014
Technical grade material (98% - 99 % active ingredient)	3,872	2,786
Formulated products for export (75 % active ingredient)	383	100
Formulated products for domestic use (50 % active ingredient)	5,869	6,183

Trade: Quantitative data on exports of DDT is only available for the 1970s onwards. In general, trade information is very scarce, in particular before the year 2000. For most countries, it was not possible to obtain quantitative import or export data: Only twelve countries reported concrete numbers. According to the numbers reported in the above mentioned sources, *ca.* 33 thousand tonnes of DDT were exported and *ca.* 61 thousand tonnes of DDT were imported in total⁵. These numbers are very unrealistically low. The large discrepancy between imports and exports is yet another indicator of the dissatisfactory quality of the available information. Figure 2 shows the amounts of DDT exported by the three main producers since 1998.

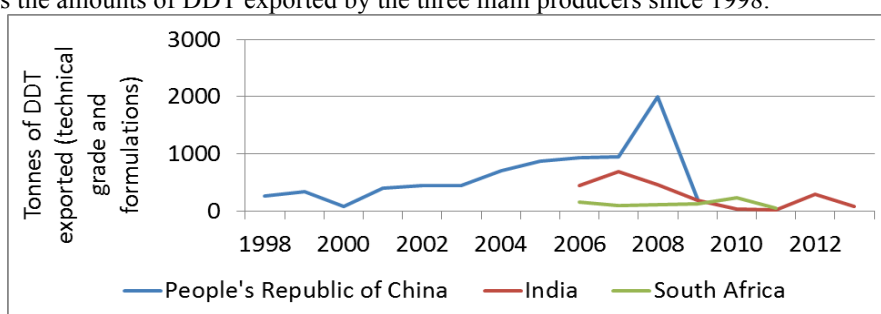


Figure 2: Major exporters of DDT

According to the latest DDT expert group report, only India continued to export DDT after 2011. The recipient countries were Botswana (*ca.* 30 tonnes in 2012/2013), Myanmar (*ca.* 12 tonnes in 2012/2013), Namibia (*ca.* 77 tonnes in 2012/2013), South Africa (a total of *ca.* 85 tonnes in 2012/2013 and 2013/2014) and Zimbabwe (a total of *ca.* 280 tonnes in 2012/2013 and 2013/2014). In total, *ca.* 382 and 102 tonnes were exported in 2012/2013 and 2013/2014, respectively. Thus, exports decreased substantially. The number of importing countries decreased from five in 2012/2013 to two in 2013/2014 – while Botswana, Myanmar and Namibia discontinued import, South Africa and Zimbabwe were still importing, albeit at lower amounts⁴.

Use: According to WHO, use of DDT has experienced an overall increase between 2000 and 2009 and reached its peak in 2009 with more than six thousand tonnes of active ingredient used globally⁶: *ca.* 4,953 tonnes, 5,219 tonnes and 3,950 tonnes of DDT were used for disease vector control in 2003, 2005 and 2007, respectively. While the majority was used for malaria control, *ca.* 20% were used for control of visceral leishmaniasis. India accounted for *ca.* 86 % of global use between 2003 and 2007. Ecuador, Mexico and Venezuela had phased out the use of DDT in 2000, while Gambia, Mozambique, Zambia and Zimbabwe had reintroduced it in 2008, 2005, 2000 and 2004, respectively. In 2007, an estimated 13 countries were using DDT for disease vector control.⁷ Stockpiles: For the reporting cycle of 2009 to 2011, six out of 24 countries provided information on stockpiles of DDT. The largest stocks were held by India (2,046 tonnes of DDT at 50 % active ingredient), followed by South Africa (36 tonnes at 75 %). Total reported stockpiles amounted to 2,126 tonnes. Swaziland reported unspecified stocks of obsolete DDT⁸. There may be additional stocks that were not reported. For example, Ethiopia has about 1,300 tons of obsolete insecticide (over 99% DDT) that needs to be disposed of⁹ and Bangladesh reportedly had stockpiles amounting to 602,389 tonnes of obsolete DDT¹⁰.

Consumption: According to available data, approximately 1.1 million tonnes of DDT have been used in agriculture and disease vector control in total. By far the largest share was used in the U.S.A. (*ca.* 454 thousand tonnes), followed by the African region (*ca.* 284 thousand tonnes), the Asia-Pacific region (*ca.* 224 thousand tonnes) and Central and Eastern Europe (CEE). The Latin American and Caribbean Group (GRULAC) (*ca.* 11 thousand tonnes) and the Western European and Others Group (WEOG) (*ca.* 500 tonnes) reported very little use of DDT. The uses are driven by single countries within given periods as can be seen from Figure 3.

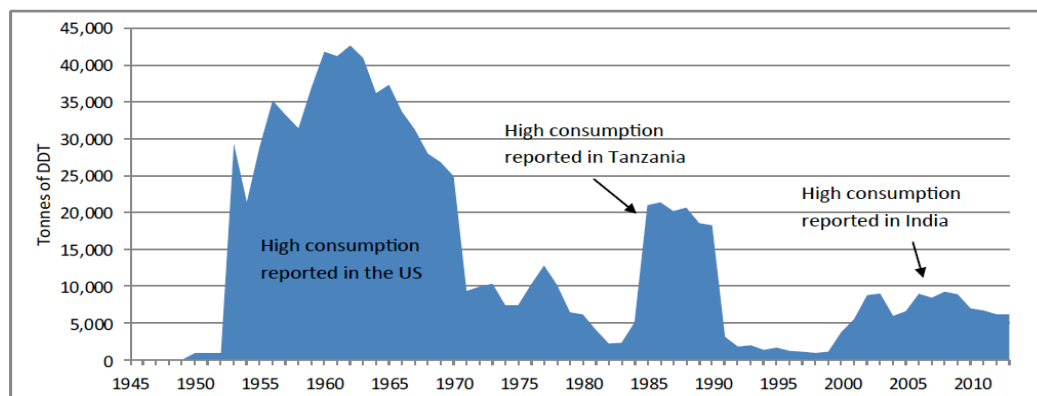


Figure 3: Consumption of DDT during the years 1945–2013

Concentrations in Humans and the Environment: The Conference of the Parties to the Stockholm Convention established a Global Monitoring Plan to evaluate the effectiveness of measures implemented. UNEP and the World Health Organization jointly implement a human milk survey on concentrations of POPs in human milk, which was selected as a core matrix. The sampling protocol and the data reporting assess baseline concentrations (*i.e.*, mothers not exposed to known sources of POPs) of primiparae reporting one sample *per* country. Data are available since 2001 and **Error! Reference source not found.** shows the concentrations in these national pools starting with the oldest samples at the left side of the graph. It can be seen that in recent years, relatively high concentrations have been detected.

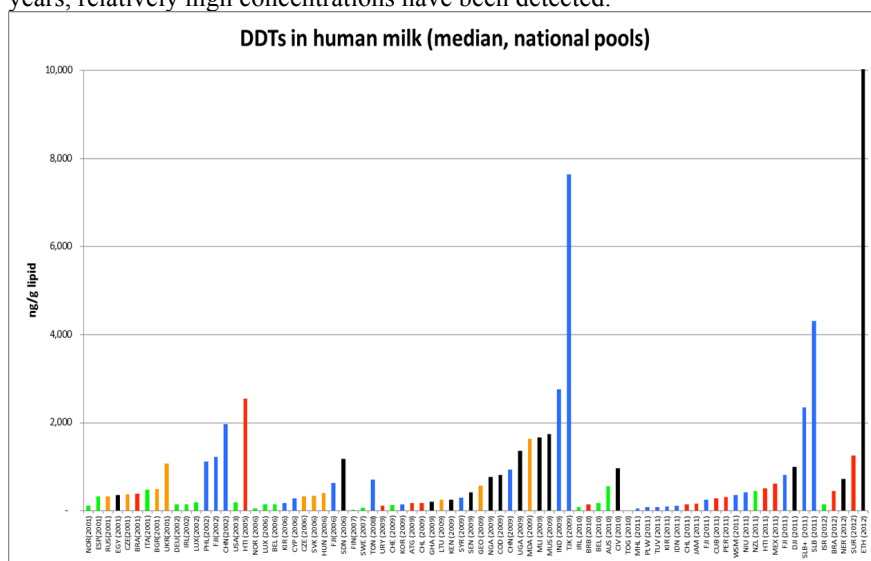


Figure 4: Concentration of DDT and metabolites in national pools of primiparae mothers

Discussion

Acknowledgements:

References:

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