



TOXIC - FREE SDGs: DOCUMENTING DDT SPRAYING, PRODUCTION, POLLUTION AND ALTERNATIVES IN ZAMBIA

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List of Abbreviations

COP	Conference of the Parties
DDE & DDE	Derivatives of DDT
DDT	Dichloro-Diphenyl-Trichloroethane
IRS	Indoor Residual Spraying
MOH	Ministry of Health
NMCC	National Malaria Control Centre
POPs	Persistent Organic Pollutants
PMI	Presidential Malaria Initiatives
RRA	Rapid Risk Assessment
UNZA	University of Zambia
WHOPES	World Health Organization Pesticide Evaluation Scheme
ZACA	Zambia Consumer Association
ZEMA	Zambia Environmental Management Agency
ZNBC	Zambia National Broadcasting Corporation

1. Background

Zambia is one of the countries that had “registered an acceptable purpose” for DDT use for malaria control. In line with Stockholm Convention COP8 decision SC-8/2, need was identified to evaluate the continued use for DDT for disease vector control. Zambia is thinking about re-registering an acceptable purpose DDT use. With this in mind, there is a need to accelerate the identification and development of locally appropriate, cost effective and safe alternatives. The overall goal of our project was to reveal the ongoing proliferation of DDT pollution in manufacturing and use, and also to cite important non-chemical alternatives to DDT in Zambia.

This report will be used in Zambia to communicate to the government so as to initiate a phasing out plan and replacement of DDT with safer alternatives. Further, the report shall be used as reference for successive Stockholm Convention Conferences of the Parties (COPs).

2. Introduction

The Stockholm Convention’s Decision SC-8/2 called for an evaluation of the continued need for DDT for disease vector control at the 9th COP “On the basis of the available scientific, technical, environmental and economic information, including that provided by the DDT expert group, with the objective of accelerating the identification and development of locally appropriate, cost-effective and safe alternatives¹”.

Zambia does not manufacture DDT locally. DDT that has previously been used both in indoor residual spraying (IRS) and for agriculture purposes has been imported mainly from South Africa. However, in communities where IRS has taken place, pollution has been discovered in the soil and water, thereby exposing the communities involved to health risks. The research support center at the University of Zambia observed that, “given that the breakdown products DDE and DDD are more stable in the environment and human matrices and have been implicated in dire

¹Report of the Conference of the Parties to the Stockholm Convention on Persistent Organic Pollutants on the work of its eighth meeting, 2017 (decision SC-8/2)

effects, urgent action is required. This calls for more investment in surveillance and environmental monitoring in order to develop effective remedial solutions that will rapidly breakdown DDT and thereby remove it from the food chain. Furthermore, the cradle-to-grave principle of waste management must be applied to this dilemma as the cost of DDT reintroduction is currently being borne by the public, and given the persistence nature of DDT, even unborn children will suffer the consequences of this lapse in environmental stewardship” (Muyinda, N. et. al., 2015).

3. Sources and levels of pollution, import/export, human exposure, possible damages, storage, alternatives and waste

3.1 Sources of pollution and human exposure and possible damages

Sources of DDT pollution, human exposure and possible damages were identified through a survey of DDT-sprayed in communities of Katuba in Chibombo and Chongwe, rapid risk assessment, and observation of indoor residual spraying as outlined in section 4.1.1 to 4.1.3 on activities conducted.

The choice of Katuba and Chongwe was based on information that the two areas had a history of DDT spraying. They are located in the peri-urban area of Lusaka so in terms of distance and cost, the two sites were found to be advantageous. The view of the survey team was that whereas open DDT contamination may not be likely to be observed due to the time lapse from the last spray in 2010, some information related to its effects would still be communicated by the communities such as diverting to agricultural purposes, etc.

In both Katuba and Chongwe, no DDT contamination was observed or reported in communities. The local authorities in both areas did not document any incidences of improper DDT left-over disposal or any other accidental release of DDT in the environment. Similarly, the local health centers did not report any human health complications.

3.2 Import, export, use and storage

The principal national law and policy on the import, use, etc. of DDT is the Environmental Management Act (No.12 of 2011). The Act lays down basic environmental principles and promulgates the National Environmental Action Plan (NEAP). Its regulations provide for guidelines and measures for management of pesticides and toxic substances such as DDT. The

law also establishes the operating agency, the Zambia Environmental Management Agency (ZEMA). The Agency must ensure the proper labeling, distribution, storage, transportation, use, application and disposal of chemicals and associated hazardous waste. This also includes licensing and permitting procedures.

239,758 kg of DDT has been used in Zambia for IRS since 2000 but its use was discontinued following reports of resistance in some sprayed communities. Zambia stopped the use of DDT in 2010 as indicated in the Zambia Supplemental Environmental Assessment for Indoor Residual Spraying for Malaria Control 2015-20 report; however, in 2015 the government declared intentions of re-introducing DDT for IRS as part of the WHOPES-recommend pesticides in the high malaria burden regions of Zambia. Our research found no documented studies on human and environmental exposure covering this period from 2015.

3.3 Alternatives

As for the diversity of measures that are currently in use as alternatives to DDT, the study documented local practices used by communities as replacement for DDT as summarized in section 4.1.4 as well as the use of insecticide treated nets (ITNs).

4. Project outcomes

4.1 Activities conducted

During the course of the project the following activities were conducted:

4.1.1 Surveyed sample DDT sprayed communities of Katuba and Chongwe

The team observed that both Chongwe and Katuba communities lacked health facilities. The communities complained about mosquito infestation and incidences of malaria. Despite the high coverage of insecticide-treated mosquito nets, the burden of malaria was high because poor housing infrastructure and lack of beds made it difficult for the communities to enjoy benefits of the mosquito nets. Further, the communities also observed that there were inadequate malaria treatment drugs for patients at the local health centers, and in any case, the mosquitoes appear to have developed resistance to Chloroquine. For this reason, Coartem is the drug commonly used to treat malaria.

Being agricultural communities, both Chongwe and Katuba acknowledged use of DDT for agricultural purposes, but admitted that both agricultural and indoor-residue spraying activities were stopped by the government several years ago.

In Chongwe, communities gave an example of how they lost a source of drinking water for their animals because health authorities closed the dam where water samples indicated contamination by DDT.

In Katuba, communities complained about the stains that remained on the walls of their houses after spraying and indicated that many of them resisted IRS for that reason.

As regards the closure of the dam in Chongwe, apart from the information provided by the community, the study conducted in the same area in 2015 (Muyinda, S.N., *et. al.*) showed that the concentrations of DDT varied in all the study areas, but the highest amounts of DDT at 25.8 ng/g were determined around a rural homestead of Chongwe.

4.1.2 Rapid Risk Assessment

The project conducted Rapid Risk Assessment (RRA) based on observations of historically DDT sprayed sites, including water bodies, communities, farming and cropping systems, forests, schools, playgrounds, markets, churches and animal grazing sites.

In Chongwe, it was discovered that a multi-purpose dam which several communities used as source of water for domestic use, gardens, fishing and drinking for domestic animals had not been in operation since 2009 as health authorities had closed it due to DDT contamination. As a consequence, some communities lost their livelihoods. Other public amenities such as school play grounds, markets and stations did not indicate any signs of DDT contamination at all. There were no visible or reported adverse health conditions linked to DDT contamination in both Chongwe and Katuba in Chibombo.

However, because of the time lapse of ten years from the time the actual DDT IRS activities were conducted and also considering that the activities took place in communities that are orally oriented, vital information was missing. A full risk assessment is recommended in order to provide detailed information to policy makers and other stakeholders.

4.1.3 Observation for Indoor residual spraying (IRS)

The study could not find many examples of indoor residual spraying taking place during the course of the project. The team therefore took pictures of just one such activity in Katuba area in Chibombo.



Photo 1: Indoor residual spraying of authorized pesticides (not DDT) in Katuba, April 2019

4.1.4 Documented local practices used by communities as replacement for DDT

Due to inadequacies in terms of health care coverage, supply of treatment drugs, lack of funds and also based on long standing indigenous knowledge of their environment and health, local communities in both Chongwe and Katuba in Chibombo have remained dependent on traditional alternatives to chemical spraying, in defense of their communities from malarial mosquitoes. Further, the information provided by health authorities regarding the adverse health conditions linked to DDT use and its perceived resistance had cemented the belief in communities to find cure and prevention in the local non-chemical alternatives available in communities. There are many examples of such alternatives in both Chongwe and Katuba. They are mostly in the form of repellent, and different communities use varied ones depending on local availability. These methods or practices have been passed on from generation to generation and local people believe in their potency more than that of foreign-induced products. For the sake of this study we have selected four (4) that are common to both study areas:

(i) Cow dung (Masu)

These are dried droppings of cattle. Both Chongwe and Katuba communities use this type of local alternative as a repellent for mosquitoes. This is done by burning the dried dung on fire allowing the smoke to stay in the room of the dwelling house before and sometimes during sleep.



Photo 2: Dried cow dung used by some communities as repellent for mosquitoes in place of DDT use

(ii) Semi-dry eucalyptus leaves (mupulanga)

Communities in both Chongwe and Katuba use this local alternative. Its use is similar to that of cow dung explained above.



Photo 3: Dried eucalyptus leaves used by some communities as repellent for mosquitoes in place of DDT use.

(iii) Lemon grass (bucwani)

It is planted around dwelling houses. It is believed the chemicals produced by the plant repel mosquitoes.

(iv) Aloe Vera flower (ntembusha)

This was more pronounced in Chibombo than Chongwe. The juice extracted from the red flowers of the plant is sprinkled on the walls of the dwelling house. It is believed the chemicals found therein do kill mosquitoes on contact.



Photo 4: Liquid extracted from boiled Aloe Vera (*ntembusha*) leaves are used by some communities to apply on body as mosquito repellent

4.2 Outreach to stakeholders

The following stakeholders were engaged at various levels during the project.

- Local communities in Chongwe and Chibombo areas including their traditional leaders (Chiefs and Headmen). They shared local experiences including local practices in replacement of DDT.
- Local Municipal Authorities in the project area- they are responsible for health care in their areas.
- The Lusaka Health District Management Team, which is responsible for the health facilities located in part of the project area.

- The Zambia Medicines Regulatory Authority - responsible for granting permissions for the importation of medicines and chemicals (poisons).
- The National Malarial Control Centre (NMCC) - the government agency responsible for malaria control efforts country-wide.
- The Ministry of Health (MOH), the one responsible for the health of the citizens in the country and, more importantly for this study, for policy making in as far as the use of DDT in Zambia is concerned.
- The Ministry of Agriculture – overseer of agricultural development in the country.
- The Zambia Environmental Management Agency (ZEMA) - responsible for environmental protection and the National Focal Point for the Stockholm Convention on POPs.
- The University of Zambia (UNZA), Research Support Centre - responsible for research and academics.

Zambia Consumer Association (ZACA) has continued to engage with ZEMA and the MOH regarding alternative products to DDT. It has also been included in the National POPs Working Group by ZEMA.

4.3 Communication efforts with local and national authorities

During the commencement of the project ZACA held a stakeholder’s meeting at the MOH boardroom to inform identified key stakeholders about the project and seek their buy-in and support. The stakeholders included representatives for local authorities, i.e. Chibombo and Chongwe; and National Authorities, i.e. MOH, National Malaria Control Centre, and Zambia Environmental Management Agency (ZEMA). Further, during the course of the study, ZACA also had the opportunity to engage these stakeholders at various stages and fora.

The activities of this project were communicated to media by way of press statements and a media briefing (*Annex 1*). At the inception meeting of the project the media was invited as stakeholders.



Photo 5: Head of University of Zambia School of Medicine, Prof. Goma, addressing participants at the consultation meeting

5. Project deliverables

5.1 Documented prevalence of DDT use in project area

The study documented the prevalence of DDT use in project area and identified affected areas e.g. water bodies.

Apart from locating the contaminated multi-purpose dam in Chongwe area, the team did not document any other DDT contamination during the project. Chongwe is one of the historically exposed communities in Zambia, DDT having been sprayed there since 2008. Based on a study, (Muyinda, N. et. al., 2015), which revealed that both water and soil were contaminated with DDT in the Chongwe area, and considering that DDT and its metabolites can persist in the soil for 2-15 years, health authorities in the areas took precautionary measures to close the dam in the interests of both human and animal life and to safeguard the environment. The picture of the dam is shown in photo 6 below.



Photo 6: Public dam that was once source of DDT contamination in Chongwe area

5.2 Documented alternatives to DDT for mosquito control

The alternatives to chemical spraying are as provided in 4.1 above. The major success of these alternatives is that they have served local communities for many years and as such there is time-tested and well-grounded belief in their efficacy by the communities despite introduction of new foreign solutions. The major challenge is that, like many other aspects of our lives, these time-tested practices are facing strong challenge from the chemicals and pharmaceutical industries whose agenda is to supplant their use from communities. Deforestation and lack of conservation is also another challenge as some of the plants used are facing extinction.

5.3 Informed government's position at Stockholm Convention COP 9, 2019

The Ministry of Health has an upper hand when it comes to policy direction involving DDT use. The Ministry responsible for environment is, unfortunately, not as assertive. This is the position of the Zambian government. The country is one of several countries that have switched from the original goal of malaria control, reducing the number of cases to very low levels, to elimination, defined as reducing the number of indigenous cases to zero. The country's ambitious goal of zero indigenous cases of malaria by 2030 is informed by the success of two Island countries - the Maldives and Sri Lanka - who received WHO malaria free certification in 2015 and 2016 respectively. However, the government is worried that anti-malaria drugs are gaining resistance to parasites and also about the rising costs of treating malaria. The government is therefore convinced that DDT can reduce the spread of malaria in Zambia if handled under controlled conditions by trained personnel and monitored by government agencies. From a policy point of

view the government intended to re-authorize use of DDT in 2015. However, DDT has not yet been registered and is currently not used for IRS in the country.

Both the Ministry of Health and ZEMA acknowledged that under the Stockholm Convention, Parties had options to re-register DDT for IRS purposes based on the country's assessment and needs. It's from this premise the Ministry of Health want re-registration of DDT in order to achieve its public health goals. ZEMA on the other hand must ensure that in doing so the Ministry of Health has to comply with strict measures set out in the Convention. This was the position of both ZEMA and Ministry during our consultations. This has not been done since 2015 but its government's position that it will be done. ZACA's position which was similar to that of Citizen for a Better Environment was that government should invest in research for alternatives to chemical spraying.

5.4 Communities' awareness about the harms of DDT and the need for its elimination

Awareness about the harm of DDT and the need for its elimination was raised by project staff mostly on Zambia National Broadcasting Corporation (ZNBC) because of its wide coverage and translation into local languages. The appearances on ZNBC were conducted at the inception of the project and at the end of the project. The awareness was population-based because the project was conducted in two areas of Chongwe and Katuba, the effects of the DDT contamination in other previously sprayed areas was similar, therefore the targeted communities and wider Zambia population benefited from such awareness raising. Environmental advocacy civil society organization based on the Copper Belt Province of Zambia, Citizens for a Better Environment cautioned about DDT use but there wasn't much noticeable reaction from members of the public.



Photo 7: Project dissemination to the public on ZNBC TV by ZACA Executive Secretary, Mr. Muyunda Ililonga in June 2019



Photo 8: Stakeholders Workshop at Chongwe in April 2019

6. Recommendations

The following are project recommendations:

1. As it's a requirement under the Stockholm Convention that Parties should only use DDT when locally safe, effective and affordable alternatives are not available, we recommend that Zambia invests in research and development of the non-chemical, indigenous products identified in this study to commercial use so that they can serve as viable alternatives in place of DDT.
2. Since 2015 the country has been considering the re-registration of DDT for IRS. The Ministry of Health and Zambia Environmental Management Agency must ensure that the capacity of the NMCC to assist the government with Stockholm Convention reporting requirements is strengthened so as to allow for regular monitoring if they eventually decide to re-register their exemption for DDT.
3. The government to ensure all malaria control programs involve respective communities for them to be effective and sustainable towards long-term toxics-free solutions to malaria control in the country.
4. ZACA strongly recommends not to re-register exemption for DDT use.

7. Resources

The following resources were used:

1. www.pops.int
2. Munyinda, N. S; Michelo, C. and Sichilongo, K. (2015). Linking Environmental Exposure with Public Health: Dichlorodiphenyltrichloroethane Extracted from Soils and Water of Recently Exposed Communities in Selected Locations in Zambia, Journal of Environmental and Public Health (Volume 2015 Article ID 564189).
3. Zambia Supplemental Environmental Assessment for Indoor Residual Spraying for Malaria Control 2015-20

Annex 1: Press Release

ZAMBIA CONSUMER ASSOCIATION (ZACA)

PRESS RELEASE

For Immediate release 16th June 2019

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RE: DEVELOP DDT- FREE METHODS OF CONTROLLING MALARIA - ZACA CHALLENGE GOVT.

LUSAKA - The Association has called upon Government to research and develop new techniques for controlling mosquitoes in the wake of the country's move to stop the use of DDT for Indoor residual spraying in 2010.

ZACA Executive Secretary, Muyunda Ililonga said this when he announced his organization's four-month study in Chongwe and Chibombo areas of the country. Mr. Ililonga stated that it was possible to control or even eliminate malaria with environmentally friendly methods and without the use of persistent insecticides and that such an approach is cost effective, highly replicable and sustainable because it was anchored on community participation.

He said strategies such as the control of mosquito breeding sites, cleaning houses and surrounding areas are easily adopted by the communities which in turn contribute to the empowerment of communities and to the change of the understanding about their participation in malaria control. He emphasized that the international community and the global bodies to which the country was a member were determined to combat malaria while realizing a low, indeed zero DDT world.

He was therefore hopeful that through the study, the Association would gather from various stakeholders' innovative ideas of how the country can offer solid evidence for the effectiveness of locally-adopted, cost effective and sustainable vector control methods pointing to a transition away from DDT.

Ends...

Martha I. Chibale

Media Relations and Communications Officer