



## REQUEST FOR CEO ENDORSEMENT

PROJECT TYPE: FSP

TYPE OF TRUST FUND: GEFTF

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### PART I: PROJECT INFORMATION

<b>Project Title:</b> Demonstration of effectiveness of diversified, environmentally sound and sustainable interventions, and strengthening national capacity for innovative implementation of integrated vector management (IVM) for disease prevention and control in the WHO AFRO Region.			
Country(ies):	Botswana, Mozambique, Namibia, South Africa, Swaziland, Zambia, Zimbabwe (Tier 1) Ethiopia, Gambia, Kenya, Liberia, Madagascar, Senegal, Tanzania, Uganda (Tier 2)	GEF Project ID: <sup>1</sup>	4668
GEF Agency(ies):	UNEP	GEF Agency Project ID:	00746
Other Executing Partner(s):	- WHO Regional Office for Africa as GEF Executing Agency, - ICIPE - Duke University	Submission Date:	08/December/2015
GEF Focal Area (s):	Chemicals, POPs	Project Duration(Months)	60
Name of Parent Program (if applicable): ➤ For SFM/REDD+ <input type="checkbox"/> ➤ For SGP <input type="checkbox"/> ➤ For PPP <input type="checkbox"/>	Global joint WHO/UNEP DSSA Program	Project Agency Fee (\$): 9%	859,500

#### A. FOCAL AREA STRATEGY FRAMEWORK<sup>2</sup>

Focal Area Objectives	Expected FA Outcomes	Expected FA Outputs	Trust Fund	Grant Amount (\$)	Co-financing (\$)
CHEM 1	Outcome 1.1 Production and use of controlled POPs chemicals phased out.	Output 1.1.1 Countries receiving GEF support to phase out the production or use of controlled POPs (other than new POPs).	GEFTF	9,550,000	308,218,167
<b>Total project cost</b>				<b>9,550,000</b>	<b>308,218,167</b>

<sup>1</sup> Project ID number will be assigned by GEFSEC.

<sup>2</sup> Refer to the [Focal Area Results Framework and LDCF/SCCF Framework](#) when completing Table A.

**B. PROJECT FRAMEWORK**

<b>Project Objective:</b> To strengthen national capabilities for implementation and scaling up of evidence-based, innovative, diversified and environmentally sound disease vector control interventions (with special emphasis on malaria) with multi-stakeholder participation within context of IVM						
<b>Project Component</b>	<b>Grant Type</b>	<b>Expected Outcomes</b>	<b>Expected Outputs</b>	<b>Trust Fund</b>	<b>Grant Amount (\$)</b>	<b>Confirmed Co-financing (\$)</b>
<p><b>Component 1:</b> Promote evidence-based multi-sectoral policy-making for IVM and strengthen multi-sectoral alliance in the promotion &amp; implementation of environmentally sound &amp; effective innovative interventions to reduce reliance on DDT for diseases vector control and strengthen countries' capacity a better compliance with multi-lateral environmental agreements particularly the Stockholm Convention</p>	TA	Outcome 1: countries develop and implement integrated cross sectoral policies, strategies and plans and have managerial capacity to support implementation of IVM	<p>Output 1.1: Technical support to countries to notify the Stockholm Convention on the use of DDT by the their NMCPs</p> <p>Output 1.2: Countries regularly report to the Stockholm Convention Secretariat on the use of DDT for disease control as stipulated in the Stockholm Convention, Annex B, Part II, para 4</p> <p>Output 1.3: Training and technical support provided to countries to develop integrated national legal frameworks and IVM plans with managerial capacity for IVM to a harmonized standard</p> <p>Output 1.4: Training, technical support and provision of equipment to countries to support implementation of evidence based national policies and plans for IVM to a harmonized standard</p>	GEFTF	800,000	25,224,095

<b>Component 2:</b> Support countries to implement IVM approaches and demonstrate effectiveness of diversified, environmentally safe innovative vector control methods including use of alternative chemicals to DDT for malaria control	TA	Outcome 2: Countries adopt the implementation of effective, sustainable and innovative interventions in demonstration project areas	Output 2.1: Mapping of vector distribution and associated insecticide resistance  Output 2.2: Three IVM approaches developed and demonstrated in six countries	GEFTF	6,100,000	248,616,284
<b>Component 3:</b> Dissemination of knowledge and sharing of experiences to all stakeholders at national, sub-regional and regional level in order to influence decision makers	TA	Outcome 3: Countries and regional institutions are using guidelines on IVM and social impact assessments to guide and influence policies on DDT use	Output 3.1: Manuals and related technical guidelines on IVM updated and published  Output 3.2: Production and delivery of programmatic and national level communications / awareness strategies and materials  Output 3.3. Production of national social impact assessments highlighting impacts on vulnerable groups from use of DDT  Output 3.4: Production of reports to the Stockholm Convention Sec (SCS) on DDT usage including amount and local distribution of obsolete DDT in project countries	GEFTF	800,000	8,294,803
<b>Monitoring and Evaluation</b>	TA			GEFTF	900,000	1,325,000
Subtotal					8,600,000	275,713,637
Project management Cost (PMC)				GEFTF	950,000	32,505,160
<b>Total project costs</b>					9,550,000	308,218,167

**C. SOURCES OF CONFIRMED CO-FINANCING FOR THE PROJECT BY SOURCE AND BY NAME (\$)**

Sources of Co-financing	Name of Co-financier (source)	Type of Co-financing		Total Co-financing Amount (\$)
		In-kind	Grant	
Countries	Botswana, Gambia, Kenya, Liberia, Mozambique, Namibia, Senegal, South Africa, Swaziland, Tanzania, Uganda, Zambia, Zimbabwe	306,433,167	0	306,433,167
Partner institute	WHO	560,000	0	560,000
GEF Agency	UNEP	250,000	0	250,000
International Institution	Stockholm Convention Secretariat	80,000	0	80,000
Partner institutes	ICIPE	150,000	0	150,000
Partner institutes	London School of Hygiene and Tropical Medicine	495,000	0	495,000
Partner Institutes	University of Witwatersrand	250,000	0	250,000
<b>Total Co-financing</b>		<b>308,218,797</b>	<b>0</b>	308,218,167

**D. TRUST FUND RESOURCES REQUESTED BY AGENCY, FOCAL AREA AND COUNTRY<sup>1</sup>**

GEF Agency	Type of Trust Fund	Focal Area	Country Name/ Global	(in \$)		
				Grant Amount (a)	Agency Fee (b) <sup>2</sup>	Total c=a+b
UNEP	GEFTF	Persistent Organic Pollutants	Global	9,550,000	859,500	10,409,500
<b>Total Grant Resources</b>				9,550,000	859,500	10,409,500

In case of a single focal area, single country, single GEF Agency project, and single trust fund project, no need to provide information for this table. PMC amount from Table B should be included proportionately to the focal area amount in this table.

**E. CONSULTANTS WORKING FOR TECHNICAL ASSISTANCE COMPONENTS:**

Component	Grant Amount (\$)	Co-financing (\$)	Project Total (\$)
International Consultants	257,000	0	257,000
National/Local Consultants	339,000	4,950,000	5,289,000

**F. DOES THE PROJECT INCLUDE A "NON-GRANT" INSTRUMENT? No**

(If non-grant instruments are used, provide in Annex D an indicative calendar of expected reflows to your Agency and to the GEF/LDCF/SCCF/NPIF Trust Fund).

## PART II: PROJECT JUSTIFICATION

### **A. DESCRIBE ANY CHANGES IN ALIGNMENT WITH THE PROJECT DESIGN OF THE ORIGINAL PIF<sup>3</sup>**

The project will achieve the same results as outlined in the approved in the PIF. The project framework and structure described herein is, however, different to the original PIF. It should be noted that the changes are largely presentational and have been initiated in order to better group the related Outputs and Activities and so make project implementation and reporting easier and more coherent. The revised structure has been developed based on consultation with the UNEP Quality Assurance Section (QAS) in Nairobi and is compliant with UNEP internal results based management (RBM) practices. The related project logical framework / results matrix has been developed based on the current guidance from QAS on the need for Outcome and Output descriptions which can have the necessary level of detail and also ensure that indicators are set at a level where impacts and results can be clearly reported. The changes to the structure related to this specific project are:

- All Components now have a single Outcome statement with associated baseline, indicators and milestones. In each case the original multiple Outcomes under a component have been combined. No Outcomes have been lost from the project as a result of this process;
- Components 1 and 2 have been combined into a single Component 1 in this proposal for GEF CEO Endorsement. The new Component 1 relates to development of the required institutional capacity and legal / policy reform to support alternatives to DDT use for Malaria vector control plus provision of the necessary training to personnel at decision maker and technical level on the need for alternatives. No Outputs have been removed and all Activities as laid out in the original PIF remain in the revised Component 1;
- Component 3 from the original PIF (linked to implementation of a series of pilot demonstration projects on Integrated Vector Management / IVM) is now presented as Component 2. No Outputs or Activities as set out in the original PIF have been removed and the number of demonstration countries has been increased from 3 to 6;
- Component 4 and 5 of the original PIF are linked to outreach and communications activities. Based on the UNEP internal review process it has been agreed that the two Components be consolidated into a single revised Component 3. No Outputs or Activities as set out in the original PIF have been removed during the consolidation process. An additional area of work has been added to the revised Component 3. The new area of work focuses on risk communication to vulnerable groups including women, children and workers employed in the application of DDT as part of Indoor Residual Spraying (IRS) activities. The component also includes inventory of obsolete DDT and reporting to the SSC. These activities have been included in the project with no implications to the total grant request to GEF.
- Components 4 and 5 of this document are related to monitoring and evaluation and management of the project, respectively. The project management component comprises recruitment of national coordinators and supervisory and technical support missions of the executing agency to project countries.

The streamlining of the project and components and Outcomes has resulted in no loss of Outputs or Activities as set out in the original PIF and will allow for clearer reporting of results and impacts in line with UNEP RBM reporting requirements. Consequently, there is no cost implication.

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<sup>2</sup> Indicate fees related to this project.

<sup>3</sup> For questions A.1 –A.7 in Part II, if there are no changes since PIF and if not specifically requested in the review sheet at PIF stage, then no need to respond, please enter “NA” after the respective question.

In terms of technical content and focus of the project, some changes have been made in order to respond to the current reality in the region and shifts in the situation concerning malaria vector control since the approval of the PIF. These changes are outlined below and further justification is provided throughout the body of this submission. The project design has had to be responsive to the changing landscape in terms of malaria vector control over the past 5 years since the original project idea was first conceived:

- **Country selection:** The original PIF approved covered 13 countries across Africa. Upon analysis of the original list during the preparation of the final submission and based on comments received from the Secretariat of the Stockholm Convention it was confirmed not all of the target countries were registered under the Stockholm Convention Annex 1 exemption to allow DDT use for malaria vector control. It was also confirmed that not all the countries that are registered to allow the possible import DDT were actually using DDT under the exemption. From discussions with the GEF SEC it was confirmed that ONLY countries that are registered and using DDT should be targeted and supported under this project, as stipulated by the Secretariat of the Convention during the PIF review. The project design has therefore been altered to allow for a two-tier approach to country participation in the project. Tier 1 countries (of which there are seven Botswana, Mozambique, Namibia, South Africa, Swaziland, Zambia, Zimbabwe) are registered for use of DDT under the Stockholm Convention exemption and are therefore eligible for support at national level to promote alternatives to DDT. Tier 2 countries (of which there are six Ethiopia, Gambia, Kenya, Liberia, Madagascar, Senegal and Tanzania) are not currently registered for use of DDT and are at risk of reverting to re-introduction of DDT to combat the spread of malaria. As such these countries are not eligible for direct support under this project for interventions at country level but should be supported to benefit at the regional level through information exchange, training and sharing of experiences to be funded through co-finance. The countries will become eligible for financial support under the GEF grant for this project if, at any time, they register for use of DDT for under the Stockholm Convention exemption;
- **Demonstration projects:** The first submission of the CEO endorsement request included the completion of 3 demonstration exercises on alternatives in 3 target countries. Following discussions with WHO it has been decided to expand the scope of these demonstration exercises so that six Tier 1 countries now benefit from the completion of national demonstration projects. The focus of the project design has shifted to strengthened the level of support given to the six of the Tier 1 countries using DDT in order to have the maximum impact on reduction in the use of DDT in each country so adding to the Global Environmental Benefit (GEB) of the project (see below). It is also planned to expand the sphere of influence from these demonstration exercises to the Tier 2 countries via knowledge sharing and information exchange. It is aimed that this will assist the Tier 2 countries to avoid the re-introduction of DDT due to increased resistance to the widely used chemical alternatives used currently (see below);
- **GEB:** The original PIF sets out the data on DDT usage in the period leading up to the initial PIF submission in 2012. At the time of PIF approval the annual usage of DDT for Malaria vector control was reported as 1,260 metric tonnes in 7 countries which was extrapolated to an estimated 2500 metric tonnes over 15 countries. By far the largest single user of DDT at this time was Ethiopia with an annual usage rate of 800 metric tonnes followed by Mozambique with an annual usage rate of 300 metric tonnes. With the assistance of the GEF Funded AFRO I project Ethiopia has since banned the used of DDT for malaria vector control and the formulation plant operating in the country has shifted away from DDT to production of Endosulfan. At the same time the campaign to promote chemical alternatives to DDT (including pyrethroids, organophosphate and carbamate pesticides) has resulted in many countries which formerly used DDT to shift to these alternatives. A number of other countries have also moved away from DDT use all together and have deregistered for exemption under Annex 1 of the Stockholm Convention (including Tanzania). As a result current usage data is very different to that presented at PIF approval with a current total of approximately 330 metric tonnes a year reported from the 6 Tier 1 countries still registered and importing DDT for malaria control. This would seem to pose a question over the project's relevance given the significant reduction in DDT usage patterns.

However this current data masks a wider regional problem *insecticide resistance due to over application (see below)*. The project design baseline provides evidence illustrating how the initial *knock-back* effect of the shift to chemical alternatives from DDT has resulted in all Tier 1 and Tier 2 countries developing resistance to all forms of chemical alternatives. At the same time the availability of cost effective new chemical alternatives has decreased with fewer and fewer compounds being brought to the market by the research based chemical pesticide manufacturers. Countries are therefore faced with a stark choice of reverting to use of DDT (for which resistance data confirms it is still an effective control agent in all Tier 1 and some Tier countries) or allowing the incidence of Malaria to increase unchecked. Faced with these options there is a strong likelihood that countries will increase the level of DDT usage (in Tier 1 countries) and revert / re-introduce the use of DDT (in some or all Tier 2 countries, where there is no DDT resistance) resulting in a situation comparable with that at the time of PIF development (see below). The project is therefore increasingly relevant as providing tools which do not rely on chemical interventions to control vector borne diseases so preventing increased use or re-introduction of DDT;

- Resistance to chemical alternatives and DDT equivalence: As highlighted above the risk of increased DDT usage in the African region is largely due to the over application of the chemical alternatives introduced in the early / mid 2000s. The national reports presented in this submission clearly show that all countries surveyed can show varying levels of resistance to the chemical alternatives available. At the same time DDT resistance is generally lower across the countries compared to pyrethroid, organophosphate and carbamate pesticides. This will promote a reversion to DDT use as incidences of malaria increase at national level due in the increased transmission by mosquitoes that are resistance to the alternative control measures being applied. The proposal also provides a clear set of data on the equivalence of DDT compared to the current chemical alternatives in use. The 384 metric tonnes of alternatives currently in use annually in Tier 1 countries equates to 2134 metric tonnes of DDT which would be used annually to achieve the same rate of control of the malaria vector. These figures are significantly higher than the original estimates in the PIF and does not factor in the current level of usage in Madagascar and Tanzania (other Tier 2 countries show higher levels of resistance to DDT) from the Tier 2 countries that would contribute a further 5,200 metric tonnes used annually. The fact that the remainder of the Tier 2 countries exhibit resistance to both DDT and the widely used chemical alternatives provides a strong justification for the continued inclusion of the Tier 2 countries in the overall project design as the relative importance of non-chemical alternatives is even higher than that for the Tier 1 countries;
- Reduction in project budget: in response to the overall narrowing of country level activities to the seven Tier 1 countries and in recognition that the project will now aim to address a more complex picture in terms of GEB the project budget has been reduced to USD9.55M plus 9% GEF Agency Fee. It should be noted that the potential impact of the project will now be greater than originally foreseen with greater country level interventions in six of the seven Tier 1 countries plus the opportunity for wider distribution of results and data to the Tier 2 countries where non-chemical alternatives are urgently needed to combat malaria transmission. The budget allocated to support all of the Tier 2 countries is approximately 5% of the total project budget (USD500,000) and covers the cost of participation in regional training, communications efforts, awareness raising and participation in regional meetings. As such the investment is comparatively small to the Tier 1 countries which will be funded to a level of USD 1M each to cover the 6 demonstration projects at national level.

**A.1 National strategies and plans or reports and assessments under relevant conventions, if applicable, i.e. NBSAPs, national communications, TNAs, NCSA, NIPs, PRSPs, NPFE, Biennial Update Reports, etc.**

The project fits within overall goal of the Chemicals Strategy of GEF5 as the project will contribute to promoting the sound management of chemicals throughout their life-cycle in ways that lead to the minimization of significant adverse effects on human health and the global environment. It is specifically relevant to Objective 1 of GEF5 Chemicals Strategy: *Phase out POPs and reduce POPs releases*, and in

addressing the management of DDT and vector control chemicals, the project will contribute to the Outcome: *Exempted POPs chemicals used in an environmentally sound manner*. The project is also in line with overall aim of the Stockholm Convention in that it is designed to contribute to the reduction of reliance on and use of DDT by making effective and affordable alternative methods for disease vector control.

The project will also support the implementation of the UNEP roadmap for development of alternatives to DDT (UNEP/POPS/COP.7/INF/7) endorsed by the seventh meeting of the Conference of the Parties (COP7) to the Stockholm Convention in May 2015. The objective of the road map is to make locally safe, effective, affordable and environmentally sound alternatives available for a sustainable transition away from DDT. This project designed is in full alignment with the road map that emphasizes support to countries in the IVM principles of capacity-building, evidence-based decision-making, cross-sector collaboration, multiple interventions, and legislation/community engagement. The project supports key elements of implementing the road map for the development of alternatives to DDT including through: strengthening the base of knowledge for policy formulation and decision-making; strengthening country and local capacities to manage insecticide resistance, developing and implementing IVM strategies, assessing and deploying alternatives; developing and deploying chemical alternatives to DDT for indoor residual spraying (IRS); and sharing experiences and up-scaling the application of non-chemical alternatives.

All the participating countries are parties of the Stockholm Convention and currently using DDT for malaria vector control in Southern African where the use of this insecticides is concentrated. They are committed to implement Annex B Part II No. 5 and 6. The countries have shown their commitment to introduce innovative alternative strategies and approaches of vector control and ultimately reduce their reliance on DDT. Demonstrating effectiveness of alternative strategies and approaches under the local circumstances is therefore timely and important. All available National Implementation Plans (NIP) of the project countries indicate the use of DDT in vector control as an important issue to be addressed. The project will also provide information and evidence of importance for further development (or up-date) and implementation of the National Implementation Plans. An overview and status of NIP in the project countries is presented in Table 1.

**Table 1:** DDT exemption and use, ratification date of Stockholm Convention and NIP status

Country	Officially reported DDT use in IRS to WHO	Intending to use DDT for IRS	Country notification to SSC of intention to use and/or produce and/or import DDT	Ratification Date	NIP Status Submission date
Botswana	X			28/10/2002	06/07/2011
Mozambique	X			31/10/2005	12/08/2008
Namibia	X			24/06/2005	14/1/2015
South Africa	X		X	04/09/2002	08/11/2012
Swaziland	X		X	13/01/2006	01/06//2011
Zambia	X			07/07/2006	11/05/2009
Zimbabwe	X			01/03/2012	10/01/2014

Some countries such as Ethiopia and Madagascar are already part of the Demonstrating and Scaling up of Sustainable Alternatives (DSSA) Global Program that aims to protect human health and the environment through the reduction of emission of DDT into the global environment. In particular those two countries are participating in the GEF funded / UNEP implemented AFRO I<sup>4</sup> project aiming at diversifying interventions related to vector control through promoting Integrated Vector Management (IVM). Ultimately, this will reduce the dependency on DDT for IRS. These countries have already committed themselves to provide

<sup>4</sup> Title of AFRO I project is “Demonstrating Cost-effectiveness and Sustainability of Environmentally Sound and Locally Appropriate Alternatives to DDT for Malaria Vector Control in Africa”

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increased attention to the promotion and introduction of alternatives to DDT in vector management. Implementation of AFRO I in these countries is already producing some lessons that have been referred to develop this project.

Moreover, nine countries of the region including Mozambique, Namibia, South Africa, Swaziland and Zambia participated in a small GEF funded project: *establishment of efficient and effective data collection and reporting procedures for evaluating the continued need of DDT for disease vector control*. This was a project to assess the challenges of multisectoral coordination and collaboration for the use, monitoring and reporting of the use of DDT. The project also aimed to support regular reporting of countries to the Secretariat of the Stockholm Convention on the use and status of DDT. The countries are not included in any of the other previous UNEP GEF DSSA projects. Through the new project they will be assisted in strengthening of multi stakeholder implementation of the Stockholm Convention, demonstrating the effectiveness and safety of diverse and innovative malaria control interventions and approaches and in strengthening of national malaria control capabilities for evidence-based management of vector control programs. The current situation with regards to DDT use in the various project countries is indicated in table 2 below.

The project will support government efforts to introduce and use diversified, evidence based and sustainable vector control interventions and approaches while at the same time support public awareness campaigns and information dissemination to ensure communities engagement. Community compliance with and adherence to malaria control methods is a challenge in many countries due to limited knowledge, cultural and religious issues. Community education and empowerment with the required knowledge is critical to address the challenge and optimize on the use of on-going efforts. In cognisance with this, the project will support civil society and community based organizations to engage communities in implementation of project activities at the grass root level to promote the use of safe and innovative chemical and non-chemical vector control interventions for the control of malaria and other vector borne diseases. This is in line with WHO's recommendations with regards to community education and empowerment in health matters. **This project is a direct response to the issue raised during the Conference of Parties of the Stockholm Convention (COP5, May 2011, Geneva) by the 'African Group' emphasizing that work on alternatives is essential and that 'African Group' countries are seriously requesting support for introduction and demonstration of alternatives to DDT before even the phase-out date of DDT can be discussed.** Ultimately, elimination of malaria from countries where it is possible will preclude the use of DDT. But the use of safe and effective interventions is the means in order to achieve that.

**Table 2:** National Situation and Quantity of DDT used in project countries in the last few years

Country	DDT used in Disease Vector Control (eg IRS)	Comments
Botswana	Yes	In 1998 Botswana changed policy from DDT to pyrethroids for indoor residual spraying (IRS) and treatment of mosquito nets. The change was as a result of non-availability of good quality DDT. The complaints from the community about DDT stains on the sprayed walls also contributed to the change. The Ministry of Health has not banned the use of DDT for public health purposes. The country re-introduced DDT in 2009 and is using it to spray in some parts of the country. In 2013, 6.3 tons of DDT was used.
Mozambique	Yes	Registered for use from 2005 Reported DDT use in: 2005/2006 – 99,563.86 kg, 2006/2007 – 252,128.69 kg, 2007/2008 – 487,676.71 kg, 2008 – 390,006.72 kg, 2009 – 115,861.37 kg, 2010 – 21,105 kg The use continuous as insecticide resistance management strategy in specific areas of the country.
Namibia	Yes	Namibia is carrying out selective spraying with DDT. Reported DDT use in: 2003: 52 tons; 2004: 26 kg; 2005: 40 tons. For 2013, the amount used was 63 tons.
South Africa	Yes	DDT is used in accordance with WHO Recommendations and requirements of the Stockholm Convention. In 1997, DDT was replaced with deltamethrin and cyfluthrin but vector resistance to these prompted limited reintroduction of DDT in 2000. To date the major malaria vector control strategy in South Africa is IRS using DDT, carbamates and pyrethroids. For the 2013/2014 campaign the following amounts have planned: DDT 44.8 tons; pyrethroids: 59.5 tons and carbamates: 0.4 ton.
Swaziland	Yes	DDT is used in accordance with WHO Recommendations and requirements of the Stockholm Convention. 2005 GEF report indicates 6000-7000 kg/yr of DDT used for selective spraying. In 2013, 4 tons were used for vector control <sup>5</sup> . The amount has been reduced as IRS is targeted at only transmission hot spots in line with the country's current elimination strategy.
Zambia	Yes	DDT is used alongside other insecticides to manage resistance of pyrethroids Reported DDT use in: From 2000 to 2010: average of 24 tons annually. Use will continue to manage resistance.
Zimbabwe	Yes	DDT use was stopped from 1993 – 2006. In 2007 DDT was re-introduced in selected districts for economic reasons. Annual use of about 140 tons of DDT

(Source: extracted from data on Stockholm Convention website and from NIP documents in preparation and from NMCP)

<sup>5</sup> Annual malaria report of 2013 for Swaziland

It should be noted that among the participating countries Botswana, Namibia, South Africa and Swaziland are currently focusing on elimination of malaria. Elimination of malaria contributes to the reduction of the use of chemicals as vector control interventions are ceased. As DDT is the major insecticide applied in Southern Africa, elimination of the disease from the sub-region will ensure elimination of the use the insecticide. Relevant quotes as taken from national NIPs and that support this project are given in Table 3 below.

**Table 3:** Quotes taken from country NIPs

Country		Relevant 'quotes' on DDT supporting this project (quotes extracted from the country NIPs)
<b>Botswana</b>	In accordance with the provisions of the Stockholm Convention, the country therefore must notify the secretariat on the intended use of DDT. The action plan (of re-introducing DDT in IRS) necessitates collaboration between the different and relevant stakeholders and will become more critical in the advent of DDT use. Operational issues with regard to public acceptance of IRS will become more relevant with DDT use. Continue looking for safer/effective alternatives to DDT for malaria vector control. Acquisition of insecticide susceptibility and bioassay test kits, conducting the tests and assess the malaria vector dynamics	
<b>Mozambique</b>	The prevention is based on integrated vector control (mainly IRS and LLINs). NIP actions will be very costly. Adequate support from national and international sources is therefore a crucial pre-condition for successful NIP implementation. Support is also needed for designing and implementation of public training and awareness programs, based on the "community- right-to-know and participate". Most importantly, evidence based identification, application, evaluation and introduction of new effective and environmental friendly vector control methods in the context of IVM in order to reliance on DDT is critical.	
<b>Namibia</b>	DDT continues to be used for public health purposes – in malaria vector control. Malaria is a major public health threat in Namibia, with 69.8% of the population living in areas where there is risk of malaria transmission. So far, DDT has been found to be the most effective pesticide against the malaria mosquito hence its continued use. It is only used by the Ministry of Health and Social Services for IRS, and this is done under very strictly controlled conditions. Large quantities of DDT are used, with an annual average of 175 tonnes having been used over the last three years.	
<b>Swaziland</b>	In Swaziland, DDT is officially imported from South Africa and is used for vector control at the malaria endemic areas in the Lubombo Plateau, Lowveld and some parts of the Middleveld. All DDT stocks in Swaziland are held by the NMCP for malaria vector control at an approximate annual quantity 6 tons.	

<b>Zambia</b>	Zambia Environmental Management Agency (ZEMA), MoH, NMCC and TDRC in collaboration with UNEP will identify alternatives to DDT and determine their efficacy and cost effectiveness. This will be achieved through desk analysis of potential alternatives to DDT and carrying out of vector susceptibility and bioassay studies of the alternatives. On average about 24 tons of DDT has been used annually for the period 2000 to 2010.	
	<b>Zimbabwe</b>	Assessment with respect to DDT. Historically, DDT was used for tsetse control and agricultural pests before it was banned. Now in Zimbabwe, it is only used for malaria vector control. This is carried out by the Ministry of Health and Child Welfare under an Indoor Residual Spraying Programme. The Ministry of Health and Child Welfare requires about 140 tonnes of the pesticide per annum, although the exact volumes imported vary from year to year, depending on availability of funds. The DDT is sprayed in malaria-endemic areas, and there are about 22 districts (out of a total of 59 districts in Zimbabwe) where this is done. The protocol for the use of DDT is very tightly controlled, such that chances of leakages are slim.

## A.2. GEF focal area and/or fund(s) strategies, eligibility criteria and priorities.

DDT is one of the original twelve chemicals listed under the Stockholm Convention and continues to be one that is the most produced and used. The Conference of the Parties of the Stockholm Convention (COP) allows the use of DDT for public health interventions for disease vector control as recommended by and under the guidance of the World Health Organization (WHO). WHO recommends the use of DDT only for Indoor Residual Spraying (IRS) to control disease vectors provided that the guidelines and recommendations of WHO and the Stockholm Convention are met. *DDT may be used until locally appropriate and cost-effective alternatives are available that also will allow countries to address the challenge of the wide spread vector resistance against pyrethroid, which was the most important replacement for DDT. This is essential for a sustainable transition from DDT.* The continued need for the use of DDT for disease vector control is evaluated at each biannual meeting of the Conference of the Parties.

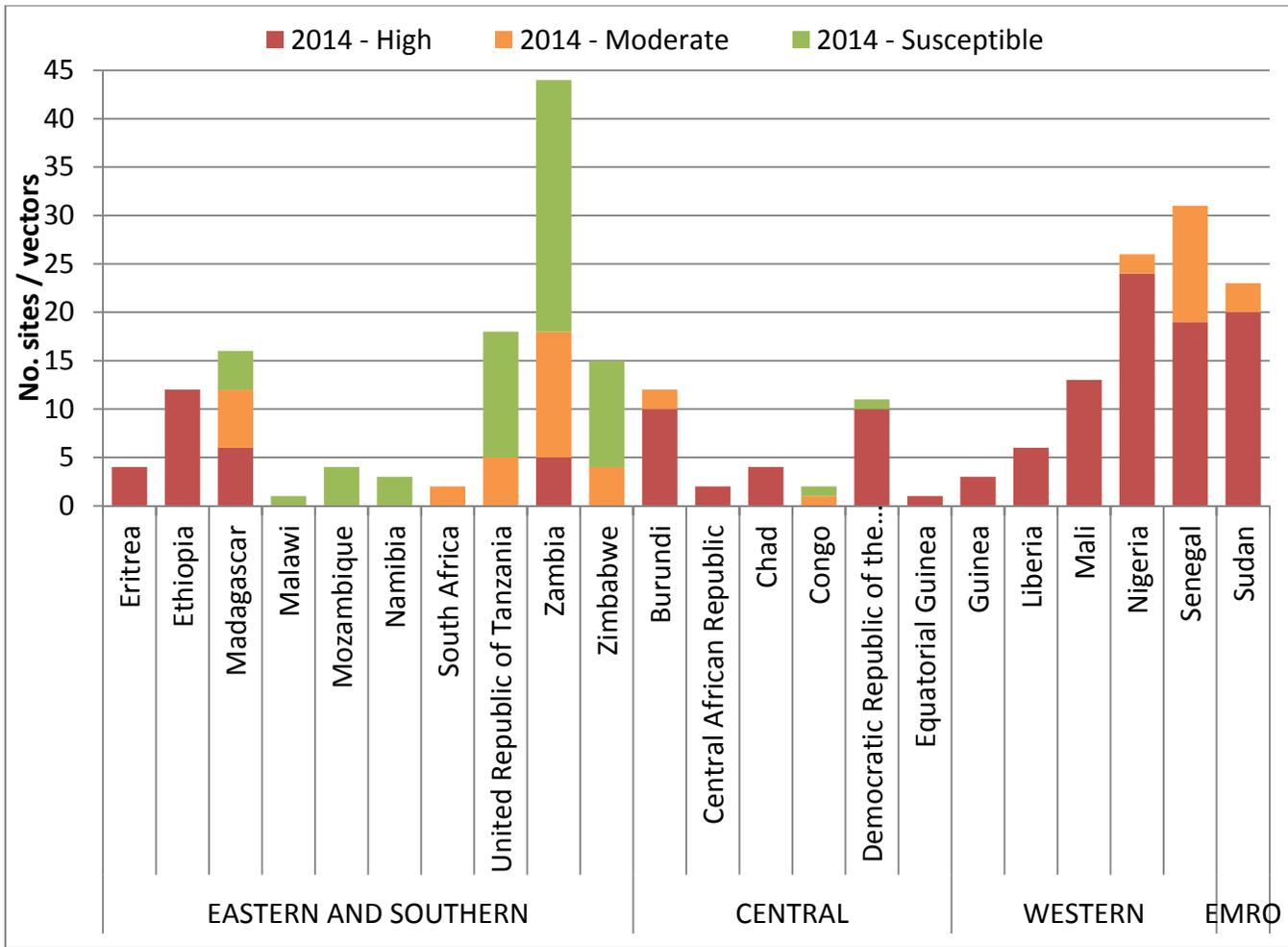
Article 12 of the Convention mentions that the Parties shall cooperate to provide timely and appropriate technical assistance to developing country Parties and Parties with economies in transition, to assist them, taking into account their particular needs, to develop and strengthen their capacity to implement their obligations under this Convention. Currently, there are collaborative alliances and organizations working with countries to develop and deploy alternative methods in order reduce the reliance on and ultimately to eliminate DDT. The GEF is the financial mechanism of the Stockholm Convention to support country parties to achieve this objective.

All the proposed project countries are parties of the Convention. They are currently using DDT for diseases vector control mainly malaria. Particularly now with the wide spread resistance of the vector against pyrethroids, the major insecticide being used and has been the alternative to DDT, it is very likely that even countries that have been applying pyrethroids will have to revert back to DDT in order to sustain the transmission control in the absence of affordable and effective alternative to DDT. In line with this, discussion is going on within the Southern Africa Development Community (SADC) to establish a DDT producing plant to ensure availability of adequate and quality DDT to national malaria control program in the region. In view of the situation of the countries in the sub-region this is an appropriate approach to contain pyrethroid resistance and even revert it by using DDT as resistance management alternative. The current status of resistance against DDT is less extensive compared to that of pyrethroid in Southern Africa (Fig. 1a & 1b).

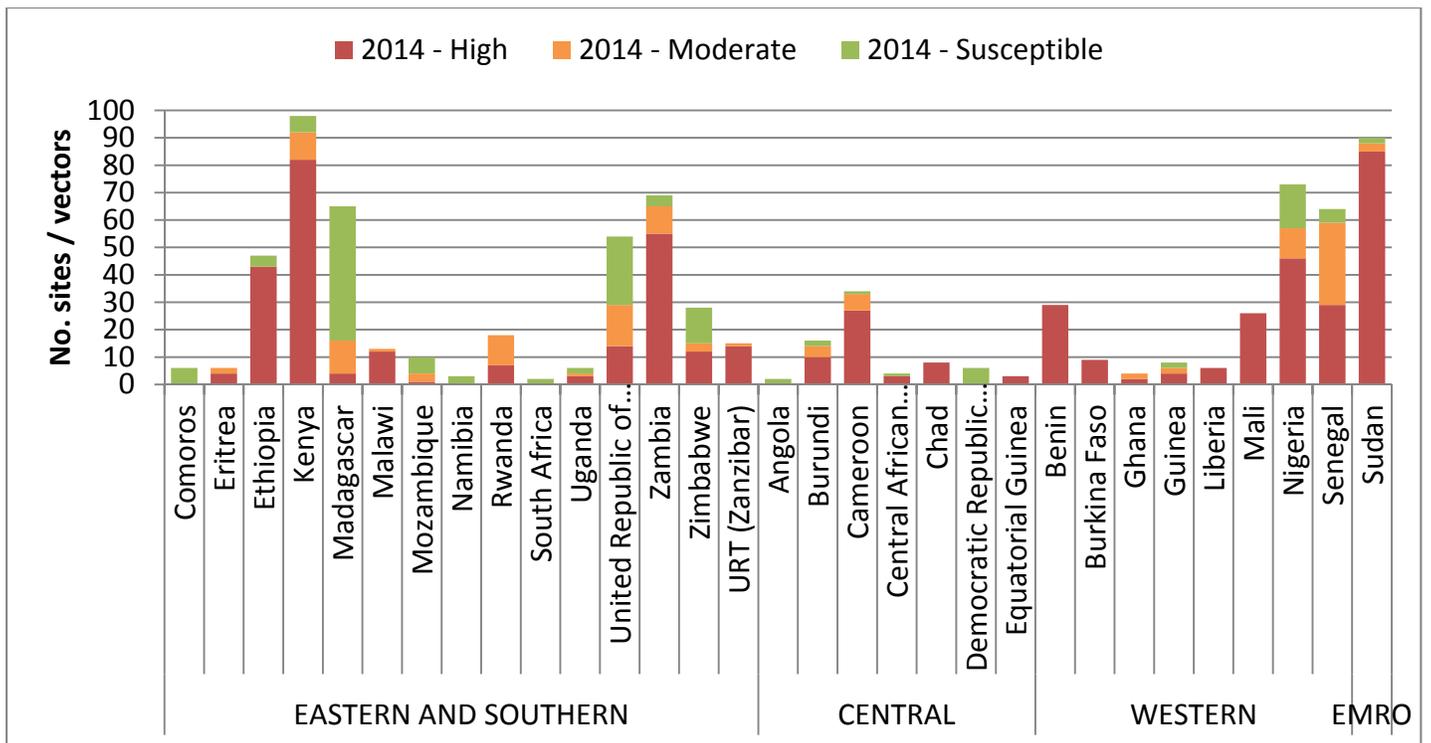
In the early 2000s, pyrethroids insecticides were promoted as an effective and affordable alternative to DDT in some countries due to reported resistance in countries such as Eritrea, Ethiopia and on the basis of economic grounds in others (e.g. Madagascar, South Africa). However, a decade later, the wide spread and intensified appearance of resistance of the vectors against this group of insecticides has limited its application for IRS throughout the region (Fig. 1a). Indeed, in large parts of the continent mosquitoes are now resistant to both DDT and pyrethroids. Contrary to expectations, however, the malaria vectors in Southern Africa remain by in large, susceptible to DDT (Fig. 1b) despite more than half a century application of the insecticide for vector control in the subregion. Following the discontinuation of the use of DDT in Ethiopia, Southern Africa is where the bulk of IRS using DDT is currently implemented. As it is indicated in Figs 1a and 1b, the wide spread resistance to pyrethroids and the continued susceptibility of the vectors to DDT in the subregion means increasing dependency of the national malaria control programs on DDT in the absence of a better alternative method. The increase in the use of DDT with an associated decrease in the use of pyrethroids after 2009 (Fig. 2) demonstrates the increased reliance on DDT when the alternative insecticide was not effective due to resistance. The situation is exacerbated by the declining number of new public health pesticides produced and made available for the control of vector borne diseases including malaria as was clearly stated in at Stockholm COP7 side event on May 5 2015 – *Developing Alternatives to DDT* which offered an opportunity to present varied perspectives on the newly produced *Road Map for the Development of Alternatives to DDT*. The presentation made by CropLife International showed a worrying trend in the reduction of options for chemicals control agents in the face of increased resistance, with fewer and fewer options available to combat vector borne diseases. This adds to the weight of evidence on the need for the development of non-chemical alternatives to pesticides as viable and affordable options to combat vector borne diseases.

The project is therefore in line with the GEF chemicals strategy's objective 1: "*phase out POPs and reduce POPs releases*". It is also a timely response to current challenge that has been faced by all the project countries and all countries in the region. Outcomes of the project including the demonstrations of alternatives are expected to significantly contribute to the effort to maintain the current achievement and further progress in malaria control through the application of affordable, effective and safe vector control interventions and approaches in all endemic countries of the region.

**Fig. 1a:** Current status DDT resistance



**Fig. 1b:** Current status of pyrethroid resistance



### A.3 The GEF Agency's comparative advantage:

UNEP's mission is to provide leadership and encourage partnership in caring for the environment by inspiring, informing, and enabling nations and peoples to improve their quality of life without compromising that of future generations. UNEP is the voice for the environment in the United Nations system, and is the primary driving force in the UN system for international activities related to the sound management of chemicals. The agency promotes chemical safety by providing policy advice, technical guidance and capacity building to developing countries and those with economies in transition, including activities on chemicals related to the implementation of the Strategic Approach to International Chemicals Management (SAICM). UNEP has facilitated the negotiations of a number of international treaties on chemicals and waste, and hosts the secretariats of (amongst others) the three Multilateral Environmental Agreements (MEAs): Basel Convention, Rotterdam Convention, the Stockholm Convention and recently the interim secretariat of the Minamata Convention on Mercury. In particular, the Stockholm Convention on Persistent Organic Pollutants is a global treaty to protect human health and the environment from chemicals that persist in the environment for long periods, become widely distributed geographically and accumulate in the tissue of humans and wildlife. The Stockholm Convention, which entered into force in 2004, requires Parties to take measures to eliminate or reduce the release of POPs including DDT, which currently is being used only for vector borne disease control, into the environment.

The project directly relates to supporting the implementation of activities linked to the achievement of decision SC-7/5 from the Stockholm Convention COP on the implementation of a road map for the phase out of DDT use. It also supports UNEP's role as part of the Global Alliance on DDT issues linked to the implementation of the Stockholm Convention. These activities continue, both in support of the Convention and as a part of UNEP's mandated work programme.

The Road Map for the Development of Alternatives to DDT, designates UNEP Chemicals Branch as responsible for overall coordination of the implementation of the road map activities. In doing so, UNEP Chemicals Branch relies on the comparative advantage it has gained through its past work on DDT, including its leadership in the 'Global Alliance for the development and deployment of products, methods and strategies as alternatives to

DDT for disease vector control'. As part of this role UNEP Chemicals Branch also serves as a hub for gathering important data, including – in close cooperation with the BRS Secretariat – on the global situation in terms of production, trade, use, and stockpiles of DDT as well as human and environmental exposures (among others making use of its role in the global coordination group of the Global Monitoring Plan). This information will be featured in synthesis reports to be prepared regularly by the UNEP Chemicals Branch that will also assess developments in the fields of insecticide resistance, cost-effectiveness of DDT and alternatives, barriers to the deployment of alternatives and on-going national and international projects of relevance.

The Road Map also sets out the role of the WHO in the development of alternatives to DDT. It notes that WHO assumes a central role in the implementation of the road map, through the Global Malaria Programme (GMP). This includes the annual World Malaria Report, which provides data on the impact of malaria interventions. WHO promotes IVM as the management approach to control transmission of malaria and other vector-borne diseases, and regularly publishes recommendations on the use of DDT for IRS, which are to be followed by Parties to the Stockholm Convention using DDT for vector control.

Therefore, partnering of UNEP with WHO in this project provides a comparative advantage. The two agencies have implemented several other similar projects including the UNEP/GEF project to phase-out DDT in Mexico and Central America and projects demonstrating alternatives to DDT in Caucasus and Central Europe, Africa, and the Eastern Mediterranean.

Major areas of programmatic work include building POPs analysis capacity and the database on operational POPs laboratories, and gathering of information on POPs and their alternatives. The "Chemicals and Wastes" Sub-programme of the Division of Technology, Industry and Economics (DTIE/Chemicals Branch) assists countries and regions in managing, within a life-cycle approach, chemical substances and waste that have potential to cause adverse impact on environment and human health.

For the bienniums 2014-2015 and 2016-2017, the project fits within the UNEP Sub Programme 5 (Chemicals and Waste), and the project contributes to *Expected Accomplishment: Countries increasingly have the necessary institutional capacity and policy instruments to manage chemicals and waste soundly including the implementation of related provisions in the MEAs*. The most relevant Programme of Work Output to which the project primarily contributes is (for 2014-2015) Output 5: *Consolidated advisory and support services promote the sound management of chemicals at national level; including mainstreaming into national policies and programmes, instruments and schemes for the governance of chemicals production, use, trade and release*. The various initiatives related to DDT, for which GEF assistance is solicited, supports the implementation of the Stockholm Convention and successfully catalyses the efforts of our partners in the region to assist Parties of the Stockholm Convention meet their obligations and so fits well into the 2014 / 15 UNEP programme of work.

As outlined in UNEP's Programme Framework for Sub-programme 5 on Chemicals and Waste for 2014-2017, the project delivers on Programme of Work (PoW) Output 5B4 and specifically on output number 524.2. This particular output focuses on "*Support to the implementation of the chemicals and waste MEAs.*" As such, by achieving this output a significant contribution is made to Expected Accomplishment B which is defined in the Programme Framework as follows: *Countries, including major groups and stakeholders, increasingly use the scientific and technical knowledge and tools needed to implement sound chemicals management and the related MEAs*. The proposed GEF-funded project detailed herein is complementary to the project concepts detailed in UNEP's own project portfolio in the strict sense and provide an essential avenue to deliver value-added results not directly contemplated in the portfolio. In line with this, all countries in the WHO African region, including those participating in the project, have endorsed and signed the Libreville Declaration on Environment and Health. Most countries have prepared Joint Plan of work to address environment and health issues in a comprehensive and coordinated manner. The processes both at regional and country levels are jointly supported and coordinated by UNEP and WHO.

UNEP also facilitated and worked closely with WHO in the development of the Libreville Declaration on Health and Environment in Africa, in which the countries reaffirmed their commitment to implement all conventions and declarations that bear on health and environment linkages. UNEP and WHO are coordinating and

facilitating both at national and regional levels the development of joint plans and other actions towards the implementation of the Declaration.

#### A.4. The baseline project and the problem that it seeks to address:

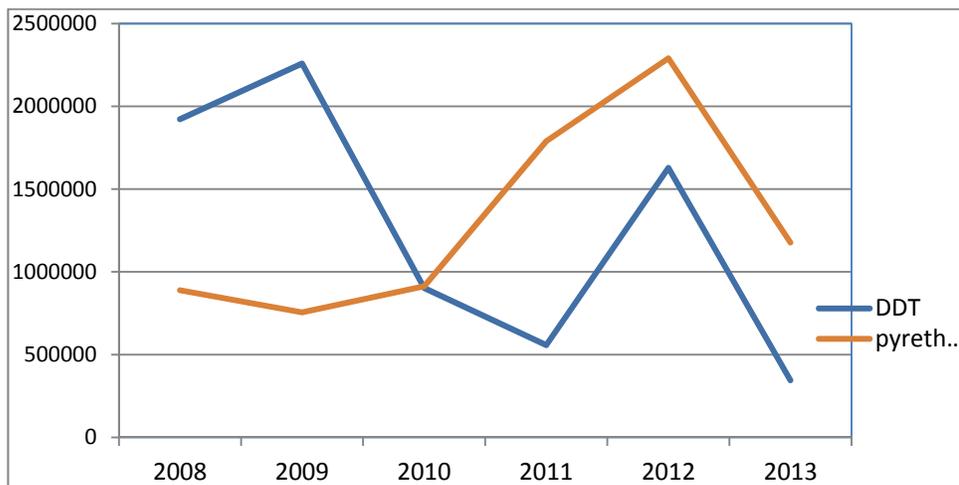
##### The Baseline Situation

Malaria remains a major problem in the region being the leading causes of morbidity and mortality, though the mortality number declined from one million per year in 2006 to about 650,000 in 2014 in sub-Saharan Africa. Beyond its direct impact due to disease burden, malaria causes significant loss of local household economy and hampers national development due to direct costs of treatment and prevention and indirect costs of lost productivity. Global climate change disrupts ecosystems and population movement resulting in displacement that can contribute to increased malaria burden and threatens emergence of the disease in currently non-endemic areas. Wide spread resistance of the malaria vector, particularly against pyrethroid based chemical pesticides, in regions is already posing a challenges to national malaria control programs to sustain the gains using existing vector control interventions, pressing countries to revert back to DDT where it is still effective.

The use of long lasting insecticidal nets (LLINs) and indoor residual spraying (IRS) of insecticides, including mainly DDT and pyrethroids are the two major vector control interventions currently used to combat vector borne diseases such as Malaria. These interventions target the adult vector population. Treatment of infected people is an additional intervention currently used to interrupt the transmission of the Malaria parasite. Both interventions have significantly scaled up during the last decade in the bid to reach universal coverage and to reduce malaria burden, in some countries to eliminate the disease. This has resulted to the reduction of malaria mortality in Africa with many countries implementing malaria elimination strategies.

However, according to the Road Map, these gains “are fragile and threatened by drug and insecticide resistance, lack of tools and strategies for ‘outdoor and residual transmission’ and overall lack of funding and capacity.” The Road Map notes that the countries with the heaviest malaria burden face significant challenges. This includes Mozambique, Zambia and Zimbabwe<sup>1</sup> where upsurges in malaria, including situations where there has been an increase in the *Anopheles funestus* populations, highlight the need for complementary vector control tools and strategies, improved entomological monitoring and effective insecticide resistance management actions.

**Fig. 2:** Amount of insecticides used in IRS by year in 22 reporting countries: 2008-2013



**Note:** This shows a general increase in the amount of DDT used during 2010-2012, as the amount of pyrethroids used decreased. This seems to be due to the increased resistance against pyrethroids, which was documented in many countries during this period. . The decline in the amount of both chemicals used in 2013 might be attributed to the reduced provision of the Global Fund for IRS but also due to the targeting of IRS implementation in some countries as the malaria burden declined.

It also should be noted that the amount of DDT required to replace the current alternative insecticides to sustain even the same level of population protection using IRS will be much higher than the amount of the alternatives due to the variation in the concentration of the active ingredients. To date, the 7 project countries in southern Africa use a total of 366.7 tons of non-DDT insecticides mainly pyrethroids but also carbamats and organophosphates. A total 2133.68 ton will be required if national malaria control program were to replace these insecticides with DDT due to insecticide resistance. Particularly, the replacement of the currently applied 121 tons of pyrethroids would entail the introduction of 1104 tons of DDT back in the malaria control programs. Table 4 shows the amount of DDT required to replace the few available alternative insecticides .

**Table 4:** Non-DDT insecticides currently in use for malaria control in Tier 1 and Tier 2 project countries and amount of DDT needed to replace these

Country	Non-DDT insecticides currently in use (ton)				Amount of DDT required to replace the other insecticides (ton)			
	PY		OP	CA	PY		OP	CA
	LC	Del			LC	Del		
<b>Tier 1 countries</b>								
Botswana	0.30	---	---	---	3.21	---	---	---
Mozambique	52.00	---	---	24.00	556.40	---	---	128.64
Namibia	---	18.00	---	---	---	603.00	---	---
South Africa	27.80	---	0.40	---	297.46	0.40	---	---
Swaziland	0.30	---	---	---	3.21	---	---	--
Zambia	5.8	---	203.60	17.50	62.06	---	203.60	93.80
Zimbabwe	17.00	---	---	---	181.90	---	----	----
<b>Total each insecticide</b>	<b>121.20</b>	<b>18.00</b>	<b>204.00</b>	<b>41.50</b>	<b>1104.24</b>	<b>603.40</b>	<b>203.6</b>	<b>222.44</b>
<b>Total others-DDT</b>	<b>384.7</b>				<b>2133.68</b>			
<b>Tier 2 countries</b>								
Madagascar	1.30	---	59.52	8.47	13.91	---	59.52	45.40
Tanzania	---	150.74	108.00	---	---	5049.79	108.00	---
<b>Total each insecticide</b>	<b>1.30</b>	<b>150.74</b>	<b>167.52</b>	<b>6.47</b>	<b>13.91</b>	<b>5049.79</b>	<b>167.52</b>	<b>45.40</b>
<b>Total others-DDT</b>	<b>326.03</b>				<b>5276.62</b>			
<b>Grand Total others-DDT</b>	<b>710.73</b>				<b>7410.30</b>			

LC: lambdacyhalothrin; Del: deltamethrin; OP: Organophosphate; CA: Carbamats

It should be noted that the amount DDT required replacing and pyrethroid, which is the most common insecticides group is particularly very high. The proportion for lambdacyhalothrin is 10 times while for deltamethrin it is 33.5 times. The use of the other alternative insecticides such as newly formulated pirimiphosmethyl (organophosphate) is also limited due to the prohibitive unit price, which is currently at USD 28.00 per sachet (one dose) compared to USD4.00 per sachet for pyrethroids. The situation reiterates the critical need for new alternative interventions and approaches to prevent the re-introduction of DDT for

malaria control as pyrethroid resistance is expanding and no other equally affordable and effective alternatives are on the horizon.

A snap shot of the malaria situation, the vector control effort in each project country, and the gap the project is expected to fill is summarized below.

### **Botswana**

Of the total population of about 2.1 million, 37% are at risk of malaria infection. Malaria transmission in most parts of the country is seasonal and prone to epidemics. There are a few places of perennial transmission particularly in the Okavango Delta and Chobe districts. *Anopheles arabiensis* is the single major vector in all malar prone districts. Botswana is one of the countries where IRS is a major vector control program. Indoor residual spraying using DDT for malaria control in Botswana goes back to the mid-1950s as a small-scale intervention. However in 1998, there were challenges in obtaining good quality DDT and as a result Botswana introduced the use of pyrethroids for malaria vector control. Vector susceptibility tests undertaken in 2006 and 2007 revealed a reduced vector susceptibility level to pyrethroids. In 2009, Botswana re-introduced DDT as part of its malaria elimination strategy. Botswana is one of the eight countries that have opted to eliminate malaria either sub-nationally or nationally. The country has planned to eliminate malaria nationally from its territory by 2015. In order to achieve this, the NMCP has scaled up all malaria control interventions. To date, the country sprays most parts of at risk areas using both DDT and pyrethroids protecting about 600,000 people. LLINs are also used as a complementary measure to IRS. Nevertheless, in areas such as the Okavango Delta access for IRS is a challenge and as a result NMCP conducted a pilot trial on the use of durable lining. This is a long lasting pyrethroid plastic sheet with which walls of houses can be plastered instead of IRS. Malaria control was funded for the first time by the Global Fund in 2014 in Botswana, with top-up from government allocations. Resistance to any insecticide in use, i.e., DDT and pyrethroids has not been reported from Botswana. In view of the wide spread pyrethroid resistance even in the neighbouring countries, it remains to be confirmed if the non-reporting is due to lack of information from the field or if it is a real absence of resistance.

#### **Baseline vector control in Botswana**

- IRS is implemented in all malaria prone districts protecting more about 600,000 people in 2011.
- More than about 150,000 LLINs distributed during the period 2010 - 2013.
- Pilot trial on effectiveness of durable lining in one village where the application of both IRS and LLINs poses challenge is going on.
- Number of partners such as the Clinton Foundation (2009 – 2010) and RBM partnership are closely working with the NMCP.
- Malaria cross border initiatives have been established with Namibia, Zimbabwe and South Africa.

With all these in place, however, limited capacity for resistance monitoring and management and lack of evidence on effectiveness of supplementary/alternative methods are challenges to NMCP. Botswana expects this project to support the capacity building for vector resistance monitoring and management to save and prolong effectiveness of insecticides for IRS; and also assist the on-going effort to diversify the vector control interventions through supporting more pilot trials on potential alternatives for vector control, strengthening vector surveillance, and mapping to guide targeting of interventions to achieve malaria elimination.

### **Mozambique**

The whole of the estimated 24,366,000 population of Mozambique are at risk of endemic malaria with perennial transmission. *Anopheles funestus* and *An. gambiae* s.s are the major vectors in the country. *An. arabiensis* is also an important vector in some areas. Application of IRS using DDT was initiated in 1946 in peri-urban areas of Maputo city and the Limpopo Valley in southern Mozambique. Mozambique was one of the countries that participated to some extent to the malaria elimination effort, and IRS was a major intervention. The IRS program was disrupted from 1970 to the early 1990s due to the unstable political situation. In the last

decade, the malaria control program has evolved to a point of implementing large scale IRS programs using DDT and lambda-cyhalothrin, a pyrethroid, in several areas in 58 districts protecting 6 to 8 million people every year. In addition to this national effort, the Lubombo Spatial Development Initiative (LSDI) an inter-country cross-border malaria control program was jointly implemented by Mozambique, South Africa and Swaziland for about the last about 10 years before its implementation was down-sized in 2010. The LSDI has been spraying bendiocarb (carbamate) in the project area to due to resistance both to pyrethroids and DDT. Distribution of LLINs was initiated in early 2000s and has been scaled up recently. The country depends on IRS and LLINs. Studies have indicated that *An. funestus* is resistant to pyrethroids and carbamates in some districts of southern region. Pyrethroid resistance is more widely distributed than that of the other insecticides. The vector can however be controlled using DDT, though there reports from a few places showing limited reduced susceptibility or even low level of resistance of the vector to this insecticide. Resistance of *An. gambiae* s.s. and *An. arabiensis* to pyrethroids and DDT has also been reported in a number of places but more studies are still needed to confirm the distribution and the intensity.

#### Baseline vector control in Mozambique

- There is big IRS program protecting about 7 million people every year
- The country has distributed about 9.3 million LLINs in the last 3 years
- There is information on status of vector resistance, though limited
- There are number of partners involved in the implementation of vector control interventions
- There is a strong cross boarder collaboration with Swaziland, South Africa and Zimbabwe
- A number of partners including PMI, GF, DFID, World Vision, RBM, UNICEF, WHO etc. are actively participating in the vector control program

Nevertheless, NMCP needs to further build its technical capacity and improve its infrastructure for effective implementation and management of IRS in order to increase quality and efficacy of the program outside the LSDI operational areas. In view of the number of vector species and the different status of their susceptibility to the different insecticides in different parts of the country, it is extremely critical to have a clear situation regarding the resistance of each vector to each insecticide and in each part of the country where IRS is implemented. The project will contribute significantly to strengthening the capacity for vector surveillance including resistance monitoring for evidence-based decision and implementation. It also will give opportunities to the NMCP to assess alternative methods and take decisions based on scientific evidences for appropriate insecticide resistance management to reinstate the effectiveness of pyrethroids.

#### Namibia

The total population is 2.2 million, with approximately 1.2 million at risk of contracting malaria. Malaria transmission is unstable and seasonal in all malaria endemic regions of Namibia. *An. arabiensis* is the most important malaria vector in Namibia following the elimination of *An. funestus* and probably *An. gambiae* s.s. also through years of IRS application using DDT. The IRS has been applied in all malaria prone areas of the country since 1965. After independence (1990) a change was made by introducing Pyrethroids in addition to DDT as DDT continues to be used in traditional structures spraying while Pyrethroids are used to spray modern houses in 22 districts in 9 regions protecting about more than 700,000 people. The WHO has worked closely with the National Vector borne Diseases Control programme (NVDCP) to address the persistent problems associated with quality and timeliness in relation to transmission season observed in the late 1990s and early 2000s. The program has shown progressive changes and improved operational coverage and quality of IRS over the years since 2005 up to date. Namibia is one of the E8 countries planning to eradicate malaria. Namibia has also distributed about 600,000 LLINs to selected communities during the last three years. Following this regional decision, the NVDCP has been trying to strengthen the technical capacity for vector surveillance and for program monitoring and evaluation in order to facilitate informed decision and program planning. According to national annual reports, *An. arabiensis* can be controlled by the use of DDT and Pyrethroids. However, Namibia is still dependent on WHO technical assistance on the required adequate

entomological capacity to facilitate informed decision making for its vector control program. Namibia is part of the cross-border malaria control initiative with Angola, Botswana, South Africa and Zimbabwe.

#### Baseline vector control in Namibia

- The country protects about 600,000 thousand people with IRS every year
- More than 600,000 LLINs between 2007 and 2012 and a pilot mass distribution in three regions identified contributing high number of cases to the national data in 2013 and efforts are underway to replace the LLINs distributed between 2008 and 2011 through planned mass distribution (universal coverage) in 2014
- The country has scaled up its malaria vector control interventions by introducing the IVM approach to eliminate malaria
- Partners such as GF, WHO, Clinton Foundation, RBM, UNICEF and Clinton Foundation are working closely with NVDCP

In spite of some challenges, Namibia has made a lot of improvements to ensure a high standard of IRS activities. Vector resistance monitoring and wall bio assays for quality control of IRS reported are conducted on annual basis. Efforts have been put in place to conduct vector surveillance studies in order to update the country baseline data on vector identification, species distribution and determination of behaviour in the country. These will enable the country to do away with the current limited choices of vector control method of chemical dependent approach for IRS (DDT and Pyrethroids). However, the efforts have been hampered by the limited entomological capacity both at national and districts levels. Consequently, similar to the situation in Botswana, the report on no resistance to all insecticides in use remains to be confirmed. Namibia is one of the countries in Southern Africa attempting to go for malaria elimination. The project is expected to contribute to the effort being made to strengthen the IRS program through building technical capacity and establishing strong vector surveillance system as foci targeting hot spots IRS as important in malaria elimination. It also will assist establishment of routine and effective vector surveillance system including resistance monitoring and management strategy as this is one of the prerequisites for program transformation to elimination.

#### Republic of South Africa

Out of about 51,000,000 South Africans about 5 million are at risk of malaria infection. Malaria is endemic in three provinces in the north east of the country. Transmission is unstable and seasonal in almost all malarious areas of South Africa. *An. arabiensis* is the only important existing vector in South Africa. *An. funestus* used to be a very important vector before it was reduced to low levels through years of IRS with DDT. The vector reappeared following the replacement of DDT by pyrethroids in 1996, to which *An. funestus* was resistant. No record of its presence was made since the re-introduction of DDT. Later on, DDT resistance was identified in a population of *An. arabiensis* in two localities in KwaZulu Natal. However, subsequent follow ups were not able to confirm the reported resistance in the same populations.

Application of IRS for malaria control in South Africa goes back to 1932 following a trial test that was carried out in 1931 in KwaZulu-Natal using pyrethrum. Application of pyrethrum was replaced by DDT in 1946. To date, DDT is used to spray traditional houses and pyrethroids in modern houses in eight districts of the three malarious provinces (Limpopo, Mpumalanga & KwaZulu-Natal). IRS is the only major malaria vector control intervention in the country. The spraying geographical area in South Africa is decreasing as malaria seems to be contained and less prevalent. South African has planned to eliminate malaria from its border in the coming few years. IRS has been scaled up to reach all communities at risk. Efforts are put in place to strengthen vector surveillance. South Africa is the leading country in the cross border malaria control programme, working closely with Namibia, Botswana, Zimbabwe, Mozambique and Swaziland

#### Baseline vector control in South Africa

- Effort is in place to protect the population at risk with IRS.

- Each for the three malarious provinces is responsible for their provincial malaria control, which makes local decision making effective.
- Research institutes in the country collaborate with provinces on malaria related issues.
- The country is working and supporting cross border malaria control to reduce the chance of re-introduction of the disease into areas that are malaria-free.
- Malaria infected areas and burden has significantly decreased in last several years.

Indoor residual spraying in South Africa remains the cornerstone of the malaria control program and has significantly impacted on malaria transmission as the country moves towards elimination of malaria. With this comes the need to diversify the vector control strategy to allow for reduction of the geographical IRS area, and target more transmission hot spots while other interventions would be implemented in other areas as appropriate to avoid re-establishment of local transmission. The potential significant negative impact of resistance on effectiveness of IRS has been demonstrated in the country when malaria increased to epidemics level following the replacement of DDT by pyrethroids to which *An. funestus* was resistant. The program needs to establish effective vector surveillance system including resistance monitoring and management to ensure effective targeted IRS and closely monitor vector dynamics for elimination. This requires major capacity development and system strengthening particularly at the provincial and district levels. The project will contribute to achieve this. It also supports the search for and adoption of locally effective and cost effective alternatives to reduce the program reliance on IRS with DDT while efficiently controlling malaria towards elimination.

### **Swaziland**

Swaziland is one of the Southern African countries planning to eliminate malaria. Malaria transmission in Swaziland is seasonal and unstable to which about 280,000 of its 1.3 million people are at risk. The country has a well-managed and successful malaria control program with IRS at the centre of the strategy. *Anopheles arabiensis* is the principal vector prevailing in the country. *Anopheles funestus* used to play a role before its elimination as a result of intensive application of IRS. It has not been detected in the country for many years even in areas bordering with Mozambique where the species is still a very important vector. *Anopheles arabiensis* is susceptible to DDT and pyrethroids. Indoor spraying of almost all malarious areas using DDT was already achieved by 1950. Since the early 2000s, however, spraying in traditional structures is being done with DDT while in urban centres pyrethroids are used. Due to many years of IRS and other malaria control interventions, malaria burden has decreased to a very low level. Nonetheless, the country is continuing IRS campaigns due to inadequate capacity for effective surveillance to guide decision and implementation at local level targeting only transmission foci and put in place alternative strategies to prevent re-introduction in areas freed from malaria.

#### Baseline vector control in Swaziland

- Swaziland manages one of the very good vector control programs in Africa.
- It is one of the countries planning to eliminate malaria.
- IRS is a well-established vector control program protecting almost 280,000 people every year
- Recently, the country has introduced LLIN as part of its effort to diversify the vector control strategy and has distributed 220,000 LLINs in the last 3 years.
- The country has good capacity for implementation of malaria vector control.
- Limited dry season larval control is implemented, though its impact is not monitored and determined

In spite of its good and effective vector control program, Swaziland lacks the required evidence-based results to make the program more focused and targeted because of limited technical capacity for regular vector surveillance to produce the evidence base to inform strategic and operational decision making. The country also continues to be heavily depend on DDT for its IRS program. The project will assist the country to build its technical capacity for vector and epidemiological surveillance. It also provides an opportunity to conduct

effectiveness and feasibility studies of other vector control interventions that can contribute to the effort of malaria elimination and help to maintain this malaria-free status in the post elimination period under the local circumstances. Swaziland is the country where the Malaria Decision Analysis Support Tool (MDAST) is going to be field tested to assess its operational applicability to promote evidence based decision making for malaria control and elimination.

## **Zambia**

Zambia's total population of over 13,000,000 is at risk of malaria infection. Malaria is endemic throughout the country with transmission ranging from low (< 1%), medium (1-14%) to high (> 15%) parasite prevalence rates. All the three most important malaria vectors, *An. gambiae* s.s., *An. arabiensis* and *An. funestus* exist in Zambia. Malaria control in Zambia, particularly in the copper mining area has a long history of vector control using the IRS approach and larval control. This however, has been interrupted for a long time until the use of LLINs was initiated in the early 2000s. Presently, both IRS and LLINs are major vector control interventions in the country. IRS is based on the use of various classes of insecticides including pyrethroids, organochlorines, organophosphates and carbamates dependent on proven susceptibility status of the vectors throughout the country. IRS is conducted in partnership with the private sector (e.g Mines, agro-companies etc.) The strategy for LLINs distribution is to attain universal coverage. A total of 5.6 million LLINs have been distributed in the last three years targeting mainly the rural population prior to 2013. A number of partners support the LLINs distribution program. Zambia is one of the countries where, generally, reduction in malaria burden in the past few years has been documented / reported, though a slight increase has been observed since end of 2013.

### **Baseline vector control in Zambia**

- There is a well-established IRS program protecting about 5 million people.
- Zambia has distributed a cumulative total of over 7 million LLINs in the past 10 years. An estimated 5 million are still in use by the communities.
- Studies have been conducted on larviciding in selected sites.
- There is some knowledge on the susceptibility level of vectors to insecticides.
- Zambia's partners on vector control include GF, PMI, DFID, UNICEF, WB, WHO and faith based organisations.

In addition to IRS and LLINs larval control through larviciding and some environmental management approaches are conducted on a limited scale. These are considered as supplementary interventions in selected urban areas where the breeding sites are few, fixed and findable. This method can also contribute to the management of insecticide resistance. Resistance against both DDT and pyrethroids has been reported with a much more wide distribution and intensity against the latter, i.e. pyrethroids. The Project will provide an opportunity to strengthen the local capacity for vector surveillance including insecticide resistance monitoring. The on-going larval control work can easily be linked to one of the demonstration interventions and supplement the outcomes.

## **Zimbabwe**

Almost half of the 12,000,000 population of Zimbabwe live in malarious areas. Most malarious areas of Zimbabwe experience seasonal transmission with a risk of epidemics. Perennial malaria transmission exists in lowland areas particularly in major river basins. *Anopheles arabiensis* is the main vector of malaria in Zimbabwe after *An. funestus* was eliminated through years of IRS application. *Anopheles merus* is commonly found in some parts of the country but no information is yet available on its role in malaria transmission. *Anopheles arabiensis* is resistant to pyrethroids but susceptible to DDT. The first IRS campaigns for malaria control in Zimbabwe were initiated in 1947 with application of DDT. Since then, the intervention has been going on but at different levels of geographical and population coverage. To date, IRS using both DDT and pyrethroids remains the major intervention of the malaria control program implemented in 47 districts, where malaria is prevalent, thus protecting more than 4 million people. After patchy distributions for many years the

use of LLINs has also become a major intervention in recent years. A total of about 3.5 million LLINs have been distributed in the past 3 years with the support Alliance for Malaria Prevention (AMP). Small winter larval control with application of larviciding is conducted particularly in the district earmarked for malaria elimination. Zimbabwe as some other countries in the sub-region has seen reduction the malaria burden reduction in the last few years. It is also one of the eight countries opting to eliminate sub-nationally and/or nationally.

#### Baseline vector control in Zimbabwe

- IRS protecting significant proportion of the population at risk (about 4 million) is in place.
- An estimated 3 million LLINs are still in use by the population in different parts of the country
- Larval control is implemented at small scale.
- Vector resistance is monitored though not regular as it should be.

The malaria vector control program of Zimbabwe is moving in the right direction. IRS and LLINs are implemented to reduce transmission. Vector resistance to pyrethroid has been documented in some parts of the country. The small scale larval control intervention that has been implemented is not properly evaluated so as to document the impact to facilitate evidence based decision making to scale up the intervention as a complementary method. The project will fill in the gap by addressing these issues and strengthen the vector control program through building the capacity for vector surveillance and for proper management and monitoring of vector control and its impact. Resistance of the vector population against pyrethroids while it remained susceptibility to DDT means the country will continue to depend on the latter in the absence of alternative interventions and methods.

The above snap shots highlight the efforts and the successes of the national malaria control programs in the project countries and their achievements in recent years. However, as described above countries are facing a serious challenge due to vector resistance to insecticides; absence of proven operationally effective and affordable alternative vector control interventions and approaches to reduce their reliance on DDT for IRS, which a major intervention in the sub-region; limited technical capacity for vector surveillance for decision making and for planning and implementation of vector control interventions; weak inter-sectoral collaboration; and, inadequate capacity for implementation of vector control interventions in an IVM approach. Regular monitoring and management of resistance is of paramount importance to maintain effectiveness of vector control programs. However, the countries have limited technical, material and infrastructural capacity to regularly perform this. The project presented in this submission aims to address these concerns through targeted technical inputs at national and regional level.

## **Tier 2 countries**

### **Ethiopia**

There has been a large scale IRS program for more than 50 years. Blanket spraying with DDT was initiated in 1959 and continued until the late 1970s in almost all affected areas. DDT spraying continued until 2005- 2006 when it was replaced by pyrethroids due to wide spread DDT resistance. Later on, in 2009, carbamats were introduced following the report of resistance against pyrethroid as well. To date, about 5 million houses are sprayed protecting about 15 million people every year. This progress, however, is in danger due to wide spread vector resistance to many insecticides including DDT and pyrethroids. Resistance against carbamats and organophosphates has been also reported from some parts of the country. Consequently, Ethiopia at the moment is putting a lot of effort into developing a strategy that can change the trend of resistance and limit its spread before it causes a program failure. Currently, the GEF supported pilot project on “Demonstrating cost effectiveness and sustainability of environmentally sound and locally appropriate alternatives to DDT for malaria vector control in Africa” is on-going and evaluating effectiveness of various chemicals for IRS and also to develop vector resistance management strategy that will revert the trend of resistance against pyrethroids

at local level. To date, DDT is not formulated and used in the country. However, the country has obsolete stocks. Ethiopia is one of the countries that do not report the status of DDT use regularly to the SSC.

### **Gambia**

IRS with the application of DDT was introduced in 2009 in a few districts. The amount used in 2013 was 19.9 tons. However, appearance of resistance to DDT has become a challenge. The national Action Plan on DDT Management options based on the analysis of the country baseline situation, considering the provisions of the Stockholm Convention as well as other relevant international treaties and national policies, pursuant to the national priorities and objectives for POPs management has been put in place. The country needs strengthening the capacity of NMCP in the trial and application of alternatives to DDT; to widen and strengthen the present NIBP programme (including sensitization of the public); to develop and implement guidance for safe use of available insecticides at community level. Gambia also does not regularly report on DDT to the SSC.

### **Kenya**

Kenya was one of the countries where pilot IRS projects were initiated in the 1950s and 1960s as part of the global malaria elimination campaign. However, the intervention has not been taken to scale. In late 2000, the country decided to reintroduce IRS in epidemic prone districts. Kenya is also one of pioneers in the use of insecticide treated bed-nets (ITNs). To date, both LLINs and IRS are major malaria vector control methods in the country. IRS is protecting about 1.7 million people every year. There is also small scale application of natural pyrethrum for IRS. This however is done on a pilot scale and is not part of a programme yet. Systematic application and assessment of this natural product might be useful. Resistance against pyrethroids has been a serious challenge to the NMCP. Resistance to pyrethroids is wide spread. Report of the status of DDT is limited. The problem has been compounded by the no registration of bendiocarb (a carbamate) for public health in the country. As in many other countries in the region, Kenya has limited capacity for optimal use of the IVM approach. Kenya is one of the countries where the GEF funded malaria decision analysis support tool (MDAST) project was implemented.

### **Liberia**

DDT has not been used for decades. IRS is being implemented using other insecticides such as pyrethroids or carbamates. However, in the face of wide spread resistance against pyrethroids and high cost of use of carbamates, the vector control program is facing a challenge. All of the POPs pesticides are banned in Liberia but some are still being used illegally, such as DDT, dieldrin, and chlordane. Liberia has never produced DDT and has banned the use of it, even for vector control. However, it was discovered that a local NGO was using dieldrin as agro-chemical in its agriculture projects in some parts of the country. The situation demonstrates the limited capacity to enforce the regulations with regarding the use of insecticides, a situation similar to many countries in the region. Currently, the main vector control intervention in Liberia is the use of LLINs. IRS program is ongoing in limited number of districts with the support of PMI. The country needs to strengthen its capacity for diversifying vector control strategy and for monitoring and management vector resistance. Currently, there is very little information on the status of insecticide resistance in Liberia.

### **Madagascar**

Madagascar has been implementing a successful IRS programme in the central highland to prevent epidemics, in the south and the margins of the highlands to reduce malaria burden protecting a total of about 12 million people. The program used DDT until 2005. DDT has not been in use after 2005, but it is kept in the list of insecticides for potential use of IRS, mainly as insecticide resistance management purposes. The NMCP has reported some level of resistance against DDT and pyrethroids while no reported resistance for carbamate and organophosphate. Nevertheless, high cost the two latter insecticides is becoming a challenge. In view of the vast observed experience in the region pyrethroid resistance appears and expands much faster than that of DDT. Consequently, with the current pyrethroid resistance trend and prohibitively high cost of the other alternatives, there is a risk that Madagascar will re-introduce the use of DDT to avoid a resurgence of malaria,

which has already been observed since 2013 (World Malaria Report 2014). There is also some problem of obsolete DDT. There has been a report on that the conditions of storage do not meet the guidelines for storage of pesticides. Madagascar is one of the countries currently implement the project on “Demonstrating cost effectiveness and sustainability of environmentally sound and locally appropriate alternatives to DDT for malaria vector control in Africa.”

### **Senegal**

LLINs are the major vector control intervention for malaria control in Senegal. Most urban dwellers buy LLINs either at subsidized price from different NGOs or at full price from retailers. IRS was not part of the malaria control strategy until recently. In 2009, through PMI, indoor residual spraying of DDT was introduced in a number of selected districts protecting about a million people. Insecticide resistance to both DDT and pyrethroids has been reported. To date, the PMI funded IRS program has been interrupted due to the resistance of DDT and pyrethroids and the high cost of the alternatives. Without thorough understanding of the vector resistance situation and development of a good management strategy Senegal faces a resurgence of malaria. However, the NMCP does not have the capacity to adequately address these issues. The project can contribute to strengthening the technical capacity for IVM, which is considered the ultimate alternative for a better management of vector borne diseases.

### **Tanzania**

Tanzania is one of the countries with a high level of coverage of LLIN for malaria control. IRS using pyrethroids was introduced recently in selected districts, mainly epidemic prone. Together with the use of LLINs, the IRS aided the country to reduce malaria burden. However, a significant level of insecticide resistance against pyrethroids has been reported, while DDT is still effective. The country has never used DDT though there has been a lot of discussion on its introduction. The effectiveness of pyrethroids, which is equally effective and affordable insecticide, aided those who opposed the introduction of DDT. Now, with the appearance of wide spread resistance against pyrethroids, the challenge of protecting the population at risk of epidemics using the very expensive alternatives will be a serious challenge to the program. The island of Zanzibar is one of the areas where malaria has been reduced to the level where elimination has been targeted. The pyrethroid resistance is posing a serious challenge to achieve this as well. The availability of safe and affordable alternatives to sustain what the country has achieved so far and to move forward in malaria elimination is critical. Tanzania is one of the two countries of tier 2 where pyrethroid is highly resisted while DDT is still effective. Tanzania is one of the countries that have implemented the MDAST project.

### **Uganda**

The first IRS pilot projects were conducted in the 1940 -1960s using DDT in urban areas particularly in Kampala where a dramatic reduction of disease transmission was documented. The pilot projects did not expand or continue for a long time except for sporadic spraying activities in some epidemic prone areas, particularly from 1997 onwards. The use of DDT was reintroduced in 2008 in a few districts but was stopped in 2009 after just one round of application. Whereas the decision to reintroduce DDT has been made, there is limited technical know-how of safe handling during IRS. There is also inadequate capacity for safe use and effective monitoring of IRS operations. Consequently, the re-introduction of the insecticide presented a challenge. During the last few years, the program has reported insecticide resistance against both DDT and pyrethroids. Recently, application of IRS with the support of PMI has been scaled up particularly in 10 epidemic prone districts protecting more about 1,000,000. Initially, pyrethroid insecticide was used. There has been a lot of discussion on whether to use DDT or not. The observation of wide spread resistance in the vector population for pyrethroids has added to the pressure for the consideration of the use of DDT. To date, surveys have reported resistance against DDT as well in many parts of the country. The program has been forced to introduce the new formulated pirimiphosmethyl, which is currently the most expensive insecticide used for malaria control. Sustaining of the IRS program has become a challenge. Outcome of the project can benefit the NMCP. Uganda is one of the countries that implemented the MDAST project funded by GEF.

## The problem the project seeks to address

For the last decade countries have been striving to promote IVM in line with global and regional trends. Capacity building efforts, particularly in terms of training, were conducted targeting mainly the health sector. To date, all malaria endemic countries including those included in the project have some sort IVM strategic framework, which in most cases is implemented only by the health sector. Most even have ad hoc inter-sectoral IVM Committees. These in many cases are not functional due to absence of policy framework and/or legislation, or any other legally binding documents such as memorandum of understanding and/or ToRs addressing such inter-sectoral alliance. There is no capacity for IVM in the relevant non-health sectors. This remains a challenge even in the health sector. Consequently, the effort to transform implementation of existing vector control programs to IVM in its full concept and context has not been achieved. The effort to engage relevant sectors in the promotion and implementation of IVM in its broader context remains a challenge in all countries. Therefore, aim of the project and its objectives are in line with this national and regional endeavor to fully use the potential of IVM by furnishing the required evidences for application of diversified vector control methods. It also supports the institutionalization of structured inter-sectoral collaboration and community involvement for implementation of IVM to reduced reliance of malaria control programs on DDT. The project also builds up on accomplishments, knowledge and experiences of related projects implemented in the region and elsewhere that are described below in Section A.7.

The IVM approach as promoted by countries, WHO and other partners brings great potential for the control of vector borne diseases, including malaria. IVM is a strategy of using evidence-based multi-faceted insecticide based and non-insecticide interventions in a sensible, comprehensive and cost-effective manner through inter-sectoral collaboration and partnership at all levels to control one or more vector borne diseases. The strategy also puts a lot of emphasis on the protection of the environment and the human health. Nevertheless, existing evidence base for effectiveness of a number of potential alternative methods including those that are non-chemical in the context of the epidemiology of malaria in the WHO African region is scarce and fragmented. Strengthening and consolidation of the scientific basis on effectiveness of innovative non-chemical and chemical IVM interventions particularly on their performance at operational level has been therefore a priority for all countries.

Implementation of effective vector control in the context of IVM is based on sound knowledge of the bionomics of the vector; understanding of the local environmental situation; full involvement and ownership of the program by the communities receiving the service; and, a working intersectoral collaboration. Planning and implementation of vector control interventions needs selection of appropriate vector control methods including effective insecticides that should be applied in a well-defined area under specific and well-defined epidemiological conditions. Blanket use of insecticides and their substandard management can contribute to the appearance and spread of insecticide resistance among the vector populations. Lack of sound management of insecticides, which requires intersectoral collaboration can also exacerbate this. Most countries do not have up to date adequate capacity, intersectoral collaboration, legal frameworks to effectively plan, implement, monitor and evaluate vector control interventions, and properly manage the insecticides in use within the context of Integrated Vector Management. More specifically these challenges are related to:

- Inadequate human and technical resources to effectively implement vector control interventions in the IVM approach.
- Lack of IVM policies/guidelines to facilitate effective implementation and evaluation of impact of vector control interventions.
- Inadequate collaboration between the health and other relevant sectors such as agriculture and construction with regards to developmental projects negatively impacting on health.
- Inadequate capacity for the enforcement of policies relating to production and safe use of insecticides and pesticides.

- Where policies exist the gap in terms of addressing issues related to insecticides applied for public health.
- Inadequate capacity to carry out quality assurance of insecticides and pesticides
- Weak collaboration and information sharing between the health sectors and the pesticides control authorities to ensure safe and appropriate management of public health insecticides in terms pre- and post- shipment quality control; safe transportation, storage, application and disposal of unused insecticides and contaminated materials.
- The increasingly wide spread vector resistance to different classes of insecticides including pyrethroids, the only group of insecticides usable for LLINs as an effective and affordable alternatives to DDT. This partly can be attributed to sub-standard management of insecticides as described above.

It is prudent to say that the overall objective of the project is therefore to strengthen national capabilities for implementation and scaling up of evidence-based, innovative, diversified and environmentally sound disease vector control interventions alternative to DDT (with special emphasis on malaria) with multi-stakeholder participation within context of IVM.

It aims at the critical needs to strengthen the evidence, knowledge, inter-sectoral collaboration, legislations and capacity to apply effective diversified vector control intervention including non-chemical methods while the human health and environmental is protected. Using the experiences, lessons and knowledge acquired through the implementation of projects described in Section A.7 and based on what national malaria control programs are currently doing the project seeks to address the following:

#### **Proposed alternative scenario**

The problems facing countries outlined above will be addressed by the project implementing the following targeted interventions as set out in the project logical framework. These interventions are in accordance with the Road Map for the Development of Alternatives to DDT.

**Component 1:** Promote evidence-based multi-sectoral policy-making for IVM and strengthen multi-sectoral alliance in the promotion & implementation of environmentally sound & effective innovative interventions to reduce reliance on DDT for diseases vector control and strengthen countries' capacity a better compliance with multi lateral environmental agreements particularly the Stockholm Convention

The challenges this component of the project attempt to address are described below.

#### *i. National capacity and improved inter-sectoral alliance for implementation of IVM*

Risk factors of vector borne diseases including malaria are related to the environment in which multiple sectors play multiple roles. Consequently, control and elimination of malaria ultimately requires engagement and full involvement of all stakeholders in the context of IVM. IVM implementation requires intersectoral coordination and collaboration, with a focus on the health, environment and agriculture sectors. Clear agreements on the division of responsibilities and the sharing of resources, together with mechanisms to maintain a productive dialogue are main features of this collaboration. In the same context, communication channels and collaboration mechanisms within sectors need strengthening. However, stakeholders' involvement in malaria control is typically very weak due to the lack of a coherent policy framework and strategy and also a lack of personnel capacity in the health and non-health sectors. The project therefore aims to:

- Develop the mechanisms and fill the gaps in the legal frameworks for intersectoral collaboration;
- Promote the creation of inter-sectoral alliances;
- Develop an IVM policy framework; and,
- Build capacity of the relevant stakeholders.

*ii. Policy environment for IVM implementation*

Enabling environments, in the form of policy, legal and regulatory frameworks, are essential to facilitate the establishment of an IVM program and for the sound management of pesticides. Pesticide used in public health generally lack the regulatory framework, infrastructure and resources for the sound management of pesticides. Therefore, this project also will promote frameworks and best practice that minimise the human and environmental risk associated with pesticide use. This will help prevent the accumulation of DDT and other pesticides in stockpiles in the context of the Convention which states “Promotion of research and development of safe alternative chemical and non chemical products, methods and strategies for Parties using DDT, relevant to the conditions of those countries and with the goal of decreasing the human and economic burden of disease.” Capacity building is a crucial component if the desired impact of IVM is to be harnessed. This is achieved through organization of national workshops for the review of policy, legal and regulatory frameworks. Such workshops will produce action plans for detailed policy formulation and adjustment, legal improvements and the creation of regulatory frameworks. These action plans will be implemented through organization of workshops. This will require political backing and endorsement at the end of the process.

*iii. Reporting the the status of DDT use to Stockholm Convention*

The Stockholm Convection Annex B Part II stipulates that “each Party that produces and/or uses DDT shall restrict such production and/or use for disease vector control in accordance with the World Health Organization recommendations and guidelines on the use of DDT and when locally safe, effective and affordable alternatives are not available to the Party in question”. The convention also states that “every three years, each Party that uses DDT shall provide to the Secretariat and the World Health Organization information on the amount of DDT used, the conditions of such use and its relevance to that Party’s disease management strategy, in a format to be decided by the Conference of the Parties in consultation with the World Health Organization.” All parties including the project countries are expected to comply with these statements which all have ratified. However, the monitoring and documentation of the use of DDT both to ensure its restricted use for disease vector control and in order to regularly report to the Secretariat and the WHO is far from adequate as a result of weak documentation and monitoring system in place. Weak collaboration and limited information sharing, if at all, between the Ministries of Health (using DDT) and Environment (reporting on DDT to SSC) is contributing to this. The problem is also partly related to the absence of structured communication and information sharing system between the two sectors. Consequently, five out of the seven project countries, all suing DDT currently, only two are regularly reporting the status of DDT. This is without considering the many other countries (not part of this project) that are parties for the Convention who are not reporting.

*iv. Documentation and sharing of information*

The Stockholm Convection Annex B Part II stipulates that “each Party that produces and/or uses DDT shall restrict such production and/or use for disease vector control in accordance with the World Health Organization recommendations and guidelines on the use of DDT and when locally safe, effective and affordable alternatives are not available to the Party in question”. The Convention also states that “every three years, each Party that uses DDT shall provide to the Secretariat and the World Health Organization information on the amount used, the conditions of such use and its relevance to that Party’s disease management strategy, in a format to be decided by the Conference of the Parties in consultation with the World Health Organization. All parties including the project countries are expected to comply with these statements which all have ratified. However, the monitoring and documentation of the use of DDT both to ensure its restricted use for disease vector control and in order to regularly report to the Secretariat and the WHO is far from adequate as a result of weak documentation and monitoring system in place. Many countries are not regularly reporting the status of DDT. This problem is also partly related to the absence of structured communication and information sharing system between the health (using DDT) and the environment (reporting on DDT to SSC) sectors resulting in weak collaboration. As described above in section i, legal frameworks and relevant

memoranda of understanding will be developed to formalize communication and information sharing between sectors and enable countries to comply with the Convention while IVM becomes a common subject and endeavor between all sectors that have role to play in vector borne disease control with a special emphasis on malaria.

The Outcome of this Component will be that countries develop and implement integrated cross-sectoral policies, strategies and plans and have managerial capacity to support implementation of IVM. This is intended to contribute to Road Map key element 2.2: Strengthen country and local capacities to manage insecticide resistance, develop and implement IVM strategies, assess and deploy alternatives. Specifically the project will deliver the following Outputs:

**Output 1.1:** Technical support to countries to notify the Stockholm Convention on the use of DDT by the their NMCPs

Main Activities:

1.1.1. Intersectoral consensus building workshop of ministries health and environment in one country (not notified DDT use)

1.1.2. Country supported to notify the DDT use to SSC

**Output 1.2:** Countries regularly report to the Stockholm Convention Secretariat on the use of DDT for disease control as stipulated in the Stockholm Convention, Annex B, Part II, para 4

Main Activities:

1.2.1. Organizing national workshop on intersectoral alliance for regular reporting of DDT use to SSC in 5 countries (where no reporting)

1.2.2. Create and agreed upon mechanism of reporting of the use of DDT by the Ministry of health to the Ministry of Environment

1.2.3. Establish memorandum of understanding between the two Ministries for DDT reporting

**Output 1.3:** Training and technical support provided to countries to develop integrated national legal frameworks and IVM plans with managerial capacity for IVM to a harmonized standard

Main Activities:

1.3.1 Technical support missions to develop national legal frameworks in 7 countries

1.3.2. Organize national workshops on harmonization of legal framework and IVM in 6 countries

1.3.3. Organize national workshops on development, implementation, monitoring and evaluation of national IVM plans in 7 countries

1.3.4. Organize one regional IVM training for NMCP managers

1.3.5. Develop/ revise national IVM documents in 7 countries

**Output 1.4:** Training, technical support and provision of equipment to countries to support implementation of evidence based national policies and plans for IVM to a harmonized standard

Main Activities:

1.4.1. Conduct needs assessment in 6 countries

1.4.2. Carry out technical support mission 7 countries

1.4.3. Procure basic entomological kits and supplies and deliver to 7 countries

1.4.4. Organize national training workshops for national and district staff in basic entomological techniques in 7 countries

**Component 2:** Support countries to implement IVM approaches and demonstrate effectiveness of diversified, environmentally safe innovative vector control methods including use of alternative chemicals to DDT for malaria control

The Component is designed to address the challenges related to lack of capacity for generation of evidences required for more effective IVM program at program level. These include:

*i. The evidence base for informed planning and implementation of IVM*

Improved capacity for evidence based planning, implementation and monitoring of vector control interventions in the context of IVM will be achieved through training, provision of the required basic materials, and creating the enabling situation for evidence based planning and implementation. This basically will be collecting entomological data from the field to provide programs with up-to-date information. Ultimately the project will provide the enabling environment needed to strengthen the evidence-based decision-making in the selection of vector control interventions considering the local epidemiology and vector ecology, as well as provide the essential infrastructure and resources. Linked to this the strengthening of national capacity to undertake operational research to improve the knowledge base for decision-making will be a major task of the project in order to address the challenges described in the project countries.

*ii. Alternative interventions and approaches for malaria control to reduce reliance on DDT*

The project will add to, and expand, the existing baseline activities to demonstrate alternatives to DDT as malaria vector control while similarly expanding and enhancing the existing capacity to review, select and implement such alternatives. It will ensure their sustained use through strengthened national and local capacity for IVM in national and local level of the Ministry of Health and other relevant sectors. The increasingly wide spread appearance of vector resistance to pyrethroids, the only group of insecticides usable for LLINs and mostly applied for IRS, as an effective and affordable alternatives to DDT is serious challenge almost all countries in the WHO African region have faced with. Without effective and affordable alternatives to pyrethroids malaria control program currently using DDT will continue to do so and countries that have stopped the use, sooner or later, are forced to re-introduce DDT in order to protect the gains that have been achieved in the control of malaria. The use of DDT was on the decline until 2009-2012 as more and more countries were using pyrethroids for IRS. However, the situation is changing due to the wide spread resistance of the vector to pyrethroids that has been documented in the last two years across the region (Fig 2). IRS with pyrethroids is becoming much less effective. The rise in malaria transmission in a number of countries in 2013-2014 is threatening the gains they have achieved through a number of years. The few available alternative insecticides other than DDT are expensive and with a short residual life requiring more than two rounds of application per year even a short transmission season areas. Consequently, use of these insecticides is unaffordable to many countries. The situation leaves countries with no much choice expect to continue applying and/or re-introduce DDT which still is effective in the majority of the countries.

Therefore, the search for alternative methods and approaches is an urgent need which this project is trying to respond to through demonstrating a number of potential non-chemical and chemical methods that have not been stream lined in malaria control pograms. The project is expected to provide the evidence base to introduce and use diversified, proven and sustainable vector control interventions including non-chemical

methods and approaches. Three innovative interventions proposed for demonstration in this project and are indicated below:

(a) Demonstration of effectiveness of house screening and larviciding as community-based interventions for malaria prevention in six countries: Botswana, Mozambique, Namibia, Swaziland, Zambia and Zimbabwe (Approach 1).

(b) Compare dry/winter season larviciding combined with GIS-based surveillance and community participation with existing vector control operations in the above mentioned six countries (Approach 2).

(c) Evidence based dissemination of information and education of communities for behavioural change (IEC-BCC) (Approach 3).

Field trial of a Malaria Decision Analysis Support Tool (MDAST) that was previously developed with the financial support of GEF-UNEP also will take place as part of the demonstration in one country.

### *iii. Monitoring and management of insecticide resistance to reduce reliance on DDT*

Regular monitoring and appropriate management of insecticide resistance is of a paramount importance to maintain effectiveness of chemicals based vector control interventions and reduce the negative impact on performance of malaria control programs reduce the reliance on DDT for resistance management. However, many countries have limited capacity to put in place a good sustained resistance monitoring and management system. In order to mitigate the situation, WHO developed a Global Plan for Insecticide Resistance Management (GPIRM) and is supporting countries in collaboration with partners such as Global Fund, Roll Back Malaria (RBM), the Gates' Foundation and PMI in the implementation of the plan. Some of the challenges in the implementation of the GPIRM are the availability of limited up to date information on the bionomics and distribution of the vectors at national level, scarcity of laboratories equipped with even the basic entomological equipment and supplies, and shortage of trained staff in entomological activities that are needed for good vector surveillance including insecticide resistance. Even the magnitude and distribution of insecticide resistance is not well documented in many countries to design the most appropriate management strategy. The project will contribute in addressing this critical gap through the provision of basic laboratory equipment and supplies, training of staff at different levels and collecting up to date information on vector bionomics and distribution, and on insecticide resistance distribution and magnitude in the project countries.

The Outcome of this Component will be that countries adopt the implementation of effective, sustainable and innovative interventions in demonstration project areas. This is intended to contribute to implementation of Road Map key element 2.3: Develop and deploy chemical alternatives to DDT for IRS, and 2.4.3: implement pilot activities.

Specifically, the project will deliver the following Outputs:

#### **Output 2.1: Mapping of vector distribution and associated insecticide resistance**

Main Activities:

2.1.1. Conduct entomological survey focusing on vector distribution in 7 countries

2.1.2. Carry out insecticide resistance monitoring activities in 7 countries

2.1.3. Establish entomological database as part of the national malaria database in 7 countries

2.1.4. Produce national malaria vectors and insecticide resistance distribution maps in 7 countries

2.1.5. Update the regional insecticide resistance data base

2.1.6. Update the regional insecticide resistance atlas

2.1.7. Produce publications on malaria vectors and insecticide resistance distribution and disseminate

**Output 2.2:** Three IVM approaches developed and demonstrated in six countries

Main Activities:

2.2.1. Complete preparation and planning for implementation of demonstrations in 6 countries

2.2.2. Conduct baseline data collection in 6 countries

2.2.3. Implement demonstrations in 6 countries

2.2.4. Evaluate, document and disseminate outcomes of the demonstrations in 6 countries

2.2.5. Organize one regional sensitization workshop for high level decision makers on the outcomes of the project

2.2.6. Organize national consensus workshops to streamline demo interventions proved to be effective into the NMCP strategies at least in 6 countries

2.2.7. Provide technical support in incorporation of demo outcomes in national vector control strategies

2.2.8. Organize MDAST training in 3 countries

2.2.9. Conduct field evaluation of application of MDAST in 3 countries

2.2.10. Document and disseminate outcomes of the field assessment of MDAST

**Component 3:** Dissemination of knowledge and sharing of experiences to all stakeholders at national, sub-regional and regional level in order to influence decision makers.

Weak partnership and community involvement is also a major challenge to optimize on the benefit for malaria and other vector borne diseases control with minimal negative impact on local communities. Some of the major issues this component targets to address with regards to this are the following:

*i. Making inventory of obsolete DDT stockpiles to reduce exposure communities*

Accumulation of Obsolete DDT among other insecticides remains a serious challenge in many countries of the region including some of them proposed for implementation of this project. The absence of information on accurate amount and distribution the stockpiles within the country remains an impediment to securing financial and expertise assistance for the disposal of the accumulations in countries. Article 6 of the Stockholm Convention specify measures to be taken by the parties in order to ensure that stockpiles consisting of or containing chemicals listed either in Annex A or Annex B and wastes, including products and articles upon becoming wastes, consisting of, containing or contaminated with a chemical listed in Annex A, B or C, are managed in a manner protective of human health and the environment. Availability of stockpiles of obsolete DDT and other insecticides is a problem in many countries. However, there are only a few who have well-documented status of the problem. The amount, distribution and storage situation etc of obsolete DDT is not assessed and registered in most cases. The project would support countries to conduct a comprehensive situation analysis to map and produce a report on obsolete DDT. This can facilitate resources mobilization to safely dispose the insecticide in an appropriate manner in order to protect the human health and environment.

*ii. Partnership and community involvement for IVM*

Decision making as to what, where, when and how to implement IVM need to take into account sustainability, intersectoral collaboration, partnerships and community involvement as crucial approaches considered in the planning and implementation of vector control activities. The need for intersectoral action is greatest at the national level. At the other end of the spectrum, the involvement of local communities is a critical element in successful IVM and sound management of pesticides. Creating the capacity for the development and application of evidence based communication to ensure participation of local communities in the adoption of alternative interventions including improvement in the involvement of communities at risk through the dissemination of health information regarding malaria vector control will be given a priority.

The Outcome of this component will be that countries and regional institutions use guidelines on IVM and social impact assessments to guide and influence policies on DDT use. This is intended to contribute to the implementation of Road Map key element 2.4: sharing experiences and upscaling the application of non-chemical alternatives. Specifically the project will deliver the following Outputs:

**Output 3.1:** Manuals and related technical guidelines on IVM updated and published

Main Activities:

- 3.1.1. Organize regional consensus workshop on outcomes of demos and field assessment of MDAST
- 3.1.2. Update and publish regional technical guidelines and manuals based on demos proved to be effective
- 3.1.3. Organize national consensus workshops on outcomes of demos and field assessment of MDAST in 6 countries
- 3.1.4. Update and publish national technical guidelines and manuals based on demos proved to be effective at least in 5 countries

**Output 3.2:** Production and delivery of programmatic and national level communications / awareness strategies and materials

Main Activities:

- 3.2.1. Develop KAP survey toolkits (guidelines) at least in 6 countries
- 3.2.2. Conduct community survey (using the KAP tool) on malaria knowledge, behavior, compliance, etc at least in 6 countries
- 3.2.3. Design, produce and publish locally appropriate IEC-BCC material and approaches based on the outcomes of the community survey intended to reach vulnerable group at least in 6 countries
- 3.2.4. Conduct vulnerable group analysis at least in 6 countries
- 3.2.5. Implement outreach programs at community level using the IEC-BCC materials and approaches at least in 6 countries
- 3.2.6. Conduct assessment of impact of implementation of outreach programs at least in 6 countries

**Output 3.3.** Production of national social impact assessments highlighting impacts on vulnerable groups from use of DDT

Main Activities:

GEF5 CEO Endorsement Template-February 2013.doc

3.3.1. Conduct assessment on social impacts of DDT in 6 countries

3.3.2. Conduct national consensus building workshops to present the results of social impacts assessments to stakeholder sectors (MoH, MoE, MoA)

3.3.3. Present the results of social impacts assessments to SSC

**Output 3.4:** Production of reports to the Stockholm Convention Sec (SCS) on DDT usage including amount and local distribution of obsolete DDT in project countries

Main Activities:

3.4.1. Conduct inventory on the use of DDT and on availability and distribution of obsolete DDT in at least 6 countries

3.4.2. Produce national reports on the use of DDT and on availability and distribution of obsolete DDT in at least 6 countries

3.4.3. Produce regional report on the use of DDT and on availability and distribution of obsolete DDT based on the information gathered in the project countries

The current project builds upon what have been achieved through the projects described in Section A.7 and other related projects in these countries. The goal of the project is to further strengthen national capabilities for implementation and scaling up of evidence-based, innovative, diversified and environmentally sound disease vector control interventions (with special emphasis on malaria) with multi-stakeholder participation within context of IVM in order to contribute to socio-economic development in the sub-region. Emphasis will be laid on identifying environmentally sound and effective alternatives to DDT for vector control and strengthen countries capacity for the management of vector control programs in the true sense of IVM, which involves strong intersectoral collaboration and community involvement. The project will assist the participating countries, all signatories to the Stockholm convention and currently using DDT, to strengthen their capacity to fulfil their obligations towards the Stockholm Convention in relying less on DDT while evidence-based effective alternatives are promoted to control malaria and other vector borne diseases. In addition, the project aims to provide the tools, guidance and systems to ensure countries do not revert to the use of DDT for Malaria vector control as a result of increased resistance to chemical alternatives currently in use (pyrethroids).

It should also be noted that at Stockholm COP 7 the side event *Developing Alternatives to DDT* held on May 5 2015 demonstrated a significant reduction in the development of new chemical pesticides which will be available to countries to combat diseases such as Malaria in the future. The significant time lag and cost between identification of a potential chemical control agency and it being available on the open market for use by countries, plus the high cost of new alternatives needed to recover the commercial investment in the their development, means there is a real risk of a lack of affordable chemical alternatives prompting a move back to DDT in the target countries. The project will work with countries to fill this gap and develop sustainable approaches which mitigate the problems of resistance to chemical pesticides.

**A. 5. Incremental /Additional cost reasoning: describe the incremental (GEF Trust Fund/NPIF) or additional (LDCF/SCCF) activities requested for GEF/LDCF/SCCF/NPIF financing and the associated global environmental benefits (GEF Trust Fund) or associated adaptation benefits (LDCF/SCCF) to be delivered by the project:**

**i. Global environmental benefit of the project through reduction of DDT use for vector control**

To date, seventeen African countries including those considered for the project have notified the Secretariat of Stockholm Convention of their intention to use DDT for disease vector control. Of these, eight countries (Botswana, the Gambia, Mozambique, South Africa, Swaziland, Zambia and Zimbabwe) are currently applying DDT and all but the Gambia have notified the use. The remaining 7 countries (Ethiopia, Liberia, Madagascar, Kenya, Senegal, Tanzania, and Uganda) are not currently using DDT. However, all have DDT in the national list of insecticide that can be used for diseases control.

To date, the total amount of DDT used in the region indicated in table 2 above (about 330 tons) is much lower than what was indicated in the original PIF approved by GEF SEC (about 2500 tons). It should be noted that the information in the PIF was captured mainly from reports in 2005 – 6. Since then, until recently, countries have been reducing the use of DDT by replacing it with pyrethroid insecticides in their effort to reduce application of DDT. However, 2011 – 2013 surveillance data collected and collated from 35 countries has revealed increasing resistance against pyrethroid insecticide in all countries including those in this project. Resistance against DDT has also been reported but at lesser extent. The situation is very likely to force many countries including those that have not been using DDT previously to introduce DDT, where it is still effective to manage resistance and sustain effectiveness of the malaria control. The resistance against pyrethroids in the absence of other effective and equally affordable alternative other than DDT is posing a serious challenge to malaria control programs in the region. Consequently, outcomes of the project are relevant useful even for countries that are not currently using DDT. The evidence and scientific data developed from this project can be used to support the other countries facing similar problems, demonstrating a strong Global Environment Benefit.

The decline in the amount of DDT (Fig 2) used currently from that was indicated in the PIF was also related to reduced funds from the Global Fund for procurement of insecticides and also due to the transformation of some control programs to elimination particularly in most of the southern African countries where the bulk of DDT is used. This strategy shift entailed targeted spraying of limited localities with malaria hot spots as oppose to blanket spraying of large geographical areas. This strategy did provide a temporary / short lives “knock-back” effect. Nevertheless, with the current resurgence of malaria in some of these elimination countries including Madagascar, Namibia, South Africa, Zambia, and Zimbabwe the reintroduction of spraying in places that were excluded is becoming inevitable.

It is therefore concluded that the current situation will result in the significant increase in the application of insecticides including DDT. The use of DDT is again made increasingly attractive due to a lack of new chemical control agents entering the market. Thus the project remains relevant and needed as it will benefit malaria control programs in all project countries by generating the evidence, knowledge, skills and experiences on effective application of diversified, safe, innovative and sustainable vector control interventions and approaches for malaria control through inter-sectoral collaboration in the context of IVM. This will in turn reduce the countries’ reliance on DDT and other chemical control agents and so prevent a situation where the annual tonnages imported and used for malaria vector control increase to the 2005 / 6 levels reported in the PIF. The global environmental benefit of the project in terms of reduction of the release of DDT is therefore not going to be reduced from what has been indicated in the PIF but rather to prevent the re-introduction and increased reliance on DDT as the main weapon countries use to control the spread of Malaria.

Among the participating countries Botswana, Namibia, South Africa and Swaziland are currently focusing on elimination of malaria and as such all efforts should be made to make this a reality. Elimination of malaria

contributes to the reduction of the use of chemicals as vector control interventions are ceased. Demonstrating effectiveness of alternative strategies and approaches under local circumstances is therefore timely and important. All available National Implementation Plans (NIP) of the project countries indicate the use of DDT in vector control as an important issue.

Reductions in malaria burden, which result from enhanced capacity, both at regional, national and local levels, and improved environmental conditions through the reduced use of DDT for IRS, will constitute the immediate benefits to the participating countries. In addition, the project will leave countries with sound district malaria control programmes that will serve as a basis for replication in other districts and countries. Longer-term benefits will include overall strengthening of national and district level programmes of improved malaria control. These will have associated socio-economic development benefits through multi-sectoral collaboration with other stakeholders who have negative or positive influences on malaria prevention due to their activities. Any reduction of the malaria disease burden will result in increased agricultural productivity and income of individual households. Another significant benefit will be the optimal functioning of the health systems in the project districts. Studies indicate that the loss of agricultural productivity due to malaria costs African countries about 1 billion US dollars each year.

#### **ii. Global environmental benefit of the project by contributing to safe management of obsolete DDTs.**

The project will yield significant environmental benefits, and is designed to be fully in line with the key elements of the DDT Road Map, conducting several pilot activities, that aim to identify and prove viable, alternatives to DDT, thereby reducing the need for DDT use in these areas.

In addition, the project directly targets what the Road Map defines as one of the key remaining challenges, insecticide resistance to pyrethroids, and the consequential desire of some governments to return to DDT use in these resistant areas. As noted in the Road Map gains in DDT use reduction “are fragile and threatened by drug and insecticide resistance, lack of tools and strategies for ‘outdoor and residual transmission’ and overall lack of funding and capacity.” The focus on pilot projects aims to address this, and to identify viable alternatives, that negate the need for participating governments to increase DDT use.

As countries move towards IVM, which holds judicious use and safe management of insecticides as one of its major principles, there remains the issue of obsolete DDT which has accumulated or may accumulate in the future in many countries. Despite the efforts of previous initiatives aimed at removal of obsolete POPs chemicals from Africa much of the old stocks of DDT and other Malaria vector control insecticides remain with Ministries of Health. Many countries in the region including those included in this project have already accumulated obsolete DDT at varying level from a few hundreds of tons in Mauritius to more than 1000 metric tonnes reported in Ethiopia. Much of obsolete stock is understood to be scattered over wide geographic areas with no firm data available on exact amount and locations of stores and the condition of the original packages. The project will therefore provide opportunity to all participating countries to conduct an inventory of the obsolete DDT to clarify the situation in terms of amount and location and the risks which the locations and the chemicals pose to public health and the environment. The results will be consolidated into a series of national environmental management plans which quantify the risks and present strategies for future risk reduction at national level. It is foreseen that the strategies will be used to develop a follow-on proposal for the environmentally sound management of DDT stockpiles in Africa. The project will also facilitate and support inter-sectoral collaboration to deal with the problem, which currently is very limited, so aiming to prevent accumulation of DDT and other Malaria vector control insecticides in the future. The quantification and risk assessment of the current obsolete DDT stockpiles and the development of plans for environmentally sound disposal with adopting the approach to prevent accumulation will result in significant Global Environmental Benefits. The identification and securing of these stocks will also prevent the leakage of DDT into the agriculture sector. These activities will also contribute to the implementation of the DDT Road Map, key element 3: Eliminate DDT stockpiles and waste. There is a growing body of evidence that DDT imported for use in IRS has leaked into the local market where it is sold illegally. The impacts of such practices are far reaching

and if used in commercial agriculture sectors can result in export bans due to residues in products destined for external markets. The local commercial impacts are compounded by the potential of health impacts on markets far from the point of food production.

The project will also build up on what has been achieved in terms of the establishment of a stakeholders alliance, development of memorandum of understanding and terms of references to facilitate regular reporting of countries to the Secretariat of the Stockholm Convention on the use and status of DDT through the just concluded GEF funded small scale project entitled *“establishment of efficient and effective data collection and reporting procedures for evaluating the continued need of DDT for disease vector control”*.

**A.6: Risks, including climate change, potential social and environmental risks that might prevent the project objectives from being achieved, and measures that address these risks:**

The project takes into account potential major risks and provides sufficient risk mitigation measures, which are summarized in the Table below.

**Table 5: Potential risks and mitigation measures**

Potential Risks	Level	Risk Mitigation Measures
1. Increased malaria transmission posed by reduced reliance on DDT or its withdrawal for IRS applications	Moderate	This risk can be averted through the establishment of an effective system coupled with prompt diagnosis and treatment.
2. Community acceptance of the alternative interventions may not be at the desired level at the beginning of the project as is the case in a number of situations currently with the use of DDT as well	Low	The project is designed to ensure the intimate involvement of communities. This will include increasing public awareness of the nature, availability and benefits of alternative interventions.
3. The comparative high prices of alternative insecticides (larvicides) to DDT, as well as some times the high tariffs on imported nets, could undermine the implementation of alternative interventions	Low	The high emphasis given by the project to potential non-insecticide methods provides opportunity to adopt cost effective vector control methods that are sustainable and affordable in the long term. Also, additional resources from countries by the Global Fund, other partners and various projects. The costs of health care interventions will also contribute to resource mobilization and reduce costs of alternative methodologies.
4. Resistance to alternative insecticides that will be used, and the reluctance of some policy makers to move to the use of alternatives are important anticipated risks to project success. The assessments of suitability of alternative interventions may reveal problems associated with adverse climatic conditions or difficulties of funding and retraining.	Low	One of the main objectives of the project is demonstrating non-insecticide methods. The application of these methods reduces the amount of insecticide used thereby reduces the pressure on the vector which can significantly reduce the management of resistance. Many times, when alternatives are adopted, a feasibility and cost-benefit analysis taking into account all pros and cons is done due to time, financial and technical capacity constraints within the project. This project aims at providing the relevant organizations with such evidence based decisions by policy makers.
5. Governments in the respective project countries assume that NGOs and CSOs will go against their respective policy with regards to malaria and DDT use and as such they might not support the project.	Low	The risk will be mitigated by liaising with the WHO and national malaria control programs responsible for the execution of 'promotion of alternatives to DDT in Vector Management' together to facilitate the crucial process of obtaining full community collaboration. The enthusiasm and commitment of the NGOs to participate in the project is evident in their Dar-Es-Salaam Declaration of April 8, 2009 which stated "We will participate in the UNEP/GEF/WHO program on Demonstrating and Promoting Alternatives to DDT in Vector Management (DSSA - Global Program on Demonstrating and Promoting Alternatives to DDT in Vector Management designed for the sub-Saharan African region".
6. Scientific evidence in recent years has demonstrated that increased temperatures due to climate change have resulted in expansion of insect zones. For instance, this has also been witnessed in areas formerly too high and cold for malaria transmission becoming endemic. Climate change can trigger also increase in the	Low	Such an eventuality will be mitigated by intensification of stakeholder participation in the project. Communities will be educated about changing disease patterns due to climate change and the need to adopt viable and sustainable measures including non-insecticide methods.

risk of other vector borne disease outbreaks may be followed by intensified malaria vector elimination campaigns that rely heavily on IRS using DDT.		
7. Lack of new chemical control entering the market or under development.	Moderate	-Strengthen countries capacity for insecticides resistance management to sustain effectiveness of available insecticides in the context of IVM
8. Potential for leakage of obsolete DDT stocks and new stocks imported for IRS into the agriculture sector.	Moderate	-Intensify community education and information dissemination of hazardous impacts of the miss use of DDR and any other insecticide -Strengthen inter-sectoral collaboration and information sharing

## **A.7. Coordination and consistency with other relevant GEF financed initiatives other national and regional initiatives:**

Through the years, WHO in collaboration with global partners produced and disseminated strategic and technical guiding documents to support countries in the promotion and implementation of IVM.

Below listed are the completed and ongoing projects to which the current project is related to and is attempting to build upon what has been accomplished:

*i. Demonstrating Cost-effectiveness and Sustainability of Environmentally Sound and Locally Appropriate Alternatives to DDT for Malaria Vector Control in Africa (AFRO I)*

One of the projects of the DSSA Programme is the so-called "AFRO I" project. The project started in 2010, with a 5 year duration and is being implemented by UNEP and executed by WHO in Madagascar, Ethiopia and Eritrea. Political issues have resulted in Eritrea not being in a position to implement activities on the ground to-date but efforts continue to allow them to benefit from the project. As such the project has focused on delivery of results in Ethiopia and Madagascar while capacity building is given emphasis in Eritrea. The AFRO I project aimed at diversifying interventions related to Vector Control through promoting IVM. Ultimately, the aim was to reduce the dependency on DDT for IRS. As the preparation of AFRO I took several years, the playing field in Africa related to Malaria and use of DDT changed dramatically. For example, in 2010 Ethiopia replaced the use of DDT for IRS by pyrethroids for malaria control because of wide spread vector resistance in that country; In Madagascar the situation today is different. Government is not using DDT in IRS throughout the country but recently have reported problem of resistance against pyrethroids, the insecticide replaced DDT. The decision to register DDT is based on the fact that the government is convinced by the need for diversification of the vector control strategy resulting in DDT still being considered as potential alternative in case resistance against pyrethroids appears. The problem of resistance is now a reality and the possibility of a shift back to the use of DDT as an alternative to pyrethroids needs careful consideration. The AFRO I project has delivered already important 'lessons learnt' which are included in this proposal:

- Countries are very interested and need support in searching for alternative vector control interventions in the context of IVM rather than in the reduction of DDT, which can jeopardize malaria control efforts if it is not coupled with effective diversification of the intervention;
- Programs and communities are flexible and accept alternative insecticides and interventions as long as they are implemented based on evidence and in a sustainable manner.
- Vector control strategies in all countries are evolving fast in response to developing circumstances such insecticide resistance to one or the insecticide.
- Replacement of DDT with just another effective insecticide is not a long-lasting solution to the problem as resistance will soon appear against the alternative. So, multifaceted approach including evidence based application of non-chemical methods along the chemical ones is highly needed.
- Vector bionomics including insecticide resistance and disease transmission dynamics can greatly vary even between different places within a country requiring a good understanding of the local situation in order to better target specific vector control interventions and facilitate evidence based locally suited implementation. However, most countries do not have up to date information on the vector and interventions are not as such evidence based.
- Each of the countries in the region might apply different insecticides and approaches of vector control. However, for a sustainable achievement in the longer term it should be understood that vector borne diseases like malaria can only be successfully controlled through regional collaboration and adaptation of the same principles;
- To really make a difference, relatively larger amounts of funding are needed over a longer period of time to allow structural institutional changes to bring about a significant and lasting inter-sectoral collaboration. The funding in the AFRO I project was insufficient and could not sufficiently and during a

significant period of time support collaborating institutions to structurally change their institutional settings.

*ii. Malaria Decision Analysis Support Tool (MDAST): Evaluating Health, Social and Environmental Impacts and Policy Tradeoffs*

The Malaria Decision Analysis Support Tool (MDAST) project, funded by GEF, sought to improve the protection of human health and the environment by promoting sustainable malaria control strategies that are consistent with the successful implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs). The project was developed in a collaborative manner with various stakeholders involved in malaria control policy making and implementation, and responded to a need for capacity building for improved policy formulation. The aim of MDAST was to promote evidence-based, multi-sectoral malaria control policy-making in Kenya, Tanzania, and Uganda, with the project serving as pilot for other malaria-prone countries. The key project partners were UNEP/GEF, WHO-AFRO, Ministry of Health, Uganda, Ministry of Health, Kenya, National Institute of Medical Research, Tanzania, University of Pretoria, and Duke University.

Major outcomes of the project were:

- Stakeholder and expert consultations, training and information sharing, partnership building, incentives analysis, and identification of knowledge gaps and research priorities
- Establishment of an inter-disciplinary network of practitioners and policymakers, and contribution to research, monitoring, and analytical capacity to make more informed and evidence-based decisions about alternative approaches to malaria prevention and treatment.
- Based on the above, developed an electronic malaria decision analysis tool (MDAST) and user manual that are made available online for use for policy making by malaria control programs. Wider application of the tool needs training at national level and some adaptation to the local situations.

*iii. Reducing health risks through sound management of public health pesticides (PHPs)*

The project was funded by the Gates' Foundation and executed by WHO in collaboration with six countries (Cameroon, the Gambia, Kenya, Madagascar, Tanzania and Mozambique). It demonstrated the gap in legislation, knowledge, capacity and practices in the management of PHPs. Capacity building through training of national staff involved in pesticide control, and development of national strategy for proper management of PHPs was conducted through the project based on outcomes of situation analysis. Since then, eight countries (including Mali and Sierra Leone supported through the project) have now strategic policy documents on PHPs management. Information and experiences of this project will play important role in the promotion of IVM in the current project. Judicious use and safe management of insecticides is one of the principles of IVM and plays important role in delaying of appearance of insecticide resistance.

*iv. Establishment of efficient and effective data collection and reporting procedures for evaluating the continued need of DDT for disease vector control*

A GEF funded small-scale project aimed at establishment of efficient and effective data collection and reporting procedures for evaluating the continued need of DDT for disease vector control is just concluded in 9 countries (Ethiopia, Gambia, Madagascar, Mauritius, Mozambique, Namibia, Senegal, South Africa, and Zambia). The overarching aim of the project was to improve the reporting on the use of DDT by countries who are parties of the Stockholm Convention. The project contributed to strengthening of the capacity for safe application, and documentation and reporting of insecticides used for public health particularly DDT. It attempted to create a better inter-sectoral alliance and collaboration through establishment memorandum of understanding and ToRs of partners for regular reporting on DDT to the Secretariat of Stockholm Convention. However, in the absence of policy framework, legislation and other legal instruments that make the relevant sectors accountable for promoting IVM applicability and sustainability of the inter-sectoral alliance might be a challenge. The current project with a better financial resources and adequate time will build upon what has been achieved in this area and ensure the institutionalization of structured inter-sectoral collaboration.

v *Other projects in Latin America, Middle East and North Africa (MENA) and Southern Caucasus and Central Asia (SCCA)*

One of the earlier UNEP initiatives concerned the Regional Program of Action and Demonstration of Sustainable Alternatives to DDT for Malaria Vector Control in Mexico and Central America run from 2003 to 2008. UNEP is also implementing similar projects in other regions in the context of DSSA programme in collaboration with WHO. The MENA project is being run in countries of the Middle East and North Africa. Another project for demonstrating and scaling up sustainable alternatives to DDT is being implemented in countries of the Southern Caucasus and Central Asia.

Another important activity that has laid important foundation for the project was the Libreville Declaration on Health and Environment Linkages, which all member states of the WHO African region have ratified. Recent Situation Analysis and Needs Assessment (SANA) in the context of the Libreville Declaration on environment and health linkages in a number of countries have indicated the difficulties at country level to fully comply with the requirements of the Stockholm Convention, among others issues, due to limited capacity, scarcity of resources and weak inter-sectoral collaboration. With regards to disease vector control, the Convention states that the use of DDT and reliance of programs on it will gradually be reduced as effective alternative interventions and approaches are established and as countries develop the capacity to deliver diversified alternative interventions for malaria vector control.

The project has learnt lessons and experiences from implementation of aforementioned projects and initiatives. It builds upon on what has been achieved. Its implementation will be part of the ongoing effort towards the same goal through these projects. To ensure coherence and coordination identification of the components and development of the project has been guided by the knowledge on ongoing malaria control programs, their gaps and needs acquired through reviewing of countries strategic plans; and through reviewing of all regional projects and their achievements.

## **B. ADDITIONAL INFORMATION NOT ADDRESSED AT PIF STAGE:**

### **B.1 Describe how the stakeholders will be engaged in project implementation.**

The project will be implemented by UNEP, the United Nations Environment Programme. The Lead Division will be DTIE, the Division of Technology, Industry and Economics; Chemicals and Waste Branch. The GEF team based in the Chemicals and Waste Branch will appoint a Task Manager to supervise the implementation of the project. Administrative support staff will contribute part-time. The Task Manager will be supported by technical staff from UNEP C&W Branch as needed. Other UNEP divisions/units (for example the Regional Office for Africa, ROA, based in Nairobi) will be called upon to support the Implementing Agency role as needed.

The project will be externally executed and UNEP will contract the World Health Organization Regional Office for Africa (WHO-AFRO), in Brazzaville, as the Executing Agency (EA) of the project. WHO will appoint a Project Manager from the Division of Health Promotion (HPR) which will be in charge of all executing arrangements of the project, including the development of detailed work plans and time schedule and coordinate the execution of the various project components in the project countries. The Project Manager will also be responsible for preparing regular technical and financial reports, providing guidance to subcontracted parties, recruitment issues and general oversight of the project. Policy and technical guidance will be provided to the national coordinators who will be appointed in each country at the beginning of the project.

A Regional Project Steering Committee (RPSC) composed of experts in the various fields relevant to the project will be established to advise the WHO-AFRO on all technical issues.

The WHO-AFRO will delegate the WHO Offices in each project country for the day to day supervision and provision of support for project implementation in the respective countries. National Project Coordinators will be appointed and will play a crucial role in the execution of the project at national level as well as with the coordination between the various relevant sectors. National Project Coordinators will have also a catalysing role in each project country. While they will be mainly involved in a supervisory role at the policy and technical levels with a view to building on existing structures to promote effective IVM, they also serve as national resource base and provider of feedback to the project Executing Agency.

National Malaria Control Programs (NMCPs) will lead the execution of the project in each country. National institutions from sectors will be involved in the project. It is anticipated that the health-, agriculture-, and environment sectors will be the main sectors involved also urban planning, rural development, local governments etc. will be involved where applicable. Execution of an Integrated Vector Management project like this one requires a multi-sectoral involvement and commitment.

National Project Steering Committees (NPSCs) composed of sectoral representatives will be established and play advisory and supervisory role. The National Project Coordinators and the PSCs will be working closely together with existing national structures like the Global Fund CCM (Country Coordination Mechanism) to allow full transparency, efficiency, and sustainability even after the project life time.

The Executing Agency will subcontract one specialised partner (ICIPE in Kenya or a similar regional organisation) for the supporting the development and execution of specific demonstration projects in representative areas in each country. The specialised partner will work with the national malaria control programs in the development of the demonstration projects based on the latest scientific principles in the field of Integrated Vector Management. The entire execution of these demonstration projects is within the responsibilities of the national malaria control programs. They will regularly report on progress and expenditure to the Executing Agency. However, the national malaria control programs can contract out implementation of the demonstration projects to local research institutes if the situation indicates a better management of the projects can be achieved by doing so. The decision whether implementation of demonstrations would be contracted out to local institutes, and if so to which institute would be decided by the Regional Steering Committee of the project on a country by country bases.

Local NGOs will be subcontracted to cater for the execution of the community involvement related activities and awareness raising in each project countries. The NGOs will establish new or re-enforce existing contacts relevant for IVM through the development and application of innovative communication methods approaches in each of the project countries in general and in each of the demonstration site areas specifically. Information for and feedback from the community grass root level will be channelled through the selected NGO/CSOs and will complement the information directly obtained from the demonstration projects.

**B.2 Describe the socioeconomic benefits to be delivered by the Project at the national and local levels, including consideration of gender dimensions, and how these will support the achievement of global environment benefits (GEF Trust Fund/NPIF) or adaptation benefits (LDCF/SCCF):**

The use of DDT for malaria vector control has always entailed the debate on its pros and cons on the economy of the countries. There have been situations where export commodities from countries where the insecticide is applied were challenged with impact on the economy of the country and the communities. In cognisance with this, the selected demonstrations focused on non-chemical methods and targeted delivery of chemical-based interventions.

Efforts to ensure sound management of chemicals, including Persistent Organic Pollutants (POPs), have important gender dimensions. In daily life, men, women, and children are exposed to different kinds of chemicals in varying

concentrations. Biological factors — notably size and physiological differences between women and men and between adults and children — influence susceptibility to health damage from exposure to toxic chemicals. Social factors, primarily gender-determined occupational roles, also have an impact on the level and frequency of exposure to toxic chemicals, the kinds of chemicals encountered, and the resulting impacts on human health. These gender dimensions need to be reflected at both site- and policy-level interventions for sound chemical management.

For example, recent report from South Africa disclosed that women (as they are mainly working in and around the house and taking care of the children) are vulnerable to pesticides applied through Indoor Residual Spraying (IRS). Furthermore, first-borne baby boys of these women tend to have a significant greater risk of being born with disabilities compared to 'control groups'. This example shows the different susceptibility to health damage from exposure to toxic chemicals due to gender-determined occupational roles and different social roles and positions.

For these reasons, during the needs assessment and implementation of intervention activities like the promotion of alternatives to DDT in IRS, the project will pay particular attention to the socioeconomic, gender and social dimensions, especially women and children, to avoid negative impacts due to the proposed alternatives. In that respect, the project, through the NGOs and CSOs, will as far as possible target women and children especially in grass root (or local) communities for communication and raising awareness about the project activities and benefits.

### **Indigenous People analysis and strategy**

In all the participating countries except South Africa, IRS of pesticides including DDT and pyrethroids, and the use of LLINs are two main interventions currently being undertaken to protect the population at risk of malaria. In line with these initiatives, this project is aiming at demonstrating the effectiveness of other environmentally sound and sustainable interventions as alternatives to the application of DDT and strengthening the capacities of all stakeholders for innovative implementation of integrated vector management for malaria vector control. In particular, the project will ensure that the population at risk including local and grass root communities are involved since the initial phases of the project. In doing so, not only this approach will maximize chances of success by bringing down barriers but the project may also benefit from indigenous knowledge that these local and grass root communities may have regarding the habitat and other related information regarding the vectors and / or on any other issues relevant to the project. The role of NGOs and CSOs will be crucial here in order to inform and get these communities embarked in the project by undertaking outreach activities targeting all the project areas.

### **B.3. Explain how cost-effectiveness is reflected in the project design:**

A number of factors have been identified and will contribute to cost-effectiveness of this project. For instance, the project will build on the solid experience that UNEP and WHO have on the implementation and execution of previous and on-going projects covered under the global '*Demonstrating and Scaling up of alternatives to DDT*' (DSSA) program (see **Section A.7**). In particular, the IVM approach that is using multi-faceted interventions will allow for a better, more comprehensive and more cost-effective manner to control vector borne diseases.

The project will take advantage on the lessons learned from the other projects. In particular, lessons learned in the AFRO I project including search for alternatives to DDT, diversification of interventions, and different approaches for vector control have been considered in this project. The experience will be important in designing, organization implementation of the demonstrations and other activities of the current projects. This particularly is relevant in terms of considering the potential changes and transformations in epidemiology of the disease, policy, strategies etc that can affect implementation of the project and the need to incorporate mitigation activities in the design of implementation of the current project.

The experiences and lessons from implementation and outcomes of the project on “Malaria decision analysis support tool (MDAST): evaluating health, social and environmental impacts and policy trade-offs” also contributes to the cost effectiveness. The project conducted stakeholders’ surveys in three countries to assess the process of malaria policy development. MDAST was the product of the project that can assist countries in the development of policies facilitating evidence-based cost-effective malaria control strategies with full involvement of stakeholders. The current project is in line with this effort as it endeavours to provide evidences for innovative and effective IVM interventions for malaria control and to build the capacity for evidence based policy and strategy development in a multi-sectoral manner. The tool developed will be utilized to promote evidence based policy making by the project.

At national level, for cost effectiveness the project will take advantage on efforts that are already being made by the Governments through related projects and activities, some of which are part of the joint UNEP/WHO Global DSSA Program (see **Section A.7**) to improve protection of human health and the environment through the reduction of emission of POPs into the global environment. In particular, the project will be run by Ministry of Health responsible for the management and running of malaria vector control programs in close collaboration with the Ministry of Environment. On-going malaria vector control activities will provide an ample opportunity on which the project can build on. As planned in the proposal, the project will also seek the support of other international initiatives (e.g. Global Funds, USAID, etc.) by establishing the appropriate linkages through on-going programs and projects that are directly supporting these institutions. The countries and sites that will be selected for demonstration purposes are those that have a malaria vector control program that is running satisfactorily and they have some basic technical and other capacities such as laboratories to conduct entomological activities including monitoring vector resistance to insecticides.

### **Replication of experiences and lessons from the project**

The project is expected to contribute towards the regional and global quest to find alternatives methods and approaches for disease vector control beyond malaria. The outcomes of demonstrations of 3 potential vector control interventions in six countries with various level of malaria endemicity will clearly show the extent of the impact of the methods and combination of them under the different level of endemicity. Outcomes of interventions will be promoted in countries with similar endemicity for improved impact on malaria while managing insecticide resistance. The lessons and experiences of the project in areas of capacity building, community engagement and intersectoral collaboration will be well documented and promoted for adaption in other countries of the region and beyond. Therefore, the project ultimately will benefit counties on the WHO African region and in other regions currently with similar challenges and needs.

## **C. DESCRIBE THE BUDGETED M &E PLAN:**

### **Monitoring Plan**

The Executing Agency WHO-AFRO in Brazzaville will be responsible for the overall monitoring and supervision of the project based on a detailed work plan that will be developed on the project’s inception. Regular consultations and site visits will be carried out to ensure the project progress is on track. Lessons learnt and corrective actions identified during the monitoring process will be used to continually adapt and address the challenges encountered during project execution. National Malaria Control Programs and Sub-contracted partners will 6-monthly report to the project Executing Agency.

The Executing Agency will report to the Implementing Agency also on a 6 monthly basis. A costed Monitoring Plan for this has been provided. (Annex G).

It is expected that during the implementation of this project, all GEF co-funded projects will become subject to regular reporting within the framework of UNEP's Project Information Management System (PIMS), for which monitoring reporting will be required on a bi-annual basis. The UNEP Task Manager and the relevant Fund Management Officer will be the responsible persons for this obligatory reporting within UNEP.

At a national level, the National Project Coordinator will as a matter of routine, monitor the project progress and report also on a 6 month basis to the Executing Agency. In addition, as the project also contributes to UNDAF processes in the project countries, regular reporting on project progress will also be provided to the respective UN Integrated Mission Offices in the project countries responsible for UNDAF monitoring and reporting.

## **Evaluation Plan**

1. UNEP will be responsible for managing the mid-term review/evaluation and the terminal evaluation. The Project Manager and partners will participate actively in the process.
2. The project will be reviewed or evaluated at mid-term (tentatively end of year 2 as indicated in the project milestones). The purpose of the Mid-Term Review (MTR) or Mid-Term Evaluation (MTE) is to provide an independent assessment of project performance at mid-term, to analyse whether the project is on track, what problems and challenges the project is encountering, and which corrective actions are required so that the project can achieve its intended outcomes by project completion in the most efficient and sustainable way. In addition, it will verify information gathered through the GEF tracking tools.
3. The Regional Project Steering Committee members will participate in the MTR or MTE and develop a management response to the evaluation recommendations along with an implementation plan. It is the responsibility of the UNEP Task Manager to monitor whether the agreed recommendations are being implemented. An MTR is managed by the UNEP Task Manager. An MTE is managed by the Evaluation Office (EO) of UNEP. The EO will determine whether an MTE is required or an MTR is sufficient.
4. An Independent terminal evaluation (TE) will take place at the end of project implementation. The EO will be responsible for the TE and liaise with the UNEP Task Manager throughout the process. The TE will provide an independent assessment of project performance (in terms of relevance, effectiveness and efficiency), and determine the likelihood of impact and sustainability. It will have two primary purposes:
  - to provide evidence of results to meet accountability requirements, and
  - to promote learning, feedback, and knowledge sharing through results and lessons learned among UNEP and executing partners.
5. The TE report will be sent to project stakeholders for comments. Formal comments on the report will be shared by the EO in an open and transparent manner. The project performance will be assessed against standard evaluation criteria using a six point rating scale. The final determination of project ratings will be made by the EO when the report is finalised. The evaluation report will be publically disclosed and will be followed by a recommendation compliance process.
6. As the required funds for this Terminal Evaluation will be made available to UNEP Evaluation Office, the relevant amount of the project budget for the Terminal Evaluation will not be included in the Project Cooperation Agreement (PCA) between UNEP and WHO. The direct costs of reviews and evaluations will be charged against the project evaluation budget.

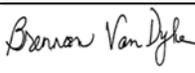
**PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)**

**A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT(S) ON BEHALF OF THE GOVERNMENT(S):** (Please attach the [Operational Focal Point endorsement letter\(s\)](#) with this form. For SGP, use this [OFP endorsement letter](#)).

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
Mrs. I. Otukile	GEF OFP	MOEWT – BOTSWANA	1.04.2011
Mr. M. Sarr	GEF OFP	MOHSW– THE GAMBIA	12.10.2010
Dr. A. Macharia	GEF OFP	MOEMR – KENYA	21.10.2014
Ms. C. Ralalaharisoa	GEF OFP	MOE – MADAGASCAR	19.10.2010
Ms. M. Manjate	GEF OFP	MOE/MOH-MOZAMBIQUE	21.01.2011
Dr.K.Shangula	Permanent Secretary	MOET-NAMIBIA	04.10.2010
Mr.J.Vilakati	GEF OFP	MOE-SWAZILAND	20.07.2012
Dr.J.Ningu	GEF OFP	MOHSW-TANZANIA	08.04.2011
Mr.K.Muhakanizi	GEF OFP	MOFPED-UGANDA	26.10.2010
Dr.N.Nkowane	GEF OFP	MOTENR-ZAMBIA	09.12.2010
Mr.I.Kunene	GEF OFP	M0ENR-ZIMBABWE	17.01.2011
Ms.A.Vohiri	GEF OFP	EPA-LIBERIA	15.03.2011
Mr. Z.Fakir	GEF OFP	DEA-SOUTH AFRICA	18.10.2010
Dr.T.Berhan	GEF OFP	EPA-ETHIOPIA	25.03.2011
Mr.N.Sylla	GEF OFP	MOE-SENEGAL	25.02.2011

**B. GEF AGENCY(IES) CERTIFICATION**

This request has been prepared in accordance with GEF/LDCF/SCCF/NPIF policies and procedures and meets the GEF/LDCF/SCCF/NPIF criteria for CEO endorsement/approval of project.

Agency Coordinator, Agency Name	Signature	Date (Month, day, year)	Project Person	Contact	Telephone	Email Address
Brennan van Dyke Director, UNEP GEF Coordination Office		December 09, 2015	Kevin Helps Senior Officer	Program	+254-20- 762-3140	Kevin.helps@une p.org

<sup>i</sup>Agubuzo, E., Brooke, B. D., Christian, R., Choi, K. S., Coetzee, M., Hunt, R. H., Koekemoer, L. L., Makuwaza, A., Muleba, M., Munyati, S., Nardini, L., and Wood, O. R. (2014.) Insecticide resistance and role in malaria transmission of Anopheles funestus populations from Zambia and Zimbabwe. *Parasites & Vectors* 2014 7:464.