



## COUNTRY CASE STUDY

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### HEADLINE HERE

Country	Mauritius
Region	Africa
Key Result Area	Reduction and Elimination of Persistent Organic Pollutants (POPs)
Project ID	3779 - Sustainable Management of POPs in Mauritius
Project Activity Dates	Start: June 2008 End: December 2012

## ABSTRACT

The overall objective of the project is to address the first two national priorities related to the reduction and elimination of Persistent Organic Pollutants as identified by the Republic of Mauritius in its 2005 National Implementation Plan (NIP):

1. Disposal of obsolete POPs chemicals and clean-up of POPs-contaminated areas
2. Development of alternative strategies for malaria vector management with reduced—or no—reliance on DDT

The first two NIP priorities both involve the disposal of POPs chemicals and the clean-up and remediation of POPs-contaminated areas. Therefore, to reduce related project costs and to facilitate project implementation both priorities are being addressed through the implementation of a single project. An addition consideration to opt for this approach was that sustainable disposal of POPs chemicals and the clean-up and remediation of POPs-contaminated areas can only be obtained when the underlying cause (in the case of Mauritius: the use of DDT) is removed. Therefore, the combination of both priorities will contribute towards long term sustainability of project achievements.

Imports, exports and use of all POPs (except for DDT) are already prohibited in Mauritius. Phasing out the use of DDT, disposing of obsolete stockpiles and cleaning-up of POPs-contaminated areas, combined with adequate enforcement, awareness and training, will lead to the creation of a sustainable POPs-free system in the Republic of Mauritius.

## BRIEF DESCRIPTION OF ISSUES

### *Obsolete POPs chemicals*

In the Republic of Mauritius, consisting essentially of the islands Mauritius and Rodriguez, the use of POPs chemicals has largely been restricted to PCBs in transformers and DDT as a malaria vector control agent. Small amounts of other POPs pesticides have been used in the past, but were never applied in significant amounts. Imports, exports and use of all POPs except DDT are already forbidden in Mauritius.

As per the POPs inventories that were carried in preparation for the POPs NIP, the following POPs stockpiles have been identified:

DDT:	116 tons
Other POPs Pesticides:	0.1 tons (Dieldrin: 8 liters)
PCB containing oil:	5 tons

The application of PCBs in transformers was halted in the 80's however during NIP development there were still some transformers in use that contained PCBs. As to the use of DDT in vector control, DDT was still being applied during that time, albeit in moderate amounts (around 600 kg/yr.). As such the DDT inventory is large and in no relation to modest annual use.

The owners of remaining obsolete POPs inventories are ready to hand these over for final disposal. However, as often is the case in small Island Developing States (SIDS), there are no disposal facilities for liquid and very limited capacity for solid hazardous waste available in country. Therefore, owners have not been able to dispose of these quantities in a responsible way. Continued storage, as well as incorrect disposal, will increase the potential for release to the environment, it is for this reason that a one-time POPs disposal program is essential.

The use of DDT has already led to soil contamination around past and current storage sites. The improper handling during the transfer of DDT into spraying equipment as well as deteriorated packaging keeps adding to this contamination. Remediation of these storage sites is possible, but better management will be mandatory to avoid future contamination. This will entail repackaging, a loss-free transfer system and, to reduce the extent of the problem, disposal of the surplus DDT inventory.

## ***Malaria vector control***

The Republic of Mauritius, as far as malaria is concerned, is in a unique position because malaria is not endemic but is “imported” through travelers. Current use of DDT concentrates therefore on air- and sea- ports with occasional indoor spraying in villages where secondary malaria cases are being reported.

However, past and current use of DDT for malaria vector control is wrought with environmental problems:

- The current DDT inventory is large and in no relation to the modest annual use.
- DDT management practices are problematic and cause release into the local and global environment
- Past storage and transfer has caused contamination of the surrounding areas posing an immediate threat to surrounding communities as well as the island’s fragile coral and marine ecosystems.

While remediation of the current contamination is possible, better management is mandatory to avoid future contamination. The ultimate solution to DDT related problems would be to discontinue its use. DDT-free systems and effective solutions are available, such as integrated vector control, and will be implemented in Mauritius as part of this project. This would allow for the elimination of all remaining DDT stock (or to maintain a properly safeguarded small inventory for emergency purposes).

## **BRIEF DESCRIPTION OF PROJECT**

### ***Major Goals***

Project activities will allow Mauritius to implement a considerable part of its POPs phase-out strategy as laid down in its National Implementation Plan. To address the NIP’s first two priorities, the project has been divided into two relatively autonomous but complementary parts:

- POPs Disposal and Remediation
- Prevention of POPs-use through alternative “non-POPs” strategies

The specific outcomes of the project will be:

- i) An appropriate legal and enforcement structure to sustain the outcomes of the project in the future.
- ii) A comprehensive awareness and responsible care program to make importers, distributors, users and the general public aware of the risks involved in the use of chemicals in general and POPs specifically.
- iii) An effective non-DDT based vector control program that will limit the chance of outbreaks of malaria or other vector-borne diseases.
- iv) Removal and disposal of all obsolete POPs chemicals.
- v) Removal and disposal of the few remaining transformers that have PCB containing oils that exceed international standards.
- vi) Remediation of all POPs contaminated sites that exceed internationally acceptable standards.
- vii) To enhance the ability to develop and implement alternative strategies for malaria vector management with the ultimate aim to eliminate future use of DDT.

## Successful Practice

<b>Key Successes</b>	<p>The project has been able to contribute to the strengthening of national laboratory capacities. For example, laboratory tests were conducted by the Mauritius Sugar Industry and Research Institute (MSIRI) to determine the level of soil contamination at the various POPs storage sites (Fort Georges and Mahebourg Hospital), which was a prerequisite to start carrying out appropriate decontamination measures. Laboratory studies and small-scale field trials on efficacy of DDT and alternative chemicals in the fight against malaria outbreaks have also started.</p> <p>The potency tests of the current stock of DDT (approx. 121 tons) stored at Pamplemousses has been completed by an international laboratory (no facilities in Mauritius were available to conduct these tests) as per WHO specifications and requirements. Based on test results, the Ministry of Health and Quality of Life has decided to dispose of the entire stock of wettable powder DDT (approx. 92 tons) which do not meet the project's requirements. The quality of the technical DDT (approx. 29 tons) is still considered effective and has been found to be suitable for the strategic reserve.</p>
<b>What Factors Supported Success</b>	<p>In depth review and consideration of the three contaminated sites resulted in the tentative identification of Fort George as the preferred site for pilot soil remediation. The selection of Fort George was based on the present security situation, the fact that the general public has no access to the site, an expansive work area and ease of access of any equipment.</p> <p>Site visits were conducted at previous and current POPs storage sites to identify, evaluate and safeguard existing POPs stocks for disposal.</p> <p>A report on the "<i>Safeguarding of POPs Wastes on Mauritius</i>" has been provided to the Ministry of Environment to provide for guidance in the storage, handling and transport of Persistent Organic Pollutants within the Republic of Mauritius. It is also intended to supplement existing environmental legislation developed for hazardous and dangerous chemical wastes.</p>
<b>Relevant Information</b>	<p>A combined report on the identification of POP contaminated soil and sludge and testing of contaminated sites has been finalized.</p> <p>The storage site at Pamplemousses, where currently the DDT stock (approx. 122 tons) is stored, will be tested after the disposal and safeguarding of the DDT has been finalized. Initially the government had hoped to be able to donate the DDT, however considering the results of the potency test the Ministry of Health and Quality of Life has now decided to dispose of the 92 tons of wettable DDT. As such, the costs to be incurred for disposal of POPs wastes may increase by an additional (approx.) 250,000 US\$.</p>

## Successful Practice

<b>Key Successes</b>	<p>Based on a risk assessment ("<i>Risk analysis of the (re-)introduction of vector-borne diseases into Mauritius with emphasis on the role of vector control</i>") undertaken as part of the project, it was recommended that DDT should not be used for residual spraying at airports and seaports and that instead of DDT, pyrethroids and insecticide treated bed nets (ITN) should be made available for emergency malaria purposes.</p> <p>Since the project's launch no malaria outbreak occurred, only imported cases of malaria have been observed. As a result of the project's awareness building activities and the risks assessment report, DDT spraying will be discontinued in the future while to date, as a result of awareness raising and trainings, during the first half of 2010 the annual use of DDT in the amount of 600 kg was already reduced to 300 kg.</p>
<b>What Factors Supported Success</b>	<p>Within the Risk Assessment Report the role of DDT in the management of risks was evaluated, and recommendations to improve cost-effectiveness of risk management were provided. The report also provided important guidance to the project's activities in relation to the use of DDT and in relation to integrated vector management.</p>
<b>Relevant Information</b>	<p>A longitudinal impact study will be undertaken soon and will provide for the monitoring of the situation regarding integrated vector management strategies implemented in the four pilot villages of the Project.</p>

## Successful Practice

<b>Key Successes</b>	A situational analysis on vector control in the pilot districts has been carried out.
<b>What Factors Supported Success</b>	Workshops on vector surveillance, within the context of Integrated Vector Management, were conducted and the experience from these workshops indicated that project “decentralization” to village level is justified. The major reason for this seems to be that at village level, people are more easily engaged to contribute time and effort with the aim to reduce the risks of vector-borne diseases that directly impact their own communities and families.
<b>Relevant Information</b>	A longitudinal impact study will be undertaken soon and will provide for the monitoring of the situation regarding (see above).

## Successful Practice

<b>Key Successes</b>	<p>One of the main challenges faced by Small Island Developing States (SIDS) with respect to the transport and disposal of obsolete POPs is that there are seldom disposal facilities available in country and that any obsolete POPs wastes require marine transport to disposal facilities abroad, tremendously increasing project incurred costs.</p> <p>Therefore, for this particular project, the packing, handling, shipping and destruction of all obsolete POPs in Mauritius (including all identified obsolete POPs pesticides stockpiles, the entire stock of wettable powder DDT (92 tons) as well as PCB contaminated oils and transformers) will be combined to reduce costs and to facilitate related procedures.</p>
<b>What Factors Supported Success</b>	The willingness of different involved stakeholders and ministries to collaborate closely on finding joint solutions to the transport and disposal of obsolete POPs wastes and stockpiles, as well as the initiative taken by concerned ministries and UNDP to launch international bidding procedures combining all related activities and procedures.
<b>Relevant Information</b>	The Central Electricity Board (CEB) has indicated that it will provide the services and facilities required for the safe execution of the works during the disposal phase. The international bidding requirements would include necessary training for CEB and oversight over the oil draining and packing operations to ensure personnel safety and safe oil handling procedures.

## PROJECT CHALLENGES AND SOLUTIONS

### Major Challenges

One of the challenges encountered during project implementation has been the shortage/availability of manpower. The project observed some delays as limited personnel/suitable contractors were available to carry out i) the collection of mosquitoes to conduct the laboratory and small-scale field trials on DDT efficacy and alternative insecticides and ii) the Longitudinal Impact Assessment study.

Through close collaboration between UNDP, the project’s technical experts, the Vector Biology and Control Division of the Ministry of Health and Quality of Life and the Ministry of Environment and Sustainable Development, solutions have been identified to address these issues: i) UNDP has contracted a team of four mosquito collectors to be employed to help in obtaining the required number of mosquito to carry out the laboratory studies and small-scale field trials; ii) The Ministry of Health & Quality of Life (MOH) has pre-selected an inter-disciplinary team from the University of Mauritius to prepare the Longitudinal Impact Assessment study.

A newly identified risk at this stage of the project is the additional 92 tons of wettable powder DDT to be disposed of which was tested to be unsuitable for donation due to insufficient efficacy levels. The disposal of these 92 tons will incur additional costs; therefore the project team will have to carefully re-programme budget allocations to ensure that all project activities can be carried out in a satisfactory manner.

## LESSONS LEARNED

- In order to encourage a country to be less reliant on the use of DDT for Malaria vector control, and move towards the use of integrated vector control, the project undertook a number of successful actions that contributed to the envisaged transition away from DDT use, for example: i) The project carried out a *“Risk analysis of the (re-)introduction of vector-borne diseases into Mauritius with emphasis on the role of vector control”*) which concluded that instead of DDT residual spraying at airports and seaports, pyrethroids and insecticide treated bed nets (ITN) should be made available for emergency malaria purposes; ii) As a result of awareness building and training activities the annual use of DDT in the amount of 600 kg was already reduced to 300 kg; iii) Since the project’s launch no malaria outbreak occurred, and only imported cases of malaria have been observed; iv) The implementation of IVM strategies seems to be taking hold in the Ministry of Health as similar methods are used for Chikungunya and Dengue; and v) A set of DDT alternatives has been proposed for testing at selected sites to test their efficacy. It could be concluded that the risk assessment, combined with training and awareness raising activities as well as building upon vector control practices used for diseases and ultimately testing efficacy of alternative insecticides has been able to establish sufficient confidence to start moving away from the use of DDT. Finally, and very importantly, the fact that no malaria outbreaks were recorded, while less DDT was used and new integrated vector control practices were applied, indicated the appropriateness of the new strategy and further installed national confidence in new methods and practices.
- Several project activities and the development of guidance documents have been important contributing factors in further developing the capacity of project stakeholders in safeguarding the existing obsolete stockpiles. First and foremost, the backstopping of project activities by a Project Steering Committee involving several line Ministries, private and non-governmental stakeholders provides for a continuous platform for inter-disciplinary discussion, information exchange and project improvement. In addition, the development of guidance documents on the safe management of POPs stockpiles *‘Safeguarding of the POPs wastes’, ‘Identification of POPs chemicals and certified containers’, ‘Legal Review of regulations and laws governing the storage, handling, and disposal of POPs, and the potential remediation of highly contaminated POPs sites on Mauritius’*, have led towards adoption of good practices by the CEB, Roger Fayd’Herbe, MSIRI, Deep River Beau Champ, and the Ministry of Health and Quality of Life.
- Workshops on vector surveillance, within the context of Integrated Vector Management and with the objective to establish decentralized vector surveillance systems at village level, were conducted and the experience from these workshops indicated that project “decentralization” to village level is justified. The major reason for this seems to be that at village level, people are more easily engaged to contribute time and effort with the aim to reduce the risks of vector-borne diseases that directly impact their own communities and families.

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