UNITED NATIONS ENVIRONMENT PROGRAMME

Final Evaluation of the UNEP GEF project "Regional Program of Action and Demonstration of Sustainable Alternatives to DDT for Malaria Vector Control in Mexico and Central America"

Project No. GF/2732-03-4680 PMS: GF/4030-03-22

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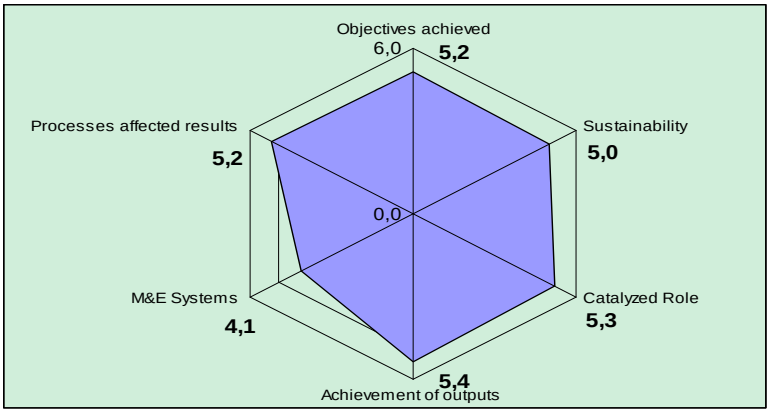
Background

The project had three main goals: to implement demonstration projects of malaria vector control without DDT or other persistent pesticides that can be replicable in other parts of the world; to strengthen national and local institutional capacity to control malaria without the use of DDT; and to eliminate DDT stockpiles in the eight participating countries. The project involved eight countries: Mexico, Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, and Panama and nine sites for demonstration projects were selected in each country. The project begun in August 2003 and was finished by July 2008 (except for the POPs Disposal component). The project was extended twice beyond its initial duration of three years.

A final evaluation was conducted from September 2008 to January 2009 as an in-depth evaluation using a participatory approach. It was a descriptive multicase study, using several sources of information. The project evaluation was conducted at the regional level and at three levels; national, demonstrative areas and localities, in four countries, namely Costa Rica, Guatemala, Mexico and Panama.

Major findings



Highly Satisfactory or Highly Likely 5,5 to 6	Satisfactory or likely 4,5 to 5,4	Moderately satisfactory or moderately likely 3,5 to 4,4

Achieved objectives

The achievement of objectives was satisfactory, because the objective 3 (elimination of DDT stockpiles) was not met. All countries adapted techniques of vector control without using persistent insecticides in their demonstrative areas.

The establishment of a regional network was developed and there was an active exchange of best practices and lessons learned among neighbouring countries. A major planned outcome was to increase government and local community awareness of DDT and other pesticide hazards to the environment and human health. Through the project, the personnel of national and local teams, leaders, community agents and teachers became informed, trained and strongly

empowered and mobilized, and the project succeeded in increasing community participation in vector control activities without insecticides.

Apart from ***effectiveness,*** the achievement of objectives was "*satisfactory*". In fact, there was a considerable reduction in the number of malaria cases registered and in the Annual Parasite Index (API) in all of the 202 pilot communities. From 2002 to 2007, malaria cases reduced by 63% and the API decreased from 15,92 to 8,36 cases per thousand inhabitants. Several communities and several departments and provinces where the demonstration areas were located reduced the incidence close to the API of 1 (pre elimination of malaria).

The project used a combination of control methods according to the Roll Back Malaria policy: diagnosis and prompt treatment, elimination of mosquito breeding sites by physical media called EHCA (Elimination of habitat and mosquito breeding sites of anopheles), larvae-eating fish, cleaning of houses and patios and whitewashing houses (painting with lime) through community participation. Risk approach (focalization of intervention in areas of high historical transmission) and selective control of vectors were strategies used to improve the cost effectiveness. The countries have adapted the model into the conditions, resources and local capabilities.

All participating countries executed activities to promote the public alert about health and environmental risks due to the use of DDT and other POPs. Experts from all countries were trained and studies about environmental impacts were executed, and the national laboratories now have the necessary equipment and trained personnel for this purpose.

The ***relevance*** of the project was rated *highly satisfactory* because the results were consistent with the proposed malaria control strategies. DDT and other POPs were not used, only insecticide impregnated bed nets were used in some localities. In addition the project contributed to achieving the Millennium Development Goals, the Roll Back Malaria goal and the possibility to eliminate the malaria in these localities and also in the entire communities of demonstrative areas.
The ***efficiency*** of the project was *satisfactory*. Implementing methods of vector control activities through community mobilization (cleaning houses and patios, control of mosquito refugees and breeding sites) were cost-effective, resulting in savings (0.4, 0.64 and 0,003 USD cost per case averted in three places studied). The major costs were those from payments of National Coordinators (NAP) and travel expenses for supervision and community support.

Sustainability

The overall rating on sustainability was "*likely*". Only the regional level assessed the sustainability as *"moderately likely*" and the rest of the countries rated it *"likely"*. The influence of hurricanes and tropical storms, the reduction of financial resources, outcomes of the global crisis, and the high migration in frontier areas, are factors that might affect the sustainability of the project to medium term.

Financial sustainability was evaluated as "*likely*". Guatemala rated it "highly likely", Panama as "moderately likely" and the rest, including regional "*likely*". The budget will not be likely to change significantly, although the global crisis could have an impact. Only the national levels of Mexico and Costa Rica considered that sustainability could be affected by ***socio-political factors***, particularly because of the 2009 presidential elections, which could change health policies and health authorities. In relation to ***the institutional framework and governance***, the rating is "*likely*". Guatemala and Panama rated it *"likely".*

The aspect that was considered to affect the ***environmental sustainability*** most was the presence of hurricanes, tropical storms and floods, which are frequent in the demonstration areas. Nevertheless, in Guatemala, Costa Rica and Panama, health services and communities reacted very well against the effects of tropical storms occurred at the end of 2008. By January, 2009, no epidemics were reported in demonstration areas of these three countries.

Catalytic Role

Catalytic role was one of the most successful elements of the project and it was rated as "*highly satisfactory*". Indeed, the control strategy on the initiative of the community leaders and health workers has been considerably replicated in other neighbouring localities and municipalities. In Mexico, Guatemala, Nicaragua and Honduras the replication was very extensive; in the last three countries alliances were forged, among others, with the Global Fund Projects. In Costa Rica, the strategy is being replicated in all Atlantic areas by the Ministry of Health in order to eliminate malaria transmission.

Achievement of outputs and activities

The project reached all programmed outputs, both in terms of quantitative and qualitative measures. The timelines at the community level were also achieved. In several cases, the accomplishments exceeded the expectations and, in other cases, unplanned activities were implemented. All countries developed institutional capacity through the following activities: i) training of national and local personnel, community members and the delivery of equipment, ii) formulation and implementation of guidelines on malaria control to develop legal capacities, and iii) constitution of Steering Committees, National Committees and Local Committees. The local committees were inserted in the structures of the Ministry of Health, using technical and management experience of the malaria control programs. There was an appropriate inter and intra institutional coordination.

The project used Echo Health approach, with four elements: i) a strategy of prevention an integral control, emphasizing Integral Vector Control recommended by WHO, ii) multidisciplinary and multisectorial approach, iii) community participation as the central axis of the control activities, iv) equity, with priority in areas with the following characteristics: rural, predominance of indigenous population, critical poverty and malaria persistence.

The approach used allowed for follow-up not only of operational activities but also expected results. The rapid impact achieved at the start of the project allowed the model to have wide support from the community and local workers. The evidence generated by scientific studies and the systematization of experiences gave the project a scientific authority and credibility to influence the formulation of malaria policies and decision makers.

Assessment of Monitoring and Evaluation Systems

One of the less developed components was the M&E (*moderately satisfactory*), since it did not have a person or unit devoted exclusively to this activity. The ***M&E Design*** was only "*moderately satisfactory*" and it had two documents of reference: i) The M&E system, described by project document referred to the aims and activities developed with a qualitative approach, with few goals or thresholds. This system worked adequately but it did not allow quantifying activities, products and results. ii) The technical guide related to strategies of malaria control implemented and to surveillance malaria cases. This system turned out to be excessive and very few indicators were gathered in the base line and at the post evaluation end of the project. The most important advances of the information system have been the development of a Geographical Information System (GIS). These applications demonstrated visually the power that the GIS has for the monitoring and evaluation of malaria situation and its determinants.

M&E Plan Implementation (use for adaptive management) *was satisfactory*. The implementation of the M&E system and the preparation of quarterly reports facilitated monitoring of outputs and outcomes throughout the project implementation. In addition, the progress of project performance was presented in the Regional Technical Committees and used for decision-making. At the country level, targets were set, and the monitoring of all activities, deadlines and objectives of the project were done regularly. Only a few indicators defined in technical guide for monitoring malaria control strategies and malaria epidemiological situation were used to evaluate the results and impact of the project.
Budgeting and Funding for M&E activities was *"moderately satisfactory*". There were enough funds to assure M&E activities, but the budget for M&E activities was integrated in the budgets of each activity.

Assessment of processes that affected attainment of project results

Officially, this project started in May of 2003, but at the country level, it started at different times in each country, beginning from April 2004. The project implementation was delayed because of several factors, including institutional arrangements and the adaptation of human resources management mechanisms and financial management into the local and national realities. Moreover, there was a delay in the appointment of Regional Coordinator (June 16th, 2004), National Coordinators and focal points. Many administrative arrangements were done during project implementation. According to stakeholders, the project had great flexibility which did not only facilitate implementation of new malaria control strategies but also promoted adaptation of the plan to the context of each demonstrative area.

As assessed by interviewees ***preparation and readiness*** achieved a "*satisfactory*" rating, but due to the fact that coordination and institutional arrangements were not in place at the start of the project, the score is only "*moderately satisfactory"*. In addition, some actors considered that preparation and readiness was insufficient, because many administrative arrangements and the stakeholder involvement were made during project implementation. The preparation of the project included evaluations on feasibility, base line, and contacting and involving stakeholders.

Country ownership and driveness was "*highly satisfactory*". At the national level, Technical Committees were constituted with delegates from several institutions (health and environment fundamentally), universities or researchers. At demonstration sites, technical local committees were constituted with participation of municipalities and NGOs. At the community level, the participation of delegates from the majority of the community organizations (Committees of Malaria Control or Groups of Health) was high. Empowerment of community leaders and health workers was high at the local level. In all levels, there was a very good stakeholder' participation.
Stakeholders´ involvement was "*highly satisfactory*".

The ***financial planning*** was evaluated as "*highly satisfactory*". Administration of funds was done by the PAHO/WHO of each country. National Coordinators in 7 of the 8 countries were hired for the management of the project. No other supplementary personnel were hired for the management of the project, because existing resources were employed, and there was no need to create additional administrative structures in any of the countries.

Recommendations and the way forward

1. In order to maintain the political and financial support, PAHO has to make advocacy to Ministries of Health in order to declare the eradication of malaria as a medium-term goal in Mesoamerica

2. PAHO could design new projects to replicate the strategy in other areas of high incidence of malaria transmission and maintain the surveillance of localities where malaria transmission was stopped. The Mesoamerican Health System (Plan Puebla Panama) is a great opportunity to replicate the strategy in other areas.
3. Malaria Control Programs in every country keep track of the areas and towns as a strategy of long term impact evaluation and homogenize and improve surveillance systems, monitoring and evaluation of the Mesoamerican countries.

Lessons learned

It is possible to control or even eliminate malaria with environment-friendly methods and without the use of persistent insecticides. The main condition is intersectoral and community participation. The strategies needed for this kind of intervention, such as the control of mosquito breeding sites, are easily adopted by the community. They also contribute to the empowerment of the community and to change the conception about their participation in malaria control activities.

Malaria control requires a multi methodological approach with the combination of interventions: diagnosis and complete treatment (compliance), plasmodium reservoir elimination (active search for asymptomatic and febrile persons), control of mosquito breeding sites with physical and biological methods (larvae eating fishes), control of typical mosquito hiding places (house and yard cleaning) and creation of barriers between people and mosquitoes (Insecticide Impregnated Bed Nets).

Before implementing new demonstrative projects, development of comprehensive protocols is required. They should include systematization of experiences, impact assessment, cost effectiveness analysis, and surveillance and monitoring systems adapted to the strategy.

GLOSARY

ABER: Annual Blood Examination Rate
API: Annual Parasite Rate
COLVOL: malaria volunteer collaborators
CODODES: Development Community Councils
CEC: Commission for Environmental Cooperation of North America
CCAD: Commission for Environmental and Development for Centroamerica (Comisión Centroamericana de Ambiente y Desarrollo)
DDT: **d**ichloro**d**iphenyl**t**richloroethane
GEF= Global Environment Facility
GIS = Geographic Information System
IR= Increase Ratios
MCP: Malaria Control Program
M&E: Monitoring and Evaluation
MTE; Mid Term Evaluation
NAP: National Professional
PAHO: Pan American Health Organization
POPs: Persistent Organic Pollutants
SDT: Single Doses Treatment
TREDI: Treatment, Revaluation and Elimination of Industrial Mailing (Tratamiento, Revalorización y Eliminación de Desechos Industriales)
UNEP: United Nations Environment Programme
WHO: World Health Organization

1. INTRODUCTION AND BACKGROUND

1.1. Project identification

Project title: **POPS projects:** Regional Program of Action and Demonstration of Sustainable Alternatives to DDT for Malaria Vector Control in Mexico and Central America

UNEP Project Number: IMIS No.: GFL-2328-2760-4680, PMS No.: GF-4030-03-22

Responsible Office: Pan American Health Organization, PAHO (Area of Sustainable Development and Environmental Health, SDE) and executing countries: Ministries of health and the environment of Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua and Panama.
Project starting date: September 2003
Project completion date: December 2008 (with authorized extensions)
Reporting period: September 2003 – December 2008
Total Budget ($US): **14.4936;** UNEP contribution **7.165.000**

1.2. Project rationale

Background

During the last decade Mexico and Central American countries have gradually discontinued DDT sprayings for malaria vector control. Malaria, however, still poses a serious risk for the population of these countries. The initial project duration was 36 months starting in August 2003 and ending in July 2006. The Project was extended to December 2008 in order to enable continuous collection of field data, to sustain project results, and to enable important international diffusion of achievements.

This project complemented the “Contaminant-based” Operational Program No 10 and aimed to “help demonstrate ways of overcoming barriers to the adoption of best practices that limit contamination of the International Waters environment”. The proposed activities were also consistent with several provisions of the recently adopted Stockholm Convention on POPs, and with the draft Operational Program on POPs under development. Seven of the participating countries have already signed the POP´s convention.

Project aims and components

The overall objective of the project was to demonstrate that methods for malaria vector control without DDT or other persistent pesticides are replicable, cost-effective and sustainable, thus preventing the reintroduction of DDT in the region. Human health and the environment were expected to be protected in Mexico and Central America by promoting new approaches to malaria control, as part of an integrated and coordinated regional program. The establishment of a regional network was expected to facilitate the exchange of best practices and lessons learned among neighbouring countries. A major outcome was an increase in government and local community awareness of DDT and other pesticides hazards to the environment and human health, and adjustment of future behaviour regarding the use of persistent pesticides.

The project activities were organized under the following four components:

Component 1: *Demonstration Projects and Dissemination*. The objective was to implement, evaluate, and disseminate the alternative strategies of malaria vector control without the use of DDT, which were developed during the PDF-B phase. The main outcome planned was to avoid future reintroduction of DDT or other persistent pesticides in national malaria control programs.

Component 2: *Strengthening of national institutional capacity to control malaria without DDT*. The objective was to strengthen national and local institutional capacities to control malaria with methods that do not rely on DDT or other persistent pesticides. The planned outcome of this component was strengthened national capacities of malaria risk assessment, development of analytical laboratory infrastructure, community participation and training regarding malaria vector control and pesticide management.

Component 3: *Elimination of DDT stockpiles*. This component addressed the existing problem of DDT stockpiles in six of the eight participating countries. All activities were to be documented and management plans were to be put into place to prevent further accumulation of stockpiles of pesticides.

Component 4: *Coordination and Management*. A regional coordinator was to be hired for this project under terms of reference established by the steering committee. Each country was to have a national coordinator. This component also included three annual meetings of the steering committee, three regional meetings for planning and evaluation of activities, and three regional annual reports.

2. OBJECTIVE AND METHODS

2.1. OBJECTIVE AND SCOPE OF THE EVALUATION

The objective of this terminal evaluation was to determine the extent to which the project objectives were achieved, or are expected to be achieved, and assess if the project has led to any other positive or negative consequences. The extent and magnitude of the project as well as the possible future impacts are now documented. The evaluation also assesses project performance, through comparison of planned project activities/outputs and actual results.

2.2. METHODS

The final evaluation was conducted as an in-depth evaluation using a participatory approach. This is a multiple comparative descriptive study of cases (Yin R 1994). The evaluation was carried out in several locations in four countries. In each country, three levels were visited: National, department or provincial, and community (see Annex 1 for more details). Strategies to assure quality assurance, validity, representativeness, validation of information sources and bias control were defined (See Annex 1).

2.2.1. Sources of Evidence and Codes Used

The complexity and extension of the subject and the multi-theoretical approach chosen for this study, presupposes methodological pluralism. Therefore, a combination of strategies and research techniques were used. In this study, five different sources of evidence were used: four of them involved qualitative methods (workshops to attend a presentation of final evaluation by stakeholders, semi-structured collective interviews, documentation, and participant observation) and one quantitative method (archival records). In the following paragraphs, the Collective Interview is described; the other procedures are described in detail in Annex 1.

Comment [p1]: ?

Collective Interview

Semi-structured collective interviews with groups of actors or key informants were carried out at three levels (see Annex 1). All the interviews were tape-recorded and transcribed. The main questions of the collective interviews were organized into sections according to the project evaluation parameters (see next section). Each section has questions formulated in order to complete all the parameters suggested by UNEP (UNEP 2009). For each question four cells were filled by the evaluator (see Figure 1).

1. Answers, which were evaluated by interviewers with four alternatives: Yes completely, Partially, No at all, N/A (no applicable)
2. Evaluator notes
3. Existence of supporting documentation

Figure 1. Example of Interview formulary

TERMINAL EVALUATION DDT-GEF PROJECT DDT-GEF IN MEXICO Y CENTROAMERICA			
Area programatica:	MaControl de la Malaria		
Level:			
Participantes names :	**Years in the project**	**Rol**	
Questions	**Answers** Yes - completely Partially No - not at all N/A= no aplicable	**Evaluator notes**	**Existence of documentation ?**
A2. Relevance			
A16 were the project's outcomes consistent with the focal areas/operational program strategies and country priorities	Yes - completely		
A17 were the project's outcomes consistent with the country priorities	Partly		
A18 What was the contribution of the project outcomes to the wider portfolio of Operational Programme on POPs	No - not at all		
Aditional Coments			

2.2.2. Variables, questions and codes

The main variables of study and questions have also coded as follow:

Section	Item	Code
A. Attainment of objectives and planned results	i) Effectiveness ii) Relevance iii) Efficiency	A1 to A7 A8 to A10 A11 to a14
B. Assessment of Sustainability of project outcomes	i) Financial resources ii) Socio-political iii) Institutional framework & governance iv) Environmental v) Recommendations	B1 to B4 B5 to B7 B8 to B11 B12 to B14 B15 to b17
C. Catalytic role		C1 to C5
D. Achievement of outputs and activities	i) Soundness and effectiveness of the methodologies ii) Legal, institutional, technical and financial capacities and mechanisms iii) Produced outputs have the weight of scientific authority / credibility of project outputs iv) Delivered outputs	D1 D2 D3 D4
E. Assessment of Monitoring and Evaluation Systems	i) Design ii) Implementation plan iii) Budgeting and Funding for M&E iv) Long-term Monitoring	E1 to E12 E13 to E16 E17 E18
F. Assessment of processes that affected attainment of project results	i) Preparation and readiness ii) Country ownership/Driveness iii) Stakeholder involvement iv) Financial planning v) Structure and organization	F1 to F5 F6 to F12 F13 to F21 F22 to F23 F24 to F29

A. "PO": participant observation;

C. Documents:

Document	Code
Trimester Report	TR
Mid Term Evaluation	MTE
Ramirez E, Henao. Final Report, December 2008	FR
Ramirez et. al, (2009). DDT-free Malaria Control in Mesoamerica: focalized control and management of breeding sites as basic strategies.	Ramirez et.al 2008

These codes will be quoted throughout the text to ensure that the source of information is clear. The quotations of documents and interviews were translated from Spanish to English by the author.

2.2.3. Study Population and Units of Analysis

The project constituted of 202 localities (see Annex 2). For the evaluation, three levels were visited in each of the four countries. In the current study, the unit of observation is the malaria demonstrative project of each country and in each of its three levels:

1. Central Level: Headquarters of PAHO and Ministry of Health (MOH).
2. Local Level: Headquarters of demonstrative projects.
3. Community Level: localities directly involved in the project.

The following table presents the countries, places and levels where the interviews took place, and number of collective interviews held:

COUNTRY	PLACE AND LEVEL	Num. interviewees	Code
Guatemala	Regional	2	R
Mexico	National	4	MN
	Chiapas Estate	8	ME
	Neguatzotcoyol community	4	MNEG
	Nueva Macedonia community	3	MNM
Guatemala Total	National	3	GN
	Peten Department	4	GP
	Ixacan Department	2	GI
	La Felicidad community	5	GF
	Sta. Maria Dolores community	5	GM
Costa Rica Total	National	3	CRN
	Talamanca Municipality	3	CRT
	Matina community	2	CRM
Panama Total	National	3	PN
	Bocas Province	2	PB
	Puente Blanco community	8	PT
	Las Tablas community	5	PPB

2.2.4. Data Analysis

Four methods of analysis were used according to the type of evidence and the variables involved in the study:

1. *Analysis of collective interviews*. For each section mean and standard deviation was computed. In order to do this the categories of answers were transformed in ordinal values: yes completely = 2, yes partially = 1 and no at all = 0. Non applicable was not quantified.
   A score of the level of satisfaction was computed for each question, country and place. The procedure was:
   - Compute observed values for every category: sum the values obtained in every question that forms part of the category.
   - Compute expected values: sum all the expected values in every question.
   - Compute the score by multiplying the observed values by 6 and dividing by expected values. See the following example:

VARIABLES	Observed values	Expected values	Score
A – Attainment of objectives	**29**	**30**	**(29 * 6) 30 = 5,80**
A1. Effectiveness	**15**	**16**	**(15 * 6) / 16= 5,63**
A1	2	2	
A1A	2	2	
A2	2	2	
A3	1	2	
A4	2	2	
A5	2	2	
A6	2	2	
A7	2	2	

The quantitative scores were transformed into levels of satisfaction as follows:

Highly Satisfactory	Satisfactory	Moderately Satisfactory	Moderately Unsatisfactory	Unsatisfactory	Highly Unsatisfactory
5,5 to 6	4,5 to 5,4	3,5 to 4,4	2,5 to 3,4	1,5 to 2,5	0 to 1,4

Comment [p2]: Shouldn't this be 2,4?

For sustainability sub-criteria on each of the dimensions of sustainability of the project outcomes was rated as follows.

Highly Likely (HL)	Likely (L)	Moderately Likely (ML)	Moderately unlikely (MU)	Unlikely (U)
5,5 to 6	4,5 to 5,4	3,5 to 4,4	2,5 to 3,4	0 to 2,5

Comment [p3]: 2,4?

Highly Likely (HL): There are no risks affecting this dimension of sustainability.

Likely (L): There are small risks that affect this dimension of sustainability.

Moderately Likely (ML): There are moderate risks that affect this dimension of sustainability.

Moderately Unlikely (MU): There are significant risks that affect this dimension of sustainability.

Unlikely (U): There are severe risks that affect this dimension of sustainability.

2. *Analysis of document contents*. The content of each document was analyzed using a matrix of content analysis. The most relevant findings were classified and grouped according to the research variables.
3. *Meaning categorization.* The contents of interviews (evaluator notes) and meetings records were classified and grouped by the same procedure as the document analysis.
4. *Statistical analysis.* Epi-Info 6.04 was used to process the quantitative data.
5. *Epidemiological Data.* For a descriptive analysis of epidemiological, service production and performance data, the number of events, percentages, rates and ratios were used. Increase Ratios (IR) were calculated to demonstrate increase or reduction (Dever A 1991).

The Annual Parasite Rate (API) was standardized using the case detection effort (ABER) for the year 2004 (Roberts D et al. 1997) (See Annex 3):

3. PROJECT PERFORMANCE AND IMPACT

3.1. Attainment of objectives and planned results

The attainment of objectives and planned results is "*satisfactory*", although the objective 3 could not be obtained completely (elimination of DDT stockpiles) (Table 1). **The third** objective involved an inventory of the existing DDT reserves, the transport of reserves to places of accumulation in each country, repacking of the material as required, and transportation and elimination of the DDT reserves. The first two activities, under the responsibility of the participating countries, were fulfilled. However, there was breach of the contract by the company contractor concerning the three final activities. The majority of the survey respondents rated partially to the attainment of the objective 3.

Mexico received the lowest rating on the attainment of objectives (*moderately satisfactory*). This was mainly due to that the interventions in Chiapas's State (which was selected for the evaluation) was not developed fully and only during the last months of 2008 the activities were increased. In Costa Rica and Guatemala the attainment of objectives was "*highly satisfactory*", but in Panama was rated as only "*satisfactory*".

Two components of this parameter, effectiveness and efficiency, obtained a "*satisfactory*" rating. Relevance was rated "highly satisfactory". Guatemala has the best results with a "*highly satisfactory*" rating for all of the three components and in the majority of the six regions evaluated.

Regarding effectiveness, the global score was "*satisfactory*". Mexico scored a "*moderately satisfactory*" rating, due to the low scores achieved at state and community levels. Although in Panama, the total score achieved was "*satisfactory*". The rest of the countries scored "*highly satisfactory*" ratings. Efficiency had similar trends than effectiveness. In Relevance, the global score achieved was "*highly satisfactory*", but in Mexico it was only "*satisfactory*".

Table 1. Evaluation of attainment of objectives and planned results. Final Evaluation. Mesoamerica 2008-2009.

PLACE	Attainment of objectives	Effectiveness	Relevance	Efficiency
TOTAL	**S (5,24)**	**S (5,11)**	**HS 5,52**	**S (5,26)**
Regional	**HS 5,8**	**HS 5,63**	**HS 6**	**HS 6**
Mexico Total	**MS 4,13**	**MS 3,88**	**S (4,8)**	**MS 4,07**
National	**S** 5,2	**S** 5,25	**S** 5	**S** 5,25
Guajaca State	**MS** 3,8	**MS** 3,38	**MS** 4	**S** 4,5
Neguatzotcoyol community	**MU** 3	**MU** 2,25	**S** 4,5	**MU** 3
Nueva Macedonia community	4	3,75	**HS** 6	**MS** 3
Guatemala Total	**HS 5,8**	**HS 5,8**	**HS 6**	**HS 5,67**
National	**HS** 5,6	**HS** 5,63	**HS** 6	**S** 5,25
Peten Department	**HS** 5,57	**HS** 5,57	**HS** 6	**S** 5,25
Ixacan Department	**HS** 6	**HS** 6	**HS** 6	**HS** 6
La Felicidad community	**HS** 6	**HS** 6	**HS** 6	**HS** 6
Sta. Maria Dolores community	**HS** 6	**HS** 6	**HS** 6	**HS** 6
Costa Rica Total	**HS 5,62**	**S 5,4**	**HS 5,63**	**HS 6**
National	**S** 5,2	**S** 4,5	**HS** 6	**HS** 6
Talamanca Municipality	**HS** 6	**HS** 6	**HS** 6	**HS** 6
Matina community	**HS** 5,67	**HS** 6	**S** 4,5	**HS** 6
Panama Total	**S 5,17**	**S 5,09**	**HS 5,5**	**S 5,14**
National	**S** 5	**S** 4,88	**S** 5	**S** 5,25
Bocas Province	**S** 4,5	**S** 4,29	**S** 5	**S** 4,5
Puente Blanco community	**HS** 6	**HS** 6	**HS** 6	**HS** 6
Las Tablas community	**HS** 5,67	**HS** 6	**HS** 6	**S** 5

Score

Highly Satisfactory (HS)	Satisfactory (S)	Moderately Satisfactory (MS)	Moderately Unsatisfactory (MU)	Unsatisfactory (U)	Highly Unsatisfactory (HU)
5,5 to 6	4,5 to 5,4	3,5 to 4,4	2,5 to 3,4	1,5 to 2,4	0 to 1,4

3.1.1. Effectiveness

The first objective (question A1) received the highest score on effectiveness with a mean of 2 (yes - completely). Only in Mexico, the impact (Annex 2, Table 1, questions A1A) obtained a rating of yes - partly (score=1), the rest of the countries evaluated had a score of 2 (yes-completely).

The second objective received a mean rating of 1,5 in Mexico and Panama, and 2 in the other countries. Objectives 3 and 4 received the lowest ratings. For objective 3, regional, Mexico and

Guatemala obtained a score of 1, which represented a partial achievement of the objectives, and Costa Rica obtained a score of 1,5.
Three questions assessed to what extent the results of this project have informed regional (question A5), national (question A6) or international (question A7) processes. Regional refers to Mesoamerica region and International means other regions of America or other continents. At the national level, Mexico and Costa Rica obtained a good performance score (more than 1,5), and the rest of the countries obtained scores of 2 (completely). At the regional level, Mexico and Panama rated a score of "partially" on performance (1 and 1,25). At the international level, most countries obtained a score higher than 1,5 (intermediate between partially and completely), with an exception of Panama with a mean of 2 (completely).

The following sections present a description of the strategies applied for every component.

Component 1: *Demonstration Projects and Dissemination*

This component was designed as the most important and complex component of the project, thereby receiving most of the resources, as well as great deal of institutional and community effort. It was successfully implemented in 202 demonstration communities and 52 municipalities. A total of nine demonstration projects were launched, one in each country, that directly benefitted a total of 159,018 inhabitants and indirectly a population of 6, 845,000 people. This accounts for 29% of the population living in high risk malaria areas of Mesoamerica (FR).

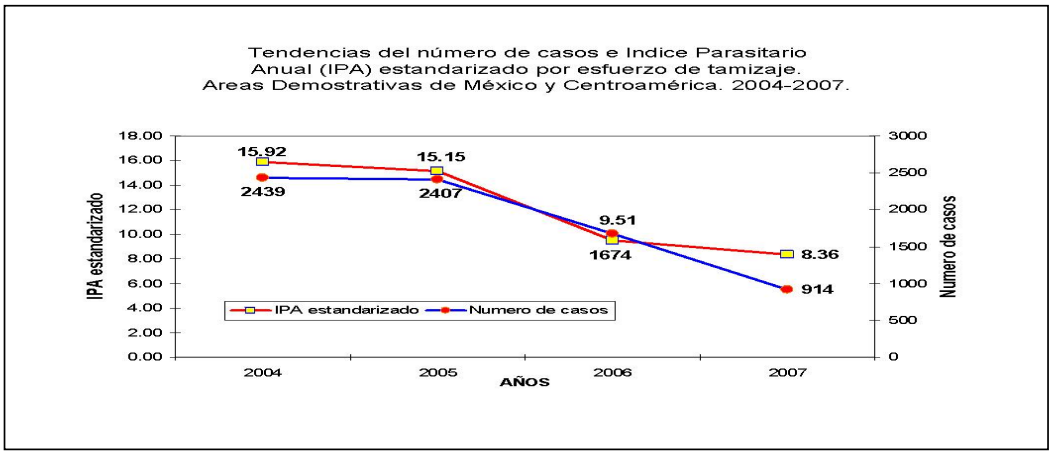
All countries have adopted technical alternatives of vector control at the demonstrative areas, not only without using DDT, but also without the use of persistent insecticides. This is why the component is rated as "*highly satisfactory*". Only Panama, sprayed PH 40% Sumithion in one of the demonstrative communities (Barranco Montaña Adentro) because of the presence of a malaria outbreak at the beginning of the project. Once the epidemic was under control, the use was ceased (MTE). The use of insecticides was restricted to the Insecticide Treated Nets in Guatemala and Nicaragua, due to the presence of Global Fund Projects, which was providing them (Impact evaluation).

Positive and negative effects

All the interviewees described positive effects of the implementation of malaria control strategy. The most important positive effects are related to: impact on other diseases, inter sectorial participation; scientific publications; no use of insecticide for the control of malaria; high community mobilization and participation; improved performance of the malaria control program and of the vector control workers; reduction of costs and improvement of the cost effectiveness of the interventions, and community self-replication. There were no negative effects.

Impact

There was a considerable reduction in the number of cases and the Standardized Annual Parasite Rate in all of the 202 demonstration communities. It registered a reduction of 63% of malaria cases and APIs decrease from 15,9 to 8,36 cases per thousand inhabitants from (Graph 1) (Ramirez et.al. 2008).



Graph 1. Annual trend of malaria transmission in demonstrative localities. DDT/PNUMA/GEF/OPS Project, Central America, 2004 - 2007.

When we compare the percentage of reduction in malaria cases in the countries, with the demonstrative localities, the average reduction in the countries was 25% while in the demonstrative localities it was 63% (Table 4)**.** Only the demonstrative localities in Costa Rica experienced an increase in malaria cases, which was due to a new locality that was included in the project in 2007 (Estrada, Matina) and which was affected by an outbreak (Ramirez et. Al, 2008).

Table 2. Number of malaria cases and the percentage of malaria case reduction in the countries, and demonstration localities. DDT/PNUMA/GEF/OPS Project. Mexico and Central America, 2004 – 2007.

	Number of Cases in the Country			Number of Cases in Demonstrative localities		
Countries	**2004**	**2006-7***	**reduction %**	**2004**	**2007**	**reduction %**
Belize	1,057	844	20%	376	128	66%
Costa Rica*	1,289	1,223	5%	99	112	-13%
El Salvador	76	49	36%	26	0	100%
Guatemala	35,349	31,093	12%	265	92	65%
Honduras	14,813	11,561	22%	521	105	80%
Mexico	6,861	2,514	63%	902	456	49%
Nicaragua*	5,095	2,514	51%	94	16	83%
Panama*	3,406	1,281	62%	156	5	97%
Total	67,946	51,079	25%	2,439	914	63%

Source: Pan American Health Organization, Health Analysis and Statistics Unit. Regional Core Health Data Initiative; Technical Health, 2007
* Cases reported in year 2007

Among the countries visited, several communities registered zero malaria cases during the past two years (2007-2008). Moreover, in all of the departments and provinces, where the

demonstration areas were located, incidences were reduced near the API of 1, which is considered the standard to qualify as the elimination of malaria. Matina is an example of a rapid control of an epidemic without insecticides; the number of cases reported in 2006 was 286, in 2007 there were 99 reported cases, and in 2008 only 12. (A1A.CRNAC). In Panama in 2008, 90 % of the controlled localities registered zero local transmission (autochthonous) cases of malaria (A1A.PNAC, A1A.PNB, A1A.T).

A similar situation prevailed in Guatemala, where both of the demonstration communities visited presented no cases in 2008. In Guatemala, the factors that contributed to the success were: "the project was implemented using health promotion of health principles through the structures of local power (COCODE) and involving local stakeholders (municipalities), empowerment of community through analyzing data, organization of action community groups, reinforcing the governance and leadership of Ministry of Public Health. There was a permanent presence of the MSP civil servants in supervision" (A1GNAC).

There was a positive impact, not only in demonstration communities, but also in all demonstration areas. Actually, in Guatemala there was considerable reduction of malaria cases in the whole country (A1A.PGAC), particularly in the three demonstration areas, due to the alliance with the Global Fund Project and Health Action Project. In all three districts of Bocas Del Toro in Panama, cases reduced from 700 in 2004 to 13 cases in 2007 due to the influence of the project (A1A.PNAC, A1A.PNB).

Mexico was the only country in which the cases were not reduced: the number of cases remained the same in 2008 in comparison to 2007 (A1A.MNM). Chiapas State reported only a reduction of 3% of the cases in 2008 (A1AMNAC). The reasons for this are: i) the presence of hurricane Stan in 2004 (A1A.MN); ii) the low efficiency of control of the breeding-sites in localities surrounded by rain forests due to the difficulties in identifying and controlling the breeding-sites (A1B.MN), iii) the presence of many new workers who had not been trained about the application of this strategy, iv) the low performance of administration of treatments and the work with communities (many workers were about to retire and there was a lack of discipline), v) the reluctance of people to give blood samples for diagnosis and to work in community activities, vi) the lack of a systematic supervision in all levels (A1ME).

Impact on other health problems

All interviewees agreed that the project had transformed towns (A1B.I). All the towns visited were clean, without rubbish or weeds in the open areas and the houses visited were clean and tidy. It can be stated that all towns in the demonstration areas are now examples of healthy communities (PO).

Several actors considered that through this strategy, other types of illnesses have also been controlled, for example parasitosis (A1B.I) and diarrhoea. There has also been a decrease in mosquito stings: "before it was impossible to stand near lakes". In Guatemala, leaders thought that due to the "clean houses" strategy, there were positive impacts on other vector born diseases like dengue (Aedes) and dermatological diseases (scabies). Other impacts include the reduction of common house fly, the improvement of community safety (because it is possible to see intruders from a longer distance) (A1B.GF), basic environmental sanitation and improvement of the streets (A1B.GM, A1BGN).

Several leaders of the towns visited, thought that the strategy has improved general health issues, such as the reduction of malnutrition, tuberculosis and child/maternal mortality, due to

the training, health education and workshops (A1B.MNM). There has also been a decrease in diarrhoea cases because of latrine building and safe water actions; both results of strengthening of community organizations (A1B.PPB). In Panamá leaders said that “although the interest was focused in malaria control, there was also interest in safe water and latrines. People were very interested and motivated to follow the program (A1B.PB)”. The generalized opinion is that the empowerment of the community allowed the interventions to extend to other health problems (A1B.PPB).

The floods that occurred in Panama, Guatemala and Costa Rica (years 2008 and 2009), were followed by a very strong reaction of the community (elimination of mosquito breeding sites and refugees - cleaning houses and patios- and active search for febrile patients), which enabled the prevention of malaria outbreaks without the use of insecticides. It has also prevented other illnesses related to these climatic phenomena (OP). In Panama, the population of a locality (Puente Blanco) has acknowledged that as a result of the project, there is “more working union, more people come to visit us, Europeans come to see this native community, because there is no malaria or other illnesses” (A1B.PB).

Intersectorial participation

The strategy allowed not only to reduce the burden of the disease, but also to promote community participation and collaboration between governmental institutions, communities and other actors. These multiple actors were involved in the organization, planning and execution of sustainable health promotion activities.

In Panama, the project involved local leaders and mayors (A1b.R). Another relevant aspect was the participation of the municipalities which collaborated in malaria control through public policy regulations, environmental sanitation, infrastructure and logistical support to the communities involved (A1B.MN). In addition, several universities were involved in research projects.

There was a synergy between GEF-DDT project and other projects such as those of the Global Fund. In these cases, the project strategy was to integrate the efforts of both institutions (A1B.GP, A1B.GI). Alliances were also made with the education sector (A1B.GP, A1B.GI).

The experience with the project showed that the municipalities play a very important role in the implementation of malaria control strategies. The reasons are the following: i) they can act in a wide range of levels and create a proper environment for successful local interventions; ii) they can support community participation and intersectorial collaboration iii) they can offer funding for infrastructure, logistical support and personnel; iv) the municipal governments can act as agents for structural change (social, cultural and physical change) through the formulation of public policies.

The experience also showed the potential of the private sector to act as an important partner in human development processes, specifically, in the area of health promotion. The intervention of the private sector helped rationalize the use of resources and to improve the coordination of actions for malaria prevention and control. Their participation in the project strengthened the social responsibility and commitment with the health of the population and the conservation of the environment.

Scientific publications

Eight scientific articles were prepared and have been sent to scientific journals for publication (A1.R, FR). Documents with systematization of the experiences were distributed in several meetings, workshops or scientific congresses (FR, A1CRN).

Community participation

The inhabitants learned to organize themselves in order to cope with health problems, not only malaria. People got involved with the project (A1B.PNAC). There has been a visible change in the level of participation of the community, seen through the different attitudes regarding the protection of the family (A1B.PT). The opinion is that political changes (in the government or the local authorities) will not affect the application of the strategy and the model developed by the project (A1B.PNAC).

The opinion of majority of the interviewees was that the reduction of malaria cases and mosquito stings has contributed to the credibility of the strategy and the improvement of community participation (A1B.MN). This opinion is generalized in all the areas visited (OP).

In the state of Chapas (Mexico), there were political problems associated with the zapatist guerrilla, who refused to take part in the malaria control activities, pointing out that this was the state's responsibility. However, the project was restarted in several areas, where the population is again taking part in the project activities (A1B.ME).

The project strengthened local organizations. For example it helped Development Community Councils (COCODES) to focus on public health and health policy subjects, because they had been acting with other topics. The project allowed these groups to increase their power and have influence over the population (A1B.GN).

Improvement of performance of the malaria control program and of the vector control workers

In Mexico, the interviewees at the national level thought that the project contributed to the effectiveness of the national malaria and dengue control programs because it brought resources to the control of these illnesses. On the other hand, the health workers benefited of the experience in community work and new strategies of vector control, which are the base of dengue control (A1B.MN). The model became an example to other programs like immunization (A1B.ME).

Model and approach

The terminal evaluation confirmed that all countries in the demonstration areas have adopted alternative methods for malaria vector control, not only without the use of DDT, but also without using persistent pesticides. A very important aspect stressed by the mid term evaluation was related to the ecological and systemic approach applied, which is characterized by five elements:

- A prevention strategy and integrated control based on epidemiological models of the health sector.
- A multidisciplinary and multisectoral approach when involving the environment and education sectors with the health sector.
- Community participation as central axis of the control activities.
- Equity in prioritizing rural areas with a majority of indigenous populations in critical poverty and the persistence of malaria.

- Combination of control methods according to the Roll Back Malaria initiative adapted to the local conditions.

Strategies implemented

The project used a combination of control methods that covered all the necessary steps to control malaria, surpassing the practices focused on the use of insecticides for the control of adult mosquitoes (MTE). The methods used are summed up in the table below:

Table 3. Implemented Malaria Control Interventions DDT/PNUMA/GEF/OPS Project. Mexico and Central America, 2004 - 2007.

EFFECT	CONTROL INTERVENTIONS
1. Parasite Elimination	Early diagnoses and prompt and complete treatment
	Compliance of treatment supervision: counselling for complete treatment, graphic prescriptions, direct observed treatment, treatment completeness supervision and blood smear control at the day planned to receive the last doses of treatment (day seven o fourteen).
2. Reservoir Elimination	Single Dose Treatment SDT (In Mexico)
	Treatment for household contacts of malaria cases
3. Contact reduction between humans and vectors	Insecticide impregnated bed nets
	Nets on doors and windows
	Repellent trees
	White washing of houses (painting with lime)
4. Elimination of breeding sites	Physical control of breeding sites: filling and drainage.
	Biological control: native fishes and sporogonic bacteria (in Guatemala, Costa Rica, Nicaragua and Honduras)
	Chemical control: ethoxilated alcohol against *Anopheles albimanus*, (in Mexico)
5. Elimination of vector refuges and reduction of attractors	Cleaning houses and backyards
	Vector refuges elimination on household surroundings
	Personal hygiene promotion

Source: Adapted from Najera *et al* (1992:14)

The countries have made adaptations to the control strategies in terms of conditions, resources and national capabilities, which has helped the replication in diverse scenarios. The characteristics of the control strategy used, coincided with the technical elements of the Global Malaria Control Strategy (WHO 1993) and the Roll Back Malaria initiative (Academia Nazionale dei Lincei. 1998;Alnwick D 2001). These can be summarized in the following aspects:

In Guatemala, where considerable impact was registered, a combination of majority of the strategies showed in Table 3 was implemented. The use of larvae eating fish was evaluated and documented, obtaining a high efficiency and efficacy and allowing the reduction of the periodicity of the malaria cases. In places called “aguadas” (places for watering farm animals and cattle), the frequency of malaria cases in the community was reduced from once every month to once every three months.

Risk approach and focalization of the interventions

The first step of the stratification allowed identifying the towns with higher index of historical transmission and persistent malaria (that were prioritized as demonstration areas of the project). The second step identified the malarious houses (defined as houses with the presence of one or more cases in the last two years) and the repeated cases. The interventions directed to improve the hygiene of houses (cleaning houses and patios and painting houses with lime) and personal hygiene, have been focused on malarious houses. The treatments of malaria cases and family-contacts of malaria patients with Single Dose Treatment (SDT) were also concentrated in the malarious houses. In this way, a more cost-effective intervention was achieved (MTE).

In Guatemala, a new methodology of stratification was developed in order to improve the interventions of Global Fund Project, with success (PO, MTE).

This strategy of stratification was used to focus the interventions to a few localities of high transmission and improve the efficiency and the efficacy of the control strategy. This approach was applied in all demonstration areas, but modifications have been made in some places (MTE).

Opportune diagnosis and prompt treatment

At the preparation phase, early diagnosis and prompt treatment was not considered a priority intervention, but when the Technical Guidelines were formulated (Mendez J, Betanzos A, & Tapia R 2004), there was no agreement on what scheme to use, so each country used its own one.

During the mid term evaluation, one of the problems identified was that several countries used schemes not recommended by PAHO/WHO. Actually, for the year 2004, only Belize and Nicaragua used schemes approved by PAHO: chloroquine for three days and primaquine for 7 days or chloroquine for three days and primaquine for 14 days. The other countries (El Salvador, Costa Rica and Guatemala) used primaquine for less days and with smaller doses. Mexico had been using the single dose treatment (SDT 3x3x3) schemes before 2004 (MTE). Due to the project influence, Guatemala, Honduras and Panama changed their schemes for those recommended by PAHO during 2007 (Ramirez et.al 2008).

There was an important progress in the opportune diagnosis and prompt treatment, especially in Guatemala where in 2004, only 15% of the treated cases went through laboratory diagnostics. The strategy implemented in the participating countries allowed the patients to be treated within the first 24 hours, which is one of the goals of the Roll Back Malaria Initiative (MTE) (Alnwick D 2001).

Locating inhabitants with fever was a central aspect of the strategy that aimed at improving opportunities and coverage of diagnostics and treatment of malaria patients. However, there was no uniformity among the countries over this procedure at the project mid term. Similarly, there were no guidelines on the follow up of treated patients, thus each country had its own policy at project mid term. At the end of the project, all countries adopted the procedure of active search for febrile patients (MTE, PO).

Reservoir Elimination

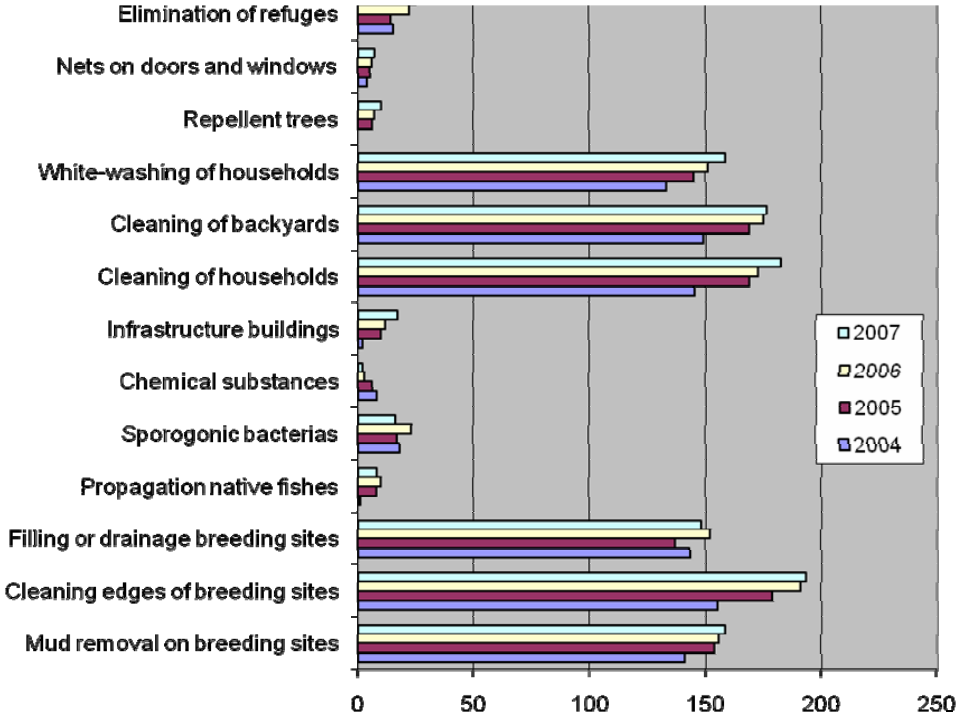
Another important element of the model was the strategy to treat malaria infected patients thus preventing the development of the parasite, particularly of *Plasmodium vivax*. All countries

adopted the strategy of locating and treating symptomatic or asymptomatic cases of malaria in contacts with positive cases, including Mexico (MTE). Mexico had adopted an explicit strategy, Single Doses Treatment (SDT) 3x3x3. Costa Rica modified this strategy and applied it only for one year (2005). Nicaragua implemented SDT as part of a multicentric study to evaluate the efficacy (MTE).

Vector control Interventions

Actions carried out for larvae control were mainly physical means, such as mud removal, cleaning of edges, and filling or drainage of the breeding sites. As biological means, native larvae eating fishes were used extensively; sporogonic bacteria were used in some areas of Nicaragua, Honduras and Panama. In El Salvador, Temefos® granulated chemical was used once in 2005 (Ramirez et. al 2008).

As a means of controlling densities of adult mosquitoes, the localities implemented strategies related to the reduction of mosquito attracts through cleaning of houses and patios and eliminating refuges in surrounding areas. To a lesser degree, whitewashing of houses was performed, nets were installed on doors and windows, and repellent trees were planted. (Ramirez et. al 2008) (Graph 1).



Graph 1. Number of demonstrative localities according to Developed Interventions. DDT/PNUMA/GEF/OPS Project. Mexico and Central America, 2004 - 2007. (N=202)

Component 2. Building Capacity

The project reinforced the national programs of malaria control in the Mesoamerican countries. From 2004 to mid 2008 it maintained a technical training program in epidemiological surveillance, entomology, social participation, participative planning and evaluation of risk factors due to exposure to DDT and other POPs, geographic information systems (GIS) and other technical areas complemented with guidelines and manuals generated by the project's experience (FR).

With resources provided by the project, many documents were edited and published in order to support training, exchange and dissemination programs as part of the strategy to strengthen institutional and communal capabilities for malaria vector control without using DDT. Fifty sets of educational materials were prepared by the participating countries with resources from the regional component (FR).

Through meetings, consultation meetings, and training workshops, it was possible to share information, knowledge and experiences among the countries that facilitated the decision making processes. Reports from the countries recorded 888 meetings, workshops or seminars. These were financed with project resources and held from December 2003 to December 2008. About 75% of these meetings were held at the local level (668 meetings), within or very close to the communities. The rest were held at the regional or national level (Table 7). A total of 21,306 participants were reported to have participated, from which 54% where community personnel (11,459) and the rest institutional personnel, all from the education, environment and health sectors, including municipal mayors and other key stakeholders (FR).

This combination of strategic actions enabled the revitalization of national malaria programs and the placing of malaria issues on the political agendas of the participating countries. The joint action of the health and environment sectors was also a benefit, as well as the performance of other external cooperation projects which were investing in malaria programs supported by the model proposed by this project (FR).

Table 4. Meetings and participants per country. Project DDT/UNEP/GEF/PAHO. 2003-2008

Countries	Num. of meetings	Type of meeting			Level			Num. of participants		Total
		1	2	3	Local	National	Regional	Community	Institutional	
Belize	124	1	17	106	89	35	0	591	676	1267
Costa Rica	28	3	4	21	23	5	0	488	468	956
El Salvador	79	1	2	76	60	19	0	757	721	1478
Guatemala	231	3	47	181	186	45	0	4246	2828	7074
Honduras	63	2	5	56	50	13	0	261	818	1079
Mexico	181	3	29	149	161	20	0	2917	1764	4681
Nicaragua	94	0	16	78	62	32	0	1284	1332	2616
Panama	47	1	5	41	37	10	0	623	305	928
Regional Component	41	27	7	7	0	0	41	292	935	1227
Total	888	41	132	715	668	179	41	11,459	9,847	21,306

Source: Final Evaluation

Does not include meetings of the Steering Committee (5) and the Regional Operational Committee (3)

Type of meeting: (1) Inter-governmental meeting (2) Expert group meeting (3) Training workshop-seminar

The most relevant activities for the development of institutional capabilities were as follows:

Malaria control training

The technical guide was prepared through participation of the countries and PAHO experts. One thousand copies of the guide were printed and distributed to the eight participating countries, to other international events and to the strategic partners of the project. Training courses and workshops have been carried out using the guide's contents.

Strengthening of the capability of toxicology laboratories and environmental studies

The project strengthened capacity of the network of gas chromatography laboratories in Mesoamerica, with technical capability for monitoring and evaluating environmental and health risks due to the exposure of POPs in the region. It was possible to build the Central American laboratories' network. The regional reference laboratories (the Toxicology Laboratory of the University of San Luis Potosí, Mexico and the Regional Institute of Toxicology of the National University of Heredia, Costa Rica), allowed the exchange and development of the inter-laboratory capabilities and the analysis of DDT compounds from soil, sediment, fish and blood (FR) samples.

The laboratories were equipped to develop risk assessments of the exposure to residual DDT. Two national laboratory professionals from each country were trained on gas chromatography and preparation of protocols, site selection and collecting environmental and biological samples. Thus, the personnel was trained for the evaluation of other POPs (FR). Therefore, it was important that the network of laboratories analyzed the samples and prepared the country reports in a reliable manner, which were then used for drafting the report for Mesoamerica and the publication "Environmental Health Risk Assessment of DDT in Mexico and Central American Countries" (FR).

Component 3: elimination of DDT reserves

During the project's PDF phase (2000-2001) it was estimated that the stockpiles of DDT in the eight participating countries were 135 tonnes. In order to have a more accurate assessment of these reserves, an inventory was carried out during the project's first year in co-operation with the national authorities and the ministries of health and environment. The inventory revealed a stockpile of 136.7 tonnes of DDT and 64.5 of other POPs (toxaphene, chlordane HCB, aldrin, dieldrin, and mirex) (Table 5).

Based on the information provided by FAO, 15 specialized companies were invited by PAHO through a public biding to implement the component of elimination of DDT reserves. SEMTREDI was selected and contracted in March 2007 for $ 500,000, in order to repackage, transport and eliminate 200 tonnes of DDT and other POPs, as well as to advise the countries to prepare the transit documents.

On October 2007 60 tonnes of POPs in El Salvador were repackaged and in February 2008, 55 tonnes of DDT in Mexico (FR). In Costa Rica, Guatemala and Panama the DDT reserves were collected, concentrated and stored in places which did not comply with international standards, and in Guatemala, this resulted in a high risk of contamination (PO).

Although attempts were made, it was not possible to export and eliminate the stockpiles of DDT and other POPs. There were many issues that affected the achievement of this component:

- Between July and August 2007 the European Union enacted new regulations in relation to notification and request of transit.
- Weak support of TREDI to advise the countries to prepare transit documents.
- TREDI requested an increase in the contract amount.
- By October 25, 2008 none of the countries had received transit authorization from the European Union. On October 29, 2008, the Program Officer from the United Nations Environment Programme (UNEP/GEF) informed PAHO “that, as of now, it is impossible to import chemical waste to countries of the European Union”.

Therefore, UNEP/GEF and PAHO are analyzing alternatives to adequately solve the implementation of this key component.

Table 5. Regional Program of Action and Demonstration of Sustainable Alternatives to DDT for Malaria Vector Control in Mexico and Central America. Updated Inventory of DDT and other POPs in Mexico and Central America. Update period: June 2004 to August 2005.

Country	Stockpile sites	DDT*												
								Container conditions				Transportability		
		10%	75%	94.20%	100%	Unknown concentration	Subtotal	Good	Minor damages	Major damages	Unknown	Yes	No	Unknown
Belize	1		13.000				13.000			13.000			13.000	
Costa Rica	1	0.028	4.060		4.533		8.621		0.028	8.593		0.028	8.593	
El Salvador	1			4.672			4.672	4.672				4.672		
Guatemala	4				15.058		15.058		0.150	14.907		0.150	14.907	
Honduras	1					3.539	3.539				3.539			3.539
Mexico	53		42.043		45.269		87.312	58.055	13.137	11.385	4.735	71.192	11.385	4.735
Nicaragua	2					0.003	0.003	0.003				0.003		
Panama	1	4.545					4.545	4.545				4.545		
Total	64	4.573	59.103	4.672	64.859	3.541	136.749	67.274	13.316	47.885	8.274	80.590	47.885	8.274
Percentage		3.34%	43.22%	3.42%	47.43%	2.59%		49.20%	9.74%	35.02%	6.05%	58.93%	35.02%	6.05%

Country	Stockpile sites	Other POPs*											
									Container conditions			Transportability	
		Toxaphene	Chlordane	HCB	Aldrin	Dieldrin	Mirex	Subtotal	Good	Minor damages	Major damages	Yes	No
Belize	1						0.008	0.008		0.008		0.008	
Costa Rica**	2					0.120	0.002	0.122		0.002	0.120	0.002	0.120
El Salvador	5	36.636		7.802	1.814			46.252			46.252	13.776	32.476
Guatemala													
Honduras	1		12.490					12.490		12.490		12.490	
Mexico													
Nicaragua**	4	5.640	0.003				0.004	5.647	0.007	5.640		5.647	
Panama													
Total	13	42.276	12.493	7.802	1.814	0.120	0.014	64.519	0.007	18.140	46.372	31.923	32.596
Percentage		65.52%	19.36%	12.09%	2.81%	0.19%	0.02%		0.01%	28.12%	71.87%	49.48%	50.52%

Component 4. Project's management and coordination

The project was implemented by UNEP and executed by the Pan American Health Organization (PAHO) under the overall responsibility of the Director, Division of Health and Environment and Ministries of Health. The UNEP Division of GEF Co-ordination, in association with PAHO, monitored activities undertaken during the execution of the project. The Director, Division of Health and Environment of PAHO was responsible for maintaining systematic overview of the implementation of the project through monthly project monitoring meetings or consultation and preparing to monitor reports.

Regional Coordination provided an accurate and permanent technical communication among those involved in administering, managing and implementing the project, verifying the flow of communication to all participating communities.

Human resources

For the coordination and management of the project, PAHO hired a regional coordinator with office in Guatemala and seven national coordinators (NAPs) located at PAHO's offices in each country (except for Costa Rica, where the duties were undertaken by an international consultant form SDE/PAHO upon decision from the national authorities). Each country had a national focal point for this project, appointed by the executing ministry.

NAPs solved the effects derived from the instability from institutional national focal points and provided continuity to the project. They also provided technical cooperation to the countries to develop community participation, harmonize the linkage between institutions, and supervise, implement and evaluate the demonstration projects in their respective countries. The project organizations; Ministries of Health and the Environment in the Region benefited from the influence, leadership and infrastructure of PAHO (FR).

The regional coordinator was located in the headquarters of the Institute of Nutrition of Central America and Panama (INCAP) PAHO's centre located in Guatemala. Regional management was based on the principles of management and development of administration, focusing on organization, planning, execution, monitoring, and evaluation. Management was highly participatory and inclusive, prioritizing joint decisions with the highest degree of consensus among the eight countries (FR).

Organization of the project's coordination and management process

The project was organized in five levels of coordination and management:

1. *The Steering Committee* was the highest body of the project and met five times to approve working plans of the countries and other duties to ensure the project's success. Every significant change to programs and budget were approved at this level (FR).

2. *The Regional Committee* was composed of the Regional Coordinator, the focal points from health and environment ministries, the national coordinators, PAHO, CEC, CCAD, and members of the civil society in the demonstration projects. This Committee met three times; in Mexico (24-28 May 2004), Costa Rica (12-14 September 2005) and Panama (25-27 April 2006) in order to be informed of the project's progress, to propose technical adjustments and to exchange experiences (FR).

3. In all countries, *National Operational Committees* were organized under the leadership of the Ministries of Health and PAHO, with participation of the ministries of the environment,

universities, and institutions. The operational committees met at least six times a year to reach agreements in the project's operations in each country (FR).

4. The *demonstration area groups* operated in each country close to the demonstration projects and were formed by the national coordinator, the health focal point representing each governmental administrative unit (departments, districts and municipalities), environment, education and other sectors at the local level, representatives from NGOs, and the civil society involved in the project DDT/GEF/PAHO (FR).

5. Community w*orking groups* were organized in all demonstration areas, taking advantage of current structures in order to avoid creating parallel organizations. In addition malaria volunteer collaborators (COLVOL) were involved in all countries (FR).

3.1.2. Relevance

The project's relevance was rated as "*highly satisfactory*", because the results were coherent with the strategies used (Table 9). The project did not only contribute towards bringing down the use of DDT and other POPs, but also reduced the use of other insecticides. Moreover, the project contributed to achieving the Millennium Development Goals (MDG), and the Roll Back Malaria goals.

Most of the interviewees thought that *the results of the project were "completely" consistent with the specific strategies used in the project* (Annex 2, Table 2, question A8); objective 3 was the only one for which the strategy was seen as weak (A8GN). Only in the Chiapas State (Mexico) and Matina (Costa Rica), the results were considered as "*partially relevant*". Most of the interviewees considered the malaria control strategy as having been validated in practice and can be replicated in other areas.

One of the more controversial aspects of the project was the single dose' treatment (SDT, TDU in Spanish) used in Mexico which aimed at eliminating the reservoir of plasmodium (see the rationale of this intervention in Mid Term Evaluation report). At the state- and local levels, people interviewed thought that it was necessary to make changes because it was difficult to carry SDT in a high migration zone. Moreover, studies carried out in Mexico to compare the efficiency of SDT with radical treatment of 3 days of chloroquine and 14 of primaquine showed, in an initial report, that the radical treatment presented fewer cases of repeated malaria than SDT (A8ME).

Integral vector control with the elimination of habitats (refugees) and mosquito breeding sites (EHCA in Spanish) was a highly valued strategy by all actors in this evaluation and in others performed previously. At the beginning of the project, there was no published evidence of the impact of this strategy, but studies made in Mexico showed that the impact of the elimination of mosquito breeds (clean house, clean garden) in malaria transmission is considerable. Additionally this strategy has high compliance among the community and families and considerable impact on other health problems (A8ME).

All people interviewed remarked the efficiency of the strategy used of involving the community in malaria control (A8PB). A study carried out in Panama about the relation between culture and malaria control revealed the fact that when people understood the links of breeding sites, vectors and malaria, a behavioural change occurred with better compliance and participation of indigenous communities in diagnostic, treatment and vector control (Salinas V & Narváez A 2009).

Only in one country did the interviewees think that *the results of the project were "partially consistent" with country priorities*; in all other countries they were seen as "*completely consistent*" (Annex 2, Table 2, question A9). The project was concentrated in towns in which malaria was persistent; therefore, all the interviewees considered malaria a priority (PO).

A significant issue that weakens the efforts of malaria control in Mesoamerica, and in the case of Mexico, the aims of eliminating malaria, is that dengue fewer is seen as a more significant risk since it is endemic in economically important tourist areas and because explosive outbreaks of hemorrhagic dengue are prevalent (A9ME).

The question *"To which extent the results of the project contributed to the Operational Program of elimination of the use of Organic Persistent Pesticides (POPs)?*" was only made in regional, national and provincial levels. Almost half of the interviewees answered that the contribution of the project to the elimination of the pesticides was "*partial*", the rest answered "*completely*" (Annex 2, Table 2, question A10). The project reinforced the determination of the countries of not using DDT or other POPs (A10R, A10CRN). Guatemala and Costa Rica signed the Stockholm Agreement (A10GI).

3.1.3. Efficiency

According to the interviewees, the project efficiency was rated as "*satisfactory*". Payment of NAP, workshops, meetings, supervision and community support represented the highest amount of the total investment. There was no investment in human resources because the project employed existing structures and resources.

Most of the interviews assessed *the project as completely cost-effective* (Annex 2, Table 3, question A11). The general agreement among the civil servants and health workers, who had experience using insecticides for control of malaria vectors, was that the cost-effectiveness of the strategy was superior to spraying (OP, A11CRN). On the other hand, community participation could be expensive at the early stage, but the costs would diminish during the course of the intervention (A11PB).

As part of project activities, a study on cost effectiveness of the project strategy was carried out in demonstration areas in El Salvador, Honduras and Nicaragua (4). This study showed that implementing methods of vector control activities through community mobilization (cleaning houses and patios, control of mosquito refugees and breeding sites) were cost-effective, resulting in savings. The costs per malaria case in the three countries studied during the two years of intervention were highest in Nicaragua, but the costs per case prevented were also lowest in this country.

Table 6. Costs and cost effectiveness of interventions of the GEF-DDT project.

Indicators	El Salvador	Honduras	Nicaragua
Population at risk in study place	100,28	1,469	13,003
Program costs 2005-2007 (USD$)	133.680	24,878	287,430
Program costs 2005-2007 ($ internationals)	289,376	68,894	845,308
Costs/person 2005-2007 (USD$)	13	17	22
Costs/person 2005-2007 ($ internationals)	29	47	65
Cases averted	26	8	19
Costs/(saving) per case averted (USD$)	(0,40)	(0,64)	0,003
Costs/(saving) per case averted ($ internationals)	(0,79)	(1,51)	0,008
DALYs averted /100000 persons	6	269	5
Costs/(saving) per DALYs averted (USD$)	(1,72)	(0,02)	0,01
Costs/(Saving) per DALYs averted ($ internacional	(3,43)	(0,04)	0,03
DALYs averted /1,000 persons	0,6	2,69	0,5
Costs/ (saving) per DALYs averted /1000 persons (USD$)	(17,22)	(1,90)	(44,10)
Cost/(saving) DALYs averted /1000 persons ($ internacional)	(34,33)	(4,48)	(129,71)

* For the estimated cost-effectiveness assume that happen 5% of complicated cases in the three countries and 5% of fatalities in Nicaragua and Honduras.

The majority of the interviewees thought that *the project was the least cost option. Only in the communities of Mexico*, was the project assessed as "*partially efficient*" (Question A12). Although there were delays in disbursements during the first two years, the majority of interviewees thought that *the project delay did not affect cost-effectiveness* (Question A13). There was good capacity for execution of the project (A13PN), because many activities were done with little money (A13PB).

The interviewees from national levels of three countries and Chiapas's State in Mexico thought that the delays in the project partially affected cost-effectiveness. In Mexico, the project suffered from interruptions due to the delays (A13MN). In Panama, delays affected the confidence of local actors (A13CRN), the credibility of external actors and breached the agreements with the communities, particularly concerning the planned interchanges' trips (A13PN).

Majority of the locations were highly successful in obtaining additional resources. However, in few locations, obtaining additional resources was partially successful (Annex 2, Table 3, question A14). In fact, many alliances were made, which facilitated the mobilization of additional funds from: PAHO, the National Governments, the Sanitary Districts, the Municipalities, communities, NGOs, private companies and churches (A14R). Impregnated bed nets and funds were obtained from the Global Fund and NGOs to extend the strategy to other localities (A14GI).

The Malaria Control Programs contributed to infrastructure, human resources and transport (A14MN). In Mexico, the National Institute of Health contributed funds to the study of relapses and efficiency of the SDT (A14BMN). Municipalities assigned resources (A14CRN) for the purchase of lime, tools, pipes for drainage (A14GF, A14GM) and machinery (A14B-R). (A14MN). They also hired staff to clean and control the mosquito breeding sites (A14PN), and to build permanent infrastructure for the drainage of the breeding sites (A14GN).

3.2. Assessment of sustainability of project outcomes

In this evaluation sustainability is understood as the probability of continued long-term project-derived outcomes and impacts after the GEF project funding ends. Four aspects of sustainability were addressed: financial, socio-political, institutional frameworks and governance, and ecological.

The general evaluation of sustainability is *"likely"*. The influence of hurricanes and tropical storms, the reduction of financial resources due to the global crisis and the high level of migration in frontier areas, are factors that the actors consider might affect the sustainability of the project in the medium term. In summary, although the evaluation rates sustainability as likely, there are places with high vulnerability.

Financial, socio-political and ecological sustainability obtained a "*likely"* rating, where as the ratings for institutional sustainability were "*highly likely*". Panama received the lowest score in financial sustainability. Regarding ecological sustainability, all countries with an exception of Panama, recognised that the influence of hurricanes, tropical storms or flows could undermine the sustainability of benefits after the project ends.

Other important factors that contributed to the project's sustainability were: I) the high perception of success achieved during the implementation of the project, demonstrated by a marked reduction in malaria cases; the rapid adherence of the countries to the project's objectives, which was achieved through participation in the design, execution, implementation, monitoring and final evaluation phases, ii) the strategy which prioritized vector elimination during its immature phases through low-cost techniques independent of external resources. Community interventions for vector control were adopted by most of the demonstration communities, iii) costs for the state, community and other key stakeholders were lower due to the targeting strategy used, as well as the selective interventions, and the community contribution, which could have accounted for a reduction of more than 50% to that of operational costs using chemical substances, iv) the trans-disciplinary, inter-sector and intercultural approach of the project with participation of the municipalities, indigenous organization and researchers were maintained throughout interventions (Narvaez A 2008).

Table 7. Evaluation of sustainability of the project outcomes. Final Evaluation. Mesoamerica 2008-2009.

PLACE	Sustainability	B.1. Financial	B.2. Socio-political	B.3. Institutional frameworks and governance	B.4. Ecological
TOTAL	**L (5,0)**	**L (4,8)**	**L (5,1)**	**HL (5,5)**	**L 4,64**
Regional	**ML (4,3)**	**L (4,5)**	**L (5, 0)**	**L (4,5)**	**MU (3,0)**
Mexico Total	**L (4,9)**	**L (4,5)**	**L (4,5)**	**HL (6)**	**L (4,5)**
National	L (5,1)	L (5,3)	ML (4,0)	HL (6)	L (5,0)
Chiapas State	L (4,5)	ML (3,8)	MU (3,0)	HL (6)	L (5,0)
Neguatzotcoyol community	L (4,8)	L (4,5)	L (5,0)	HL (6)	MU (3,0)
Nueva Macedonia community	L (5,1)	L (4,5)	HL (6)	HL (6)	MU (3,0)
Guatemala Total	**L (5,3)**	**HL (5,6)**	**HL (5,6)**	**L (5,3)**	**L (4,6)**
National	L (5,4)	L (5,3)	HL (6)	HL (6)	ML (4,0)
Peten Department	HL (5,6)	HL (6)	HL (6)	L (4,5)	HL (6)
Ixacan Department	L (5,4)	HL (6)	HL (6)	L (4,5)	L (5)
La Felicidad Community	L (5,1)	L (5,3)	L (5,0)	HL (6)	MU (3,0)
Sta. Maria Dolores Community	L (5,1)	L (5,3)	L (5,0)	HL (6)	MU (3,0)
Costa Rica Total	**L (4,9)**	**L (5,3)**	**L (4,3)**	**L (4,8)**	**ML (5,1)**
National	L (4,1)	ML (3,8)	MU (3,0)	L (5,25)	ML (4,0)
Talamanca Municipality	L (5,4)	HL (6)	L (5,0)	L (4,5)	HL (6)
Matina Community	L (5,4)	HL (6)	L (5,0)	L (4,5)	HL (6)
Panama Total	**L (5,3)**	**ML (4,3)**	**HL (5,8)**	**HL (5,8)**	**HL (5,6)**
National	L (5,6)	L (4,5)	HL (6)	HL (6)	HL (6)
Bocas Province	L (5,1)	ML (3,8)	HL (6)	HL (6)	L (5,0)
Puente Blanco Community	L (4,8)	L (4,5)	L (5,0)	L (4,5)	HL (6)
Las Tablas Community	L (5,4)	L (4,5)	HL (6)	HL (6)	HL (6)

Highly Likely (HL)	Likely (L)	Moderately Likely (ML)	Moderately unlikely (MU)	Unlikely (U)
5,5 to 6	4,5 to 5,4	3,5 to 4,4	2,5 to 3,4	0 to 2,5

Comment [p4]: 2,4?

3.2.1. Financial sustainability

Financial sustainability was evaluated as "highly *likely*" in Guatemala, "*likely*" on the regional level, Mexico and Costa Rica and "*moderately likely*" in Panama. Although it does not diminish the influence of the global crisis, it was considered that the budget that was assigned for next years should not change significantly from what will be needed to support the reached achievements.

Regarding the question *to what extent are the outcomes of the project not dependent on continued financial support*, 8 of the 17 locations stated "*partly not dependent*". The other locations stated that the project was "*completely not dependent*" on financial support (Annex 2, Table 4, question B1). In several municipalities, specific funds have been destined for the control of malaria and dengue, as alliances with Global Fund projects in Nicaragua, Honduras and Guatemala (B1R).

In Guatemala, Panama and Costa Rica, the strategies continued without finances from the project for the last 6 months of the year 2008. The community continued with the malaria interventions because it was a habit that they had already adopted (B1GM). The floods in September 2008 and January 2009 were a test of sustainability, which indicated that the ending of the project will not affect the continuation of the strategies considerably. It could have some affect regarding the follow-ups of the communities and the quality of the interventions at local level (B1GN).

Regarding *the likelihood that any required financial and economic resources will be available to sustain the project outcomes/benefits once the GEF assistance ends,* the interviewees from nine locations considered the likelihood to be "*partial*", where as the rest considered it to be "*completely likely*" (Annex 2, Table 4, question B2). In all of the four countries evaluated, there are funds (partially or totally) to give continuity to the interventions and to assure the sustainability of the results reached by the project. The major suppliers of funds will be the Ministries of Health, the municipalities, Global Fund (GF) in Nicaragua, Guatemala and Honduras (B2R, B2CRM). The municipalities have included malaria in their regular budgets in almost all of the countries (B2CRT, B2GF, B2GM).

A probable financial source is the Mesoamerican Health System (Plan Puebla Panama Initiative), which will be financed by the Foundations of Bill and Melinda Gates and Carson, in order to eliminate malaria in Mexico and Central America (B2MN). Due to the high impact reached in Guatemala, there is a possibility of obtaining a third phase from the Global Fund projects (B2GP, B2GI) and a proposal for 9th round has been prepared with an aim of replicating the model at national level (B2GN).

In eleven places (from 17) the interviewees considered that *the project was successful in identifying and leveraging co-financing* (Annex 2, Table 4, question B3). However in all locations of Mexico and in two of Panama, the interviewees considered that the project was partially successful (B3MNEG, B3MNM). (See Annex 2, Table 4, question B3). Besides of PAHO, the Ministries of Health and municipalities offered a great contribution. In general, there was an increase in the budget for malaria control by governments (B8MN) in all of the project countries. In Nicaragua, Guatemala and Honduras the project was financed by Global Fund Projects. In Panama, Nicaragua and Costa Rica also private industries financed activities and human resources (B3R).

All interviewees thought that several long term impacts resulted from the project (completely score) (See Annex 2, Table 4, question B3). They are listed in the following paragraphs:

- Implementation of laboratories for toxicological studies, development of research capacity, and monitoring the impact of POPs on environment and human health (B4R).
- The pre -elimination phase of malaria transmission was achieved in Mexico, El Salvador, and Costa Rica (B4CRM), maintaining malaria case reduction tendency in Mexico and Salvador (B4R, B4ME) B4MNM B4MNEG. There is a high probability of reaching the pre-elimination phase in Guatemala and Nicaragua over the next 3 to 4 years (B4GP, B4GI, B4PT).
- Strengthening of the regulatory role of Ministries of Health (B4CRN) and vector control programs (B4MN).

- Strengthening of the local capability to carry out research and epidemiological surveillance of malaria (B4CRN). GIS´s use for malaria surveillance and study of pesticides (B4GN).
- Reduction in pesticides used (B4GN).
- Malaria reduction could have an important impact on improving health conditions and reducing poverty, allowing families to improve the quality of life (B4GM).
- Awareness and community participation in environmental conservation.
- Empowering communities and building their capacity on claiming and negotiating in order to resolve other health problems, such as lack of latrines and roads.

3.2.2. Socio political sustainability

Respondents of nearly half of the locations (8 / 17) stated *that the outcomes of the project are not dependent of socio-political factors.* (Annex 2, Table 5, Question B5). At regional and national levels of Mexico and Costa Rica, it was believed that sustainability could be affected partially by socio-political factors such as presidential elections (2009), which may cause a change in public health policies and health authorities. At the regional level, political instability, expressed as constant changes in government, is identified as the main threat for sustainability and a cause of failure in achieving planned objectives. Changes in national/central governments that imply changes at the local level were perceived as a threat/menace to the stability of employment.

The global economic crisis was identified by respondents as a negative issue; a good example is the bankruptcy of the shipping companies as an additional factor that delays the elimination of stockpiles of DDT and other POP's (B5R).

In Guatemala, the general opinion was that as the strategy is based on health promotion, the outcomes and impacts will probably be independent of changes in government. Nevertheless, such changes may modify the implementation of strategy in other places /regions (B5GN). In Panama, interviewees' opinions were that political changes will not affect the implementation strategy due to the existence of a defined budget for vector control (a budget reduction for the control of malaria is not considered) (B5PB). People working in vector control have job stability and awareness about the subject, and they continue attending meetings even after the project finishes. Moreover, it is hoped that the new government's policies are still the same, especially on issues of citizen participation.

In Mexico, because of the change in mayors, the connections with municipalities were interrupted. Changes in high level authorities in the National Institute of Health affected the national program since the new managers had different perceptions and policies. (B5ME).

It is believed that internal migration is also a threat (B5MN). There are some communities which are transit areas for emigrants to United States. These immigrants pose a risk of reintroduction of cases into areas that are malaria free (B5MNEG).

The opinion of Costa Rica and Mexico was that the changes in municipal authorities will partially affect the local levels. Even though, they believe that the existence of career civil servants would guarantee the continuity of the process. Furthermore, at the municipal level of Costa Rica, there are committees or commissions that have a statutory obligation or commitment (B5CRT) and do not depend on the mayor (B5CRM, B5GF, B5GM).

In most locations (14/17), the interviewees considered that *the level of stakeholder ownership will allow to sustain the project outcomes/benefits completely* (Annex 2, Table 5, Question B6). However, at the regional level, the level of stakeholder ownership is considered to sustain the project outcomes/benefits only partially. At the regional level it was

considered that five more years is required in order to achieve real sustainability. Currently, *"there is a high level of adherence to the strategy on behalf of parents and children who will apply the strategy for the rest of their lives because they saw the changes and the benefits*" However monitoring is required. Mayors and municipal governments joined the strategy and there is high probability that political will would be maintained under community demands. Support by the technical level of public institutions is lower (B6R).

"If you keep on track for five years, there will be no decrease in the use of DDT, but must be achieved to eliminate stockpiles. The commitment of technical workers in public institutions is inferior, and is related to the time they will stay in determinate job position. If monitoring/assessment is maintaining, there will be no decrease in the use of DDT, but stockpiles must be eliminated" (B6R).

In Mexico, a high adhesion by the community to the model has been demonstrated, but environmental conditions and a few social factors (migration) are unfavourable (B6MNEG). The lack of empowerment and training (B6MN) among workers and the size of the territory that exceeds the capabilities of workers are aspects that limit continuity. The existing resources are sufficient to maintain a low number of cases, but it is still difficult to eliminate malaria (B6MN).

Community involvement in countries was very variable. In some places, there was broad participation, but in others it was quite limited. For example, in Mexico in the Zapatista area (Chiapas) the population seemed to be more reluctant to participate because of the rejection by the government (B6MN). In addition, a subsidy program called "Community Opportunities", weakened community participation, because of the sabotage of its authorities. (B6ME)

In Guatemala, it is believed that the strategy has been integrated only into 25% of the population (B6GF, B6GM). With the change of government and the new authorities, they might have to start from the beginning at the national level. However this would not be the case at the community level, which will be the first to assert and enforce support if the malaria cases increase (B6PN). Empowerment among health care workers was good, but the project has not been able to incorporate personnel from other places that are distant from the demonstration areas. (B6PB)

In Guatemala, Panama and Costa Rica the level of empowerment of health workers and communities and their capacity to respond to natural disasters was tested in the recent floods. The level of organization and collective hard work was high in order to eliminate rubble and repair the damages in public places. Each family was responsible for maintaining their houses and yards clean (B6PPB, B6PT).

The majority of interviewees (14/17) *thought that there was sufficient (completely) public/stakeholder awareness in support for the term objectives of the project* (Annex 2, Table 5, question B7). Only in the national and state levels of Mexico and national level of Costa Rica, the stakeholder awareness was partially sufficient. At the regional level, awareness in demonstration areas of the use of insecticides was high, particularly in indigenous areas because of their holistic concept to protect the ecosystems (B7R). In Guatemala and Panama, high levels of sensitivity and awareness of communities and stakeholders was reported (B7PB, B7GN). *"They know, accept and participate (B7PN) thanks to work in every house"* (B7PPB, B7PT).

In Costa Rica, the base line survey revealed that people had not been empowered about malaria and the use of DDT. Although there were no other surveys done, the situation itself, according to the interviewees, changed (B7CRN), and the awareness is now high especially in the municipalities and communities (B7CRT). Nevertheless, nowadays there is social

pressure to use insecticides for other problems as dengue (B7CRN), which is a risk to reintroduce POPs for vector control.

3.2.3. Institutional framework and governance

Institutional framework and governance was rated as "*highly satisfactory*" in 13 localities evaluated, with the exception of a locality in Panama, two localities in Guatemala and one in Mexico, where the parameter was rated as "*partially satisfactory*".

The majority of the interviewees (14/17) thought that there were *issues relating to institutional frameworks and governance that favoured completely the extent of the outcomes of the project* (Annex 2, Table 6, question B8). Only the regional level and two departments of Guatemala considered it as "*partial*". The malaria control strategy integrated and strengthened several policies such as the Millennium Development Goals, the social and community participation (B8MNEG, B8CRN), decentralization, protection of individual rights (B8ME), intersectoral coordination (B8PB, B8PT, B8CRT), and promotion of healthy schools and healthy municipalities (B8GN).

In seven of 17 places the answer to the question of *the likelihood that institutional and technical achievements, legal frameworks, policies and governance structures and processes will allow for, the project outcomes/benefits to be sustained* was "*completely likely*'. In the Regional level, all levels of Costa Rica rated the aspect as "*partially likely*" (See Annex 2, Table 6, question B9).

According to the regional interviewees there was initial resistance to the new strategy and it required more than one year of work for the Ministries to join (B9R). The strategy was a clash against tradition, so that during the first implementation phase, the execution was not smooth, but the project reversed this problem. In some countries, there was rapid change and the practice spread to other areas (B9R).

In several countries the decentralization process carried out during the 1990´s, weakened the malaria control programs, but the program were, however passed (B9MN). The project reinforced malaria control programs despite their structure, because the local committees have joined the Ministry of Health structures and specially at the vector control programs, taking advantage of the technical experience and the structure that remain from the vector elimination program.

In Mexico, a specialized semi autonomous structure of the program still prevails, but the integration with the general health services is good (PO). In Panama, the specialized structure persists, but because of the health service's decentralization process (began in 1996), the Malaria Control Program (MCP) disappeared and the old structure was weakened because the retired vector workers were not replaced. Through the project, the integration of the MCP to the general health services is being reinforced.

In Guatemala, the vector control structure persists, but it is under the Health Regional Chief´s leadership. It can be qualified as an integrated structure, but it is not a horizontal structure yet.

Costa Rica had the most decentralized intervention. There was no parallel or independent structure for vector control, so the area chief was, at the same time, responsible of the preventive activities. The area has a multidisciplinary team, with director, epidemiologists, teacher and also vector inspectors who work in the communities. There was some coordination between the general health services and the health staff.

In majority of the locations (8/9) the interviewees thought that *there is a complete likelihood that institutional and technical achievements, legal frameworks, policies and governance structures and processes will allow for, the project outcomes/benefits to be sustained* (Annex 2, Table 6, question B10).

In Mexico, the model has been adopted to the entire country (B10MN). Nicaragua, Guatemala, El Salvador, Honduras and Panama reviewed national guidelines for malaria control taking as reference the Technical Guide of the Project (OP, B10GP). All countries have ascertained that they will not use DDT for Public Health. There were changes in treatment patterns and structures of community participation (B10R).

All the interviewees considered that *the systems for accountability and transparency and the required technical know-how were completely in place* (Annex 2, Table 6, question B11). PAHO has a strict management system control of funds to ensure transparency and proper resource management (B11GN, B11PB, B11CRN, B11CRT). In PAHO headquarters and in each country level PAHO´s agencies have internal and external audit mechanisms (B11R). It is difficult to deviate from resources because the audit mechanisms are strict.

Only in Guatemala, did the community delegates' participate in planning, implementation and auditing of funds, through a committee called “table of health”· (B11GI). In other countries, the community participation in the audits was weak (PO).

3.2.4. Environmental sustainability

The aspect that was considered to affect sustainability the most was the presence of hurricanes, tropical storms and floods, which are frequent in the demonstrative areas. Nevertheless, in Guatemala, Costa Rica and Panama the health service and the communities reacted very well against the effects of tropical storms that occurred at the end of 2008. By January 2009 no outbreaks or epidemics had occurred and the threats were controlled without the use of any kind of insecticides (B12R, B12PB).

In more than half of the places the interviewees (9/17) noted that *there will be no environmental risks that can undermine the future flow of the project's environmental benefits* (Annex 2, Table 7, question B12). In all places in Mexico and, in two places in Guatemala the opinion was that the impact of these climate phenomena will be partial. At the national level of Costa Rica, the opinion was that the impact will be severe (score= 0).

In seven of the nine places studied, the interviewees considered that *there are no risks to the ecological sustainability of this project* (Annex 2, Table 7, question B13). According to the regional level, if the elimination of DDT is not completed, there is a risk of re-use in case of epidemics (B13R).

Generally, *activities that have become threats to the project are not identified* (Annex 2, Table 7, question B14). The regional level confirms that failure to complete the component 3 is a threat, which would take out merit from the project (B14R).

3.2.5. Suggestions for long term impact

The interviewees made the following suggestions *to improve future impacts of the project at regional or country level* (question B15). It is important to find new funds to support a new small project (one million U.S. dollars); in order to develop unexpected needs such as laboratories, disseminate research, to maintain the monitoring of communities, to replicate the experience, and to generate valid scientific evidence (B15CR, B15PB), which not only

ensures the sustainability, but would also help to eliminate malaria in Mesoamerica (B15R, B15ME, B15GI). The regional level suggests that it is necessary to find mechanisms to disseminate the achievements and experiences widely in the region and beyond (B15R).

Another way to ensure sustainability is to strengthen the health system, including the information system, operational research and the formulation of a strategic plan to improve efficiency and effectiveness. (B15MN).

The best channels and means to ensure the long-term impact (question B16) are to maintain the partnership between PAHO, Ministries, Municipalities, communities, universities and collaborating centres (B16R). The creation of the Mesoamerican Health System Initiative (Rodriguez M 2009) is a potential means to sustain these partnerships (one of its work areas is the vector control) (B16R).

It is necessary to find the mechanisms to ensure sustainable community participation (B16MN). One of the prospective ways of obtaining such participation is to insert the malaria control project in the broader multi-purpose development projects (B16PN). It is also necessary to address nutritional problems and high mortality from preventable diseases (B16PN). In indigenous areas, it is necessary to strengthen an intercultural approach, for instance, to motivate health workers to speak native languages and to produce educational materials in these languages (B16PN).

There were several limitations to evaluate the impact of the project. Although there is an evaluation chapter in the Technical Guide, the methodology that was to be used to evaluate the impact was not clearly defined. After mid term evaluation, a protocol was formulated and during 2008 a retrospective study was carried out. However, a problem occurred concerning the selection of control localities in each of the participating countries. The condition for the appropriate selection of control localities is that they share similar characteristics as the demonstration communities but should not be placed near them. Unfortunately, these kinds of localities could not be found because the vector workers have the same areas of influence and the project control strategy was replicated in these communities, so they were not real control localities.

An alternative to solve the lack of control locations in the impact assessment study could be to maintain several communities where it would be continued to record cases as demonstration sites (question B17). Nicaragua, Guatemala, El Salvador and Mexico have good epidemiological surveillance systems to achieve this objective. In other countries, it is necessary to strengthen surveillance systems (B17R, B17CRN, B17GI).

3.3. Catalytic role

Catalytic role was one of the key evaluation parameters with major success. It was rated as "*highly satisfactory*"; since there was an extension of the interventions to other neighbouring localities and municipalities due to an initiative of the community leaders and health workers. Only in México one locality had not replicated the model to other communities. In Mexico, Guatemala, Nicaragua and Honduras the replication was very extensive. In the last three countries there were alliances with the Global Fund Projects and other projects.

Table 8. Evaluation of Catalytic Role. Final Evaluation. Mesoamerica 2008-2009.

PLACE	Score of Catalytic Role
TOTAL	HS (5,5)

Regional	**HS (6,0)**
Mexico Total	**HS (5,5)**
National	HS (6,0)
Chiapas State	HS (6,0)
Neguatzotcoyol community	MU (3,0)
Nueva Macedonia community	HS (6,0)
Guatemala Total	**HS (5,6)**
National	HS (6,0)
Peten Department	HS (6,0)
Ixacan Department	HS (6,0)
La Felicidad community	S (4,5)
Sta. Maria Dolores community	S (4,5)
Costa Rica Total	**HS (5,4)**
National	S (4,5)
Talamanca Municipality	HS (6,0)
Matina community	HS (6,0)
Panama Total	**HS (5,3)**
National	HS (5,3)
Bocas Province	S (4,5)
Puente Blanco community	HS (6,0)
Las Tablas community	HS (6,0)

Health workers and community leaders spontaneously replicated the strategy in other neighbouring areas (Annex 2, Table 8, question C1). Although most countries replicated the strategy in several locations, it is important to highlight the extent of these replicas in Panama (C1PB, C1PPB, C1PT). There were only two communities (one in Mexico and one in Guatemala) in which the leaders did not replicate the strategy in other localities, but malaria workers did it. Partial replication was performed in only one in Panama.

Comment [p5]: One community?

Currently, with the exception of Belize, the model has been applied by all countries in other endemic areas (C1R, C1CRN, C1CRT). Nicaragua, Honduras and Guatemala are using this model in the areas of intervention of the Global Fund Projects. Guatemala is the country with most replicas (600 towns) (C1PN).

The impacts of these replicas have reduced malaria cases in all communities of the demonstration areas (C2R, C2CRN) and in the case of Guatemala, in the whole country. The main effect is that the involved institutions have adopted the strategy and methodology, specially the approach to work with the community and environment as main axes (C2R, C2CRN). In all countries, the demonstration areas are an example of a successful experience (question C2).

Only one community in Mexico responded that *there were no lessons or experiences applied in other areas* (Annex 2, Table 8, question C3). The rest of interviewees answered that this aspect was "*completely*" fulfilled.

The project strategy was extended to Andean countries. In the frame of the PAMAFRO Project, supported by Global Fund, a mission from Mexico presented the model and shared experiences in the Andean Area (C3R). The author of this evaluation also applied the model in Ecuador with success (Narváez A & Cañas M 2007). PAHO is implementing the model in Veraguas-Panama in the frame of the project "Faces, voices and places" (C3PN).

Concerning the question *are there lessons or experiences that have been developed as results of the project that can be replied or extended to other places or to the design and implementation of other projects,* all the interviewees answered "*completely*" (Annex 2, Table 8, question C5). In fact, experiences from this project could be applied in other projects, for example:

- An education experience with puppets in Costa Rica and El Salvador (C5CRM)
- The strategy of community participation and a variety of activities of social sensitization (C5CRT)
- The intercultural approach for indigenous and afro descendent populations, adapted in each country (C5GN). An interviewee says: *"When we go to some areas with our ideas to impose them, it does not work. Here we started with a different approach: we made meetings where the people prioritized their health problems and took advantage of the popular conception that malaria is an illness that affects normal day work. This makes a difference with other projects that want to impose, because in this project we let people choose what to do. Knowledge is not useful if the community does not participate and is not aware of what they are doing"* (C5PB).

3.4. Achievement of outputs and activities

The achievement of outputs and activities obtained a "*satisfactory*" rating at the overall level. Only at the regional level, the rating was "*moderately satisfactory*" because it was not possible to eliminate the existing DDT stockpiles (30% of implementation), Belize did not carry out the risk assessment, and two activities of component were not implemented (Anexx 4). At the national level of Costa Rica, the component was rated as "*moderately unsatisfactory*", because the accomplishment of the four criteria formulated to evaluate this component was partial.

Table 9. Evaluation of Achievement of outputs and activities. Final Evaluation. Mesoamerica 2008-2009.

PLACE	Score of Achievement of outputs
TOTAL	**S (5,4)**
REGIONAL	**MS (3,8)**
MEXICO TOTAL	**S (5,4)**
National	S (5,3)
Chiapas State	S (5,3)
Negualzotcoyol Community .	S (5,0)
Nueva Macedonia Community	HS (6)
GUATEMALA TOTAL	**HS (5,8)**
National	S (5,3)
Peten Department	S (6)
Ixacan Department	S (6)
La Felicidad Community	S (6)
Sta. Maria Dolores Community	S (6)
COSTA RICA TOTAL	**S (4,9)**
National	MU (3,0)
Talamanca	HS (6)
Matina Community	HS (6)
PANAMA TOTAL	**HS (6)**
National	HS (6)
Bocas del Toro Province	HS (6)
Puente Blanco Community	HS (6)
Las Tablas Community	HS (6)

Interviewees from regional level, Costa Rica national level and a Mexican community qualified the <u>*soundness and effectiveness of the methodologies*</u> as "*partially satisfactory*". The rest rated this parameter as "*completely satisfactory*" (Annex 2, Table 9, question D1). According to some interviewees the effectiveness and soundness of the methodologies used to develop the actions were satisfactory in the components 1, 2 and 4, but not in objective 3, related to the elimination of DDT stock piles (D1CRM, D1GN). The methodological structure of the implementation was proper and allowed a follow-up methodology in operative actions and expected results (D1MN).

The methodology used and the impact achieved in objective 1 has already been extensively explained in previous paragraphs. An interviewee said "*the methodology is satisfactory, because before health workers used to think only in fumigating and giving treatment, but did not educate people. Now, the most important is the education to change behaviours and control breeding sites without chemicals"* (D1GI), *"…the key was not imposing, but interacting"* (D1PN).

The organization of working groups at community level and at higher levels was another important aspect. One or more leaders were trained and they expanded the knowledge to their working group or to the Health Committee. "*They went to talk to every family. Families*

received a lot of support from vector workers through lectures and advise on what to do in each case "(D1PPB).

It should be noted that both, the Single Dose Treatment (SDT), and whitewashing of homes, were not supported by scientific evidence. The last intervention was strongly welcomed by the community in all countries where it was implemented. In the case of SDT, the evaluation carried out in Mexico showed less effectiveness in reducing relapse compared to radical treatment (Cerón L 2009).

Organization of the project execution in phases was also a success. The first phase was to validate the model in practice. During second extension, research and documentation were prioritized, although there was not enough time to complete all the activities planned (D1CRN).

Organizing the operative committees at regional, national and demonstrative areas under objective 4 was rated as "*successful*" (D1R). The methodology used for exchanging experiences through phone-conferences, meetings of technical committees, and internships of leaders and health workers in other locations had a significant role in the success of the project. (D1CRT).

All interviewees assessed the *legal, technical and financial capacities and mechanisms implemented in the project* as "*completely satisfactory*" (score 2) (See Annex 2, Table 9, question D2). All countries have developed in building institutional capacity activities through: i) training of national and local personnel and community members, and the delivery of equipment, ii) strengthening of legal capacities through the formulation and implementation of guidelines for malaria control, iii) constituting of Steering Committee, the technical teams, National Committees and Local Committees (MTE, OP).

The project was adapted to the national regulatory frameworks (D2R), but administrative and financial adjustments were made to meet PAHO requirements to the donor (D2MN). In general, there were no significant changes, mainly because the same structure of the Ministry and PAHO were used (D2PN).

At the municipal and community levels of all countries, laws and ordinances were formulated to encourage the implementation of the project, particularly the breeding site control and environmental sanitation (D2MNEG, D2CRM). Local authorities (in Mexico Commissioners and in Panama Aldermen), appointed by the people in meetings, encouraged participation and participated themselves in activities and sometimes punished people who did not clean houses and patios (D2GF, D2GM, D2PPB, D2PT).

According the interviewees *the project outputs have the complete weigh and scientific credibility*. Only the national level of Panama assessed it as "*partially*" complete, because at Ministry of Health Headquarters, some civil servants did not support the new strategy (Annex 2, Table 9, question D3). The rapid impact achieved at the start of the project allowed the model to achieve wide support from the community and local workers. The approach "test-error" used in the implementation of control strategies determined that the implementation of strategies were highly flexible (D3GP).

The evidence generated by scientific studies and the systematization of experiences have given the project a scientific authority and credibility to influence the formulation of malaria policies and decision makers (D3CRT, D3GN).

In terms of participation, social stakeholders and communities were convinced about the benefits of the strategy, because of their previous experiences. The results of the studies on the impacts of DDT on environment and human health constituted a scientific and practical

contribution, because many people believed that they would not find metabolites of DDT (D3CRN), but results showed contamination in several places (Díaz-Barriga F 2009).

Interviewees from four places thought that the ***delivery of outputs*** was "*partial*", but in general, achievement of the activities and planned results was "*complete*" (Annex 2, Table 9, question D4). In several places the goals planned were surpassed and in other cases activities not planned were implemented, such as the studies to validate the strategies (D4MN). In general, respondents felt that the project was successful in achieving each of the products in quality, size and utility; particularly in objectives 1, 2 and 4 (D4MNEG, D4MNM, D4CRT, D4CRM), but not in objective 3. There were problems in time management due to late payments and administrative changes, but this was overcome in most cases thanks to the countries and PAHO, which provided money when resources were not available due to delays in disbursements (D4R).

3.5. Assessment of Monitoring and Evaluation Systems

As mentioned previously, one of the less developed features was the M&E, which obtained a "*moderately satisfactory*" rating. M&E design, budgeting and funding, and long term monitoring obtained only "*moderately satisfactory*" rating, but implementation plan was "*satisfactory*". Mexico shows least performance, particularly at community levels in almost all the criteria evaluated (Table 11).

Table 10. Evaluation of Monitoring and Evaluation Systems. Final Evaluation. Mesoamerica 2008-2009.

PLACE	E- M&E performance	E.1. M&E design	E.2. plan implemen-tation	E.3. Budgeting and Funding	E.4. Long-term Monitoring
TOTAL	**MS (4,0)**	**MS (3,9)**	**S (4,6)**	**MS (3,6)**	**MS (3,8)**
REGIONAL	**MS (4,0)**	**MS (3,8)**	**S (5,3)**	**MU (3,0)**	**MU (3,0)**
MEXICO TOTAL	**MS (3,2)**	**MS (3,3)**	**MU (2,5)**	**U (1,5)**	**U (2,3)**
National	MS (4,2)	MS (4,0)	S (4,5)	MU (3,0)	HS (6)
Chiapas State	MS (3,3)	MS (3,3)	MS (3,8)	MU (3,0)	MU (3,0)
Negualzotcoyol Community	U (1,7)	U (1,5)	U (2,0)	HU (0,0)	MU (3,0)
Nueva Macedonia Community	U (1,7)	U (1,5)	U (2,0)	HU (0,0)	MU (3,0)
GUATEMALA TOTAL	**S (4,9)**	**S (4,7)**	**HS (5,7)**	**S (4,8)**	**MS (4,2)**
National	S (4,2)	MS (3,5)	HS (6)	HS (6)	MU (3,0)
Peten Department	S (4,7)	S (5,0)	S (4,5)	MU (3,0)	MU (3,0)
Ixacan Department	S (5,0)	S (5,0)	HS (6)	MU (3,0)	MU (3,0)
La Felicidad Community	HS (6)	HS (6)	HS (6)	HS (6)	HS (6)
Sta. Maria Dolores Community	HS (6)	HS (6)	HS 6	HS (6)	HS (6)
COSTARICA TOTAL	**MS (3,8)**	**MS (3,5)**	**S (4,9)**	**MS (4,0)**	**MU (3,0)**
National	U (2,3)	U (2,0)	MU (3,0)	MU (3,0)	MU (3,0)
Talamanca Municipality	**S (5,2)**	**S (5,0)**	**HS (6)**	**HS (6)**	**MU (3,0)**
Matina community	**S (4,3)**	**MU (3,0)**	**HS (6)**	**MU (3,0)**	**MU (3,0)**
PANAMA TOTAL	**S (4,6)**	**S (4,5)**	**S (4,9)**	**S (4,5)**	**MS (3,8)**
National	S (4,5)	MS (4,3)	S (5,3)	HS (6)	MU (3,0)
Bocas del Toro Province	S (4,8)	MS (4,3)	HS (6)	HS (6)	HS (6)
Puente Blanco community	HS (5,6)	HS (6)	S (5,0)	HS (6)	HS (6)
Las Tablas community	MU (3,0)	HS (6)	MU (3,0)	HU (0,0)	HU (0,0)

Score

Highly Satisfactory (HS)	Satisfactory (S)	Moderately Satisfactory (MS)	Moderately Unsatisfactory (MU)	Unsatisfactory (U)	Highly Unsatisfactory (HU)
5,5 to 6	4,5 to 5,4	3,5 to 4,4	2,5 to 3,4	1,5 to 2,4	0 to 1,4

3.5.1. M&E design

The M&E system had two documents of reference; the Project document Section 5, Monitoring and Reporting (GEF 2003) and the technical guide (Mendez J, Betanzos A, & Tapia R 2004). The project document was referring to the aims and activities planned, but the guide was related with malaria epidemiological surveillance and monitoring of the strategies of control implemented.

According to the Project document, monitoring of the GEF-DDT Project would consist of: (i) quarterly progress reports referring to the aims and activities developed with a qualitative approach, with few goals or thresholds; (ii) terminal report; (iii) Substantive Reports presented and (iv) financial reports. This system design was assessed as adequate.

The Technical Guide defined an extended list of indicators (more than 1209) and it covered procedures, products, results and the impact.

Eight of 17 places evaluated rated the statement "*the project has a sound M&E plan to monitor results and track progress towards achieving project objectives"* as "*complete*". The rest (nine places) answered "*partially*", particularly in Mexico, Guatemala and Costa Rica (See Annex 2, Table 10, questions E1).

The M&E section of the Project Plan did not contain M&E of malaria control interventions and epidemiological surveillance of the malaria situation. This was developed in the Technical Guide, which presents a chapter "Demonstrative Projects Evaluation". In this chapter, four evaluation aspects are described: the impact, the process, the effectiveness, and efficacy. Some of the key interventions did not have monitoring indicators, as the coverage and treatment compliance.

The complexity of the malaria surveillance system presented in the technical guide and the heterogeneity of the surveillance systems of the countries determined that each country used their own surveillance and monitoring systems (PO). During 2008 Mexico, Guatemala and Nicaragua designed and implemented, surveillance and monitoring systems consistent with the needs and strategies of the malaria control model implemented by the project (E1M, E1GP, E1GI); in other countries, this is still a challenge.

Lack of uniformity of the surveillance systems for malaria in the countries caused serious difficulties in evaluating the impact and results of the project in relation to the incidence of malaria and control of mosquito breeding sites and refugees. The base line was carried out at the beginning of the project but not at the end (E1CRN). In the participating countries, an explicit monitoring plan was not designed at the national level. The project was set to the regional level (E1GN).

Several countries designed and implemented situation rooms at the community and health district levels, but there was no uniformity (OP, E1CRM, E1PB). The use of GIS in the situation room was a privileged tool.

Interviewees from three of the nine places assessed this question as "*partially*", and the rest thought *that the project met the minimum requirements for project design of M&E (SMART) and the application of the Project M&E plan*. (Annex 2, Table 10, question E2).

At the regional level and in each country *there were no specific units or persons responsible for M&E*, which was recognized as one of the limitations of the project (PO) (Annex 2, Table 10, question E3). Because of that, in three of ten places the interviewees assessed this

aspect as "*partially*" (Chiapas State, Guatemala National and Panama National), the rest assessed it as "*complete*".

The regional project coordinator, NAPs and focal points were responsible of the M&E activities (E3R, E3MN, E3ME, E3CRT, E3PN). At the local level, the focal points of the project (epidemiologist of demonstration areas or the heads of vectors) were the ones who brought up this activity (E3CRT, E3GN, E3GP, E3GI, E3PB).

In Bocas Del Toro - Panama the interviewees assessed *the quality, application and effectiveness of project monitoring and evaluation plans and tools* as "*no - no at all*" (0 score). In six places the rating was "*partially*" and only three said "*completely*" (Annex 2, Table 10, question E4). The M&E project was carried out through quarterly reports using the instrument designed in the project formulation. This assessment focused on compliance of products and cannot report results and impacts (PO). Each country prepared a quarterly report that was sent to the regional level. The regional coordinator of the project then consolidated these quarterly reports and sent them to the donor. A total of 16 quarterly reports were prepared, but there was no feedback from the donor, except for a one comment. The Mid-Term Evaluation (MTE) was an important element in defining the necessary changes to ensure project success (E4R). Before MTE, instruments for the systematization were not defined. After instruments for systematizing, monitoring and evaluation were discussed and designed, they were implemented during the last year of the project (E4CRN).

The definition of risk management was done for the project as a whole, but a risk assessment based on management assumptions of each country were not formulated (E4GN). Therefore, some management risks were not identified in the project documents (E4MN).

With exception of Chiapas in Mexico, *the baseline was carried out in all places*. Mexico carried out the baseline only in Oaxaca demonstrative area (Annex 2, Table 10, question E5). Seven of the participating countries published a report of the baseline. A comprehensive guide and the baseline were formulated (E5R) containing socio economics, demographic and ecological indicators, knowledge, attitudes and practices, prevalence of malaria and evaluation of mosquito breeding sites (E5CRT). A guide for the inventory stock of DDT was also designed (E5CRN).

In more than half of the places (6/10) evaluated the interviewees said that *the schedule of M&E activities and standards was "partially" defined*, the rest answered "*completely*" (question E6). Although a timeline was defined at the regional level and was adjusted to the conditions of the program (E6MN, E6GN, E6PB), no explicit schedules were defined at the country level. Time and goals were defined with regional coordination, but at the country level they were not explicit (E6CRN, E6CRT). There were no minimum standards to ensure products (E6R). There were reporting formats for each area of work (E6CRN). Quarterly reports had a definition of the level of compliance: complete, incomplete or in process. Quarterly reports were complemented by annex when required (E7PN).

In three places the answer was "*no – not at all*" and in six places it was "*partially*". Indeed, *there was not a specific document for collection, aggregation, analysis and decision making for each level of the regular reporting system*. (Annex 2, Table 10, question E7). Mexico, Guatemala, Nicaragua and Panama are using the ones that control programs had. (E7GN, E7ME, E7MN, E7PB). For impact assessment and baseline study specific documents were developed to meet this requirement (E7R).

There were no specific written procedures for handling late, incomplete or inaccurate information of surveillance system at the regional level and at country levels of Guatemala

and Costa Rica (OP, E8CRT E8CRM E8GN E8PN). Mexico national, Chiapas state level and Panama National level answered "*partially*" (Annex 2, Table 10, question E8). This represented a constraint to the impact evaluation study, as inconsistencies were found in reports from several countries (E8MN). In the four countries visited, the review for mistakes and inconsistencies was carried out eventually (E8ME).

Only two places answered "*completely*" to the question *"how inconsistencies have been resolved when discrepancies were found in surveillance system*?" Interviewees from six places said that there was "*no – not at all*" and one said "*partially*" (Annex 2, Table 10, question E9). Indeed, the procedures to resolve discrepancies had not been documented. At the local levels of each country, a regular review of data and correcting the discrepancies was done directly by health workers (E9GN, E9GI), but there were no documents that specify these procedures (E9MN, E9ME, E9CRT, E10MN).

Related to *the availability of a systematic feedback for the different levels of information about data quality of the reports produced* (Annex 2, Table 10, question E10), there were different answers. At the national level of Costa Rica, the answer was "*no – not at all*", at the regional level and in national and state levels of Mexico, the answer was "*partially*". These opinions were based on information from malaria surveillance systems, but not on quarterly reports, which received systematic feedback. One of the most important mechanisms for feedback and discussion of progress were phone-conferences and the Regional Technical Committee meetings (OP, MTE).

At each country level and demonstration area, there were several meetings, workshops and other feedback activities each month (E10CRT, E10ME), but there was no systematic procedure to evaluate accuracy and completeness (E10GN E10GI E10PB). In relation to timeliness, the participating countries defined that the reports for all the surveillance systems for malaria were delivered weekly (PO).

Only in five of the nine places, the interviewees said that *there was quality control of data done in the field for the reports written* (question E11). Interviewees of the national level of Costa Rica answered "*no – not at all*" and four said "*partially*" (regional, Mexico national and state and Panama national). Data quality controls on impact evaluation study were done on regional level (E11MN). In Costa Rica and Guatemala the entomological surveys in the field were done routinely (E11CRT, E11GN, E11GP). In Panama and Mexico monitoring visits were done during supervision visit, but there were no registration instruments (E11PN, E11PB).

The regional level used to review the quality and completeness of information of the quarterly reports of each country, and then it consolidated them and published on the web site and e-mailed to countries (E10R).

The regional level, national and provincial levels of Panama, and national level of Costa Rica had no available *computer system with a clear and active documentation of the procedures for database administration*. In four places the answer was "*partially*" (Annex 2, Table 10, question E12).

3.5.2. M&E plan implementation

The following monitoring activities were implemented: i) baseline study in each demonstrative area about malaria epidemiological situation, environmental risk and knowledge, attitudes and practices ; ii) quarterly progress reports of every country and a regional summary according to the parameters established by UNEP; iii) Substantive reports of Steering Committee and Technical Committees meetings where progress and adjust work

plans, and the general interest of the core team in achieving quality were discussed. The reports of Executive Committee meetings convey detailed and in-depth discussions on implementation and delivery issues; iv) a mid-term evaluation undertaken with the participation of the PAHO and Regional Coordinator to diagnose problems and suggest necessary corrections; v) a final evaluation undertaken by independent consultant from November 2008 to February 2009.

Monitoring and evaluation of project document was adequately addressed, contributing to the project's effective implementation, although it did not allow quantifying the activities, the products or results. Baseline study and mid-term evaluation were carried out as planned, with detailed responses prepared to each of the recommendations, all of which were considered by the Regional and Country Boards.

On the other hand, the M&E system of the Technical Guide turned out to be excessive and very few indicators were in use which was gathered in the base line and at the end of the project. After the mid term evaluation, the Regional Coordinator defined 20 core indicators, but not all were reported in final impact evaluation; only Guatemala, Nicaragua and El Salvador reported all the indicators defined for the final evaluation.

The budget for M&E was integrated in each of the activities.

In all countries, a surveillance system for reporting malaria cases was implemented at community levels. Before that, the information was only aggregated at provincial or departmental levels. Nowadays, there is good quality surveillance system at community level, which will allow evaluating the impact in the long term.

The most important advance of the information system has been the GIS development. GIS applications were developed in all countries, using the SIG-EPI package of PAHO (E12CRT, E12GN). In Guatemala, Costa Rica, Mexico, Nicaragua, El Salvador and Panama, the regional, national and local staff has achieved useful applications to take decisions (base line diagnosis, the monitoring interventions). These applications enable seeing the power that the GIS has for the monitoring and evaluation. In this sense, it is evident that the capability which the vector and the epidemiological staff have reached in making epidemiologic analysis was enhanced by the maps made in GIS.

In eleven places*, a M&E system was in place, and it facilitated tracking of results and progress towards project objectives throughout the project implementation period* (Annex 2, Table 11, question E13). One third of the places (6/17) answered "*partially*" to this question, Chiapas State and both communities in Mexico, Peten District in Guatemala and both communities of Panama.

The opinion of the interviewees was that the implementation of the M&E system and the preparation of quarterly reports facilitated monitoring of outputs and outcomes throughout the project implementation (E13ME E13CRN). In addition, the progress of project performance was presented in the Regional Technical Committees and used to take decisions (E13R). At the country level, goals to be achieved were defined, and monitoring of all activities, deadlines and objectives of the project were done regularly and in extent (E13CRT, E13GF, E13PN).

In ten places (from 17) *the quarterly reports of the project were complete and accurate, and well justified rates were achieved*. In four places, the answer was "*partially*" and in three "*no – not at all*" (Annex 2, Table 11, question E14). No annual reports were prepared, but only a quarterly and a final report, which were complete and contained information that was requested in the guidance of procedures provided by the donor (E14R, E14MN, E14CRT, E14GN, E14GP, E14GI).

The majority of the interviewees (13/17) said that *the information from M&E system was used to improve project performance* (Annex 2, Table 11, question E15). The standard instrument used for monitoring allowed identifying the progress easily, making it a useful tool to improve performance, and adapt it to the necessity of change at regional and country levels (E15R). However, the absence of entomological and malariometric information was a limitation in the first phase, which was corrected in the second phase and the extensions.

Information from the mid term evaluation is considered as one of the most important inputs that allow improving performance and quality of the project (E15R). At local levels (demonstrative areas) evaluation of the epidemiological and entomological situation was used to improve the intervention (E15CRN, E15CRT, E15CRM, E15GI). In this sense, the experience of Guatemala about decision making with community participation for the stratification and evaluation of impact of interventions was successful (E15GP).

In six places the interviewees said that *the project has a M&E system in place with proper training for parties responsible for M&E activities to ensure data will continue to be collected and used after project closure* (Annex 2, Table 11, question E16). In three out of nine places the answer was "*partially*" (Chiapas State in Mexico, Panama national and Peten in Guatemala). According to regional interviewees there were training sessions at the beginning of the project. However, a training program was not designed at the outset, but people were trained when problems appeared (E16R). One of the interviewed said "everyone was learning on the fly as required" (E16PN).

Budgeting and Funding for M&E activities

Three communities from Mexico and one from Panama responded that "*no – not at all*" to the question if the project had *adequate budget provisions* for M&E. Six places, including regional interviewees, responded "*partially*" and in ten places, the answer was "*completely*" (Annex 2, Table 12, question E17).

There was a specific budget to carry out the baseline study from UNEP (E17CRN). The rest of financial resources for M&E execution were taken out from funds allocated by PAHO as part of the counterpart contribution. Because of that, there were no problems in timeliness (E17R). At the country level, specific budget was not defined, but the resources for M&E were integrated into the programming of each component. That is why interviewees said that the resources allocated were adequate (E17MN, E17ME, E17CRT E17GP E17GI). In several countries, funds for local monitoring (per diem and transportation) were provided by the Health Ministries or Vector Control Programs.

Long-term Monitoring

Only five places answered "*yes completely*" to the question "*Was long-term monitoring envisaged as an outcome of the project?"*. One answered "*no – not at all*" and the rest "*partially*" (Annex 2, Table 12, question E18). According to the regional interviewees, an evaluation was planned to be carried out, but the resources were not provided (E18R).

The opinion of many interviewees was that the best way of evaluating long-term impacts is to maintain a surveillance of malaria cases in the participatory localities or define some localities as sentinel sites. Mexico, Guatemala, Nicaragua and El Salvador have implemented a new surveillance system, which allows long term monitoring in demonstrative communities (E18ME, E18MN, E18GF, E18CRT, E18CRN, E18PM). In other countries, there are monitoring systems that should be strengthened to enable a long-term monitoring, but achieving it requires additional funds (E18R).

A specific protocol must be designed in order to evaluate: entomological, demographic (migration) and ecological variables as hurricanes, storms and floods, and intersectoral community participation and other factors related to sustainability.

3.6. Assessment of processes that affected attainment of project results.

Officially, this project started in May 2003. At the country level, the project started at different time in each country. Of the evaluated countries, Panama and Costa Rica were the first to begin the activities (April 2004). The rest started the project at national levels in June of 2004. The activities of institutional arrangements and the adaptation of the mechanisms of human resources and financial management into the local and national realities delayed the implementation process of the project by one year.

Once the project started, the implementation was "*highly satisfactory*", and there were no important *factors that affected the attainment of project results*. Mexico received only, a "*satisfactory*" overall score, with a "*moderately satisfactory*" score in Chiapas. The lowest score, "*satisfactory*", was received from the preparation and readiness - parameter. The score was influenced by results mainly in Mexico, Costa Rica and Panama which received "*satisfactory*" and "*moderately satisfactory*" scores in several places. Country ownership, stakeholder involvement, financial planning and the structure and organization achieved a "*highly satisfactory*" score. Only the state level in Mexico obtained an "*unsatisfactory*" rating in stakeholder involvement.

Table 11. Assessment of processes that affected attainment of project results. Final Evaluation. Mesoamerica 2008-2009.

PLACE	F. Processes affected attainment of results	F.1. Preparation and readiness	F.2. Country ownership	F.3. Stake-holders involvement	F4. Financial Planning	F.5. Structure and organiza-tion
TOTAL	**S (5,3)**	**S (4,8)**	**HS (5,6)**	**HS (5,7)**	**HS (6)**	**S (5,2)**
REGIONAL	**HS (5,7)**	**S (4,8)**	**HS (6)**	**HS (6)**	**HS (6)**	**HS (5,5)**
MEXICO TOTAL	**MS (4,3)**	**S (4,7)**	**HS (5,5)**	**S (4,6)**	**HS (6)**	**MS (4,3)**
National	**S (4,6)**	S (4,8)	HS (6)	HS (6)	HS (6)	S (4,5)
Chiapas State	**MU (2,8)**	MS (3,6)	S (4,7)	2	HS (6)	MS (4,0)
Negualzotcoyol Comm.	**HS (5,8)**	HS (6)	HS (5,5)	HS (6)		
Nueva Macedonia Comm.	**HS (6)**	HS (6)	HS (6)	HS (6)		
GUATEMALA TOTAL	**HS (5,6)**	**S (5,2)**	**HS (5,5)**	**HS (5,8)**	**HS (6)**	**S (5,3)**
National	**S (5,4)**	S (4,2)	S (5,1)	HS (6)	HS (6)	S (5,0)
Peten Department	**HS (5,7)**	S (5,4)	HS (5,6)	HS (6)	HS (6)	HS (5,5)
Ixacan Department	**HS (5,9)**	S (5,4)	HS (6)	HS (6)	HS (6)	HS (5,5)
La Felicidad Comm.	**HS (5,8)**	HS (6)	HS (6)	S (5,3)		
Sta. Maria Dolores Comm.	**S (5,3)**	HS (6)	S (5,0)	S (5,3)		
COSTARICA TOTAL	**HS (5,7)**	**S (4,5)**	**HS (6)**	**HS (6)**	**HS (6)**	**HS (5,8)**
National	**HS (5,5)**	MS (3,6)	HS (6)	Hs (6)	HS (6)	HS (5,5)
Talamanca Municipality	**HS (5,7)**	S (4,8)	HS (6)	HS (6)	HS (6)	HS (6)
Matina Community	**HS (6)**	HS (6)	HS (6)	HS (6)		
PANAMA TOTAL	**HS (5,5)**	**S (4,7)**	**HS (5,7)**	**HS (5,5)**	**HS (6)**	**S (5,0)**
National	**HS (5,7)**	S (4,8)	HS (6)	HS (6)	HS (6)	S (5,0)
Bocas del Toro Province	**S (4,4)**	MS (3,6)	S (4,7)	S (4,3)	HS (6)	S (5,0)
Puente Blanco Community	**HS (6)**	HS (6)	HS (6)	HS (6)		
Las Tablas Community	**HS (6)**	HS (6)	HS (6)	HS (6)		

3.6.1. Preparation and readiness

Despite an extensive preparation phase including evaluations on feasibility, base line, and contacting and involving stakeholders, several actors thought that it was not sufficient because many administrative arrangements and stakeholder involvement were done along the implementation of the project thus causing a year's delay in starting activities.

In fourteen (14/17) places the interviewees said that *the project's objectives and components were "completely" clear, practicable and feasible* (Annex 2, Table 13, question F1). The regional and national levels of the 4 evaluated countries answered that it was "*partial*", because the scheduled time was insufficient; and the project required two extensions to complete the scheduled activities (F1R, F1CRN, F1GN). Despite all the programmed activities were executed there were delays (F1MN, F1MNEG, F1MNM).

In half of the places, the interviewees though that *the capacities of the executing institutions and counterparts were only "partially" considered when the project was designed,* the rest answered that they were considered "*completely*" (Annex 2, Table 13, question F2). According to regional level the consideration was assessed "*completely*" at PDF Phase (Project Formulation) (F2R). The interviewees from Mexico, who responded "*partially*" said that there were several problems: i) internal conflicts in malaria control program, ii) poor communication with national level about resources that were not authorized to be receive them by the donor (F2MN), iii) Insufficientinappropriate linkage to the Education Ministry because in some communities, there are no teachers, or they are not involved (F2ME). In Guatemala the commitment was made with former government and the project began with another and the transition was not considered (F2GN).

Comment [p6]: ?

In Costa Rica, mayors and community leaders were not involved in project formulation. Several stakeholders participated in the formulation of the technical guide (F2CRN). However, the participation of the entomological component was weak despite having great importance (F2CRT).

Sixteen respondents said that *the lessons from other relevant projects were "completely" incorporated in design* (Annex 2, Table 13, question F3). Only in one place (Panama, Bocas del Toro) the answer was "*partially*". In general, Mexico's experience in 2003 was used as a basis for designing the strategy, but country specific experiences were incorporated and adapted by others (F3CRN, F3GI), such as the experience of Guatemala related to the use of larvae eating fish in a previous project funded by PAHO (F3GN). Mexico used the experience of PLAXSALUD financed by DANIDA Denmark about insecticides (F3R, F3MN).

Six of ten respondents said that *the partnership arrangements were partially identified and the roles and responsibilities negotiated prior to implementation* (Annex 2, Table 13, question F4). At the regional level, the response was completed (F4R). At the country level commitment papers were signed as a prerequisite for initiating the project, principally with institutions related to environment and education. Alliances were made after, but formal statements were made through letters of agreement as a requirement of the project (F4GN). At local and community levels, many of the arrangements were made during the project with local authorities, teachers, private companies, and development institutions (F4CRN, F4GP).

In half of the places, the opinion was that *the availability of counterpart resources (funding, staff, and facilities), passage of enabling legislation, and adequate project management arrangements in place at project entry* was "*partial*" (Question F5). In all countries, the Ministry of Health contributed funds for the regular implementation of the model (F5ME) and particularly for salaries for personnel, funds to cover travel expenses and vehicles (F5GN). The project had the support of vector control personnel, Governing Areas of the Health

Ministry staff, the Social Security Institute and the Municipalities (F5CRT). There were problems in several countries for the delivery of equipment, particularly vehicles (F5CRN), due to specific legislation of each country to receive donations.

3.6.2. Country ownership / Driveness

According to the opinion of the interviewees, reports and participant observation, there was high empowerment of the local level health workers and of community leaders. In all levels, the level of stakeholder participation was very good, through national and local committees and community working groups.

According to all interviewees *the project design was completely in-line with the national sector and development priorities and plans* (Annex 2, Table 14, question F6). All participating countries have joined to the Millennium Development Goals and adopted Roll Back Malaria Initiative, as well as, they are signatories of the conventions for the elimination of POPs. (F6R, F6CRN). Except for Mexico and El Salvador which had successfully reduced malaria transmission before the start of project, the countries, considered the disease as a public health priority. In Guatemala, which bore 30% of malaria cases throughout Mesoamerica, malaria was in fifth place on the priority list (F6GN).

The interviewees considered that *the project outcomes were contributing completely to national development priorities and plans, particularly to sectoral development plans* (Annex 2, Table 14, questions F7) (F7R).

The majority thought that *the involvement of the relevant country representatives, from government and civil society was complete* (Question F8). Only in two places, the interviewees considered the involvement to be "*partial*". Indeed, civil servants of the Vector Control Program or the Epidemiology Department were focal points at national levels and in demonstration areas. National committees were formed by representatives from various ministries and universities. The second-level community organizations (COMUDE in Guatemala, Comarca in Panama), mayors, police, churches, firemen, etc. participated in the local committees at demonstration area levels (F8R, F8GN) with an excellent performance (F8CRT).

In all places, the interviewees thought that *the recipient governments maintained completely their financial commitments to the project* (Question F9) (F9R). Despite of temporary problems (F9MNl), the Health Ministries (F9CRN) and municipalities (F9CRT). never denied time nor resources). The contributions were mainly in human resources, local transportation (F9GN) and technical support (F9GI).

The opinion in every country was that *government approved policies and regulatory frameworks were in-line with the project's objectives* (Question F10). The approved national standards and guidelines were in line with the Project Guide (F10R, F10CRT, F10GN). In Mexico, these regulations were already in place before the project start (F10MN). At municipal and community levels, the local authorities (mayors, commissioners, oldermen) adopted regulations to ensure that people complied with malaria control activities. At the community level, assemblies took decisions to strengthen the implementation of the project (F10MNEG, F10MNM, F10CR).

Regarding *the level of ownership and commitment of the country,* only in one place the interviewees considered the ownership to be "*no – not at all*" and in four places "*partial*" (Annex 2, Table 14, question F11). The majority though that it was "*complete*" (F11CRM, F11CRT, F11GI). At the regional level, the weakest was Belize (F11R). In some countries,

including Panama, Guatemala and Mexico, there were weaknesses at the central level due to the change of authorities, but it was very appropriate to the local and departmental level (F11GN). At local levels, there were difficulties when the mayors belonged to a different political party than the central government (F11ME).

The majority of the interviewees though that *the project was completely effective in providing and communicating information that catalyzed action in participating countries to improve decisions relating to the use of alternative strategies of malaria vector control without the use of DDT* (Annex 2, Table 14, question F12) (F12R). Some respondents felt that there was no defined Information Education and Communication plan in each country (F12ME) and that there was a lack of communication through mass media (F12CRN). Communication at community level was very good (F12GI).

3.6.3. Structure and organization

No additional structures or organizations were created on to the existent ones. In addition, there were no supplementary personal agreements devoted to the project in hardly any country (Annex 2, Table 15, question F24). All the interviewees rated this aspect as "*complete*". The local committees joined to the structures of the Ministry of Health, thus, taking advantage of the technical experience and the structure that remained from the vertical elimination program.

Except for Mexico, all the interviewees thought that *the coordination mechanism between general health services and malaria control services were complete* (Question F25). In Mexico and Panama, there is still a specialized semi autonomous structure of the program, but there is a good integration with the general health services (MTE). Only in Costa Rica and Guatemala *the vector workers were completely integrated into the general health service's structure; in other countries, this integration was "partial"* (Question F29).

In Costa Rica, Honduras and El Salvador there was no parallel or independent structure for vector control, so the area chief was at the same time responsible for the preventive activities. The Environmental Sanitary Workers (former malaria inspectors) was a multipurpose unit for all vector borne diseases (dengue, malaria, Chagas, etc.) (PO).

In Guatemala and Nicaragua, the vector control structure persisted, but it was integrated in Health District at demonstrative areas (it is under the Regional Chief´s leadership). It can be considered as an integrated structure, but it is not a horizontal structure yet. In Guatemala and Panama, some interviewees stated that *"the vertical structure costs more. It was better where the intervention was integrated with general health services"* (F25N, F25P, F25I).

Most interviewees had the opinion that there was a clear definition of the structure and organization of the project and of the levels of control and supervision (Question F26).

In all countries visited, *there was personnel dedicated to vector control activities, not only malaria* (Annex 2, Table 15, question F27). It was assessed that in Costa Rica the personnel responsible for vector control carried out activities related to Environmental Primary Health "*completely*". The majority said that this involvement was "*partial*" (Question F28). However, all vector control workers in demonstrative areas used the project strategy that involved environmental health activities such as clean house and clean patio.

3.6.4. Stakeholder involvement

Stakeholder participation was good at all levels. At the national level, Technical Committees were constituted of researchers and delegates from universities and several institutions (mainly Health and Environment). At demonstration areas, with the exception of the state of Chiapas in Mexico, Technical Local Committees were constituted with participation of municipalities and NGOs. At the community level, there was high participation of delegates from majority of the community organizations, which were those who named the members to the Committees of Control of Malaria or to the Groups of Action in Health.

Almost all interviewees said that *the project involved the relevant stakeholders "completely" through information sharing, consultation and by seeking their participation in project's design, implementation, and monitoring and evaluation*. Only in three places did they state that involvement was "*partial*" (Annex 2, Table 16, question F13). Indeed, all relevant stakeholders were involved in the project formulation, execution and evaluation through National, Local and Community Committees (F13R). In few places, such as Bocas del Toro (Panama) and Chiapas (Mexico), the municipalities and Costa Rica, the institutions that promote tourism did not participate, although they were invited (F13CRN, F13CRT). Some national civil servants had weak participation in Guatemala (F13GN)

The answer to the *question "did the project implement appropriate outreach and public awareness campaigns?"* was similar to the former question (Annex 2, Table 16, question F14). However, these campaigns were focused on demonstration areas, and were limited to the national level (F14R F14GN). At the community level, the primary mechanisms were community assemblies, workshops and person-to-person conversation (F14MN, F14MNM, F14GN).

Almost all interviewees assessed the statement that *the project consulted and made use of the skills, experience and knowledge of the appropriate government entities, NGOs, community groups, private sector, local governments and academic institutions in the design, implementation and evaluation of project activities* (Annex 2, Table 16, question F15) as "*completely*". Only in Chiapas was the answer "*partially*". There was an important participation of the universities and researchers in the studies of impacts of DDT on the environment and human health, entomology and GIS (F15CRN F15CRT). At the municipal level, participation of local authorities such as commissariats, aldermen, municipal agents and health promoters was important (F15MNEG, F15MNM). In Guatemala, three students of a Masters Public Health Program were involved in health system studies (operational studies) (F15GN).

Most considered that *the perspectives of those that would be affected by decisions, those that could affect the outcomes and those that could contribute information or other resources to the process were taken into account completely while taking decisions* (Annex 2, Table 16, question F16). Only in one place did the interviewees state that the consideration was "*partial*". Perspectives and opinions of community leaders, majors, managers of private enterprises, Global Fund projects, and Collaborative Centres (IRET, INSS Mexico and University of San Luis Potosí) were taken into account (F16R, F16CRN). An interviewee said "always took into account the thoughts of everyone involved" (F16CRT).

Fourteen interviewees (of 17) thought that *the relevant vulnerable groups and the powerful groups of the supporters and the opponents of the processes were properly involved* (Annex 2, Table 16, question F17). There were no opponents: "some persons were indifferent to the strategy, but little by little with house to house visits, people were sensitized; the project was easy to sell" (F17CRN). At a community level, all decisions were discussed with leaders and family members, including children (F17MNEG, F17MNM). In Guatemala, the discussion of malaria situation and the results of intervention (Situation Room) in the monthly assembly was a favoured mechanism (F17GN).

In eight of ten places, interviewees had the opinion that *the mechanisms put in place by the project for identification and engagement of stakeholders in each participating country were defined completely and were successful* (Annex 2, Table 16, Question F18 and F19). The Steering and Regional Technical Committees, the National and Local Technical Committees, the technical teams, the national operative committees, the local operative groups and the community groups were the better mechanism to identify and engage stakeholders (F18R, F18CRN).

In eight of the nine places, the interviewees thought that *the degree and effectiveness of collaboration/interactions between the various project partners and institutions during implementation of the project was completely sufficient* (Annex 2, Table 16, question F20).

In general, the interviewees thought that *the degree and effectiveness of various public awareness activities that were undertaken during implementation of the project, both within the countries as well as in the international context, were "complete"*. The response was "*partial*" in one instance (Annex 2, Table 16, question F21). As a result, no insecticides for malaria control were used in most of the countries (F20CRN). Many individuals and health workers did not know the effects of the chemicals at base line study (F21GN). An effective campaign against the use of POPs was developed, and it enhanced knowledge in all institutions involved (F20CRT).

3.6.5. Financial planning

According to all interviewees the project had *the appropriate financial controls, including reporting and planning, that allowed management to make informed decisions regarding the budget and allowed for timely flow of funds* (Annex 2, Table 17, Question F22). PAHO at a central level and in every country had a very well constructed and strict financial control system (F22CRN, F22MN, F22GN, F22GI).

The interviewees at regional level thought that financial controls were very high "sometimes in excess". There were changes in the allocation of the funds; new activities not foreseen were included, particularly for the extension of the project. Nevertheless, any changes in budget lines were authorized by Managerial Committees and by the donor (F22R). The expenses were registered in the quarterly reports (F22CRT). In Peten Guatemala, there was a community audit for delegates of communities (group of 15 leaders) (F22GN).

All interviewees thought that *the financial controls, including reporting and planning were completely strong and useful* (Annex 2, Table 17, question F23). However, they allowed the project management to make informed decisions regarding the budget and allowed a proper and timely flow of funds for the payment of project deliverables. The controls were invaluable in order to see which area was working and which not; and also to define where reforms or corrections should be done (F23GN).

3.6.5. UNEP Supervision and backstopping.

As already mentioned, the start of the project was delayed by more than a year and thus UNEP authorized two extensions. Thanks to PAHO and UNEP permanent relation, the problems were identified on time. With exception of the elimination of DDT stockpiles, there were no serious problems.

PAHO staff provided quality support and advice to the project at country and local levels, where the intervention of UNEP staff was not necessary. UNEP approved modifications and

restructures in time, particularly the approbation of the two extensions. According to regional interviewees, UNEP's support improved from 2007. However, one of the problems was the lack of feedback to the quarterly reports, which for the 16 reports, was received only once (E1R).

3.6.6. Co-financing and Project Outcomes & Sustainability

There was a considerable difference in the level of expected and actual co-financing. Multilateral agencies, including PAHO and CEC actual contribution in kind was ten times (92%) more than was programmed. Furthermore, the contribution from central governments was 13% more (See Table 12).

The contribution from private sector and municipal governments was not foreseen. The municipal governments financed important infrastructure constructions and provided logistical and human resources as a counterpart to the project. Their contribution as co-financing was estimated to be approximately 180,000USD (Table 12). The figures for co-financing shown in Table 13 were estimated based on interviews with key informants. According to all interviewees the community contribution was enormous, but it was not estimated. Indeed they contributed with voluntary work, food, transport and other inputs.

Thanks to these additional contributions, it was possible for the project to be replicated in other localities and areas. Nevertheless, it was impossible to assure that these contributions would be ongoing for medium and long term, thus it is necessary to search for new funds.

Table 12. Co-financing Project GEF-DDT. September 2003 - December 2008.

Source	In-kind (Mill US$)		Other type of resource - PDF-B (Mill US$)		TOTAL		Difference
	Budget	Actual	Budget	Actual	Budget	Actual	(Rate per 100)
Multilateral Agency (Non-GEF)	854.000	12.321.000	440	440	**854.440**	**12.321.440**	**92,26**
Central Governments	51.164	58.838			**51.164**	**58.838**	**13,04**
Local Governments	0	180			**0**	**180**	**0,00**
Private Sectors	0	80			**0**	**80**	**0,00**
Total	905.164	12.380.098	440	440	**905.604**	**12.380.538**	**16,05**

*PAHO: Approximately $US 7.848.000; * CEC: Approximately $US 4.473.000
Source: Final Report.

It was not possible to compare the final actual project expenditure by activity to be supplied by the UNEP Fund management Officer in Terms of Reference (UNEP 2009) because the date of this report was until 06 of November 2008 and the cost reported by activity at final report by Regional Coordinator was until December 2008.

Component	Final Report (Ramirez et. Al, 2008)	Terms of Reference
Component 1	2841423	1768022
Component 2	977618	3218255
Component 3	633556	52692
Component 4	2100107	45308
Total	6552704	5084277

3.6.7. Delays and Project Outcomes & Sustainability.

As it was explained above, the institutional arrangements delayed the implementation of the project by one year, but with the two extensions the project was completed successfully, with the exception of component 3.

4. CONCLUSIONS AND RATINGS

The project has demonstrated at global, regional, national and local levels that methods for malaria vector control without DDT or other persistent pesticides are cost effective, highly replicable, and sustainable.

There were not studies of cost effectiveness of the DDT use, but comparing the study of cost effectiveness of the strategy used in this project with studies of bed nets cost-effectiveness in Togo (5) (a program integrated to measles immunization campaign) and Tanzania (6) the cost per person in the GEF-DDT areas is greater than those reported in African studies; but the cost per case prevented is much lower in Central America than in Africa (5). In relation to cost per Disability Adjusted Life Year (DALY) averted per 1000 persons, El Salvador and Honduras showed lower costs, but Nicaragua reported costs twice as high as the Togo study.

Table 13. Comparison of costs of the GEF-DDT project and bed nets.

COSTS	GEF-DDT			BED NETS	
	El Salvador	Honduras	Nicaragua	Togo	Tanzania
Cost per person 2005-2007 (USD$)	13	17	22	5,95	7,57
Cost per case averted (USD$)	0,4	0,64	0,003	4,4	13
Cost per DALY averted x 1000 persons (USD$)	17,22	1,9	44,1	22,1	

The project was successful in: i) implementing new integrated vector control techniques, ii) developing a coordinated regional program and iii) improving national capacities to control malaria and evaluate the impact of POPs, in human health and environment. The project has strengthened regional, national and local institutional technical and community capacity to control malaria with methods that do not rely on DDT or other persistent pesticides.

The project had a high impact with a 63 percent reduction of malaria cases in the demonstration areas from 2004 to 2007. The cases of malaria caused by *Plasmodium falciparum*, the species that causes the most severe morbidity and mortality in the world, reduced by 86,2 percent without any registered deaths due to this disease. Due to the project's large impact on malaria control in demonstration areas, the reintroduction of DDT for malaria control will be unlikely. The scaling up of this model could help to achieve the objective of eliminating malaria from Mesoamerica (WHO 2007;WHO 2008).

The project has raised awareness on the hazards of DDT and other pesticides to the environment and human health, particularly at demonstrative areas. Lessons learned were documented and shared at local, national, regional and global levels.

Only one of the four components was not achieved. It was not possible to eliminate the DDT stock piles in the participating countries, but due to the huge impact in malaria transmission, the possibility of re-introduction of DDT for malaria control is unlikely.

All the expected results were achieved at three levels: i) At the national level, each one of the 8 participating countries had documented the results and monitored demonstration project; ii) At the regional level the lessons learned in each country were exchanged and a regional consensus was built; iii) The model could be replicable in other places with similar characteristics.

The project's success can be attributed to the implementation of a new model for control of disease, whose main characteristics are:

1. ***Stratification to prioritized communities and intensive application of the interventions in territories and prior groups*** (more affected, higher risk, higher vulnerability) (RABREDA-AMI 2007).The methodology of stratification was used to limit the interventions to a few localities of high transmission and predominance of vulnerable groups. It improved the efficiency and the efficacy of the control strategy. In Mesoamerica, most of the malaria cases are concentrated in few localities; the methodology of stratification developed by Mexico and Guatemala allowed interventions to be carried out in few communities, thus reaching high cost effectiveness. The same situation was also discovered by the evaluator in the Andean area, and it is possible that it is also similar in other continents.
2. ***The simultaneous combination of several control measures*** (diagnosis and treatment, elimination of breeding sites, elimination of human reservoirs), adapted to specific reality (selective vector control) (Nyarango P et al. 2006).
3. **Interventions with impact on other health problems.** Clean house, clean patio and mosquito breeding site control probably served to control other vector borne diseases, dermatological problems and improve quality of life.
4. ***Ecosystem approach*****,** with five characteristic elements (Level J 2003):
    - A control and prevention strategy based on an epidemiological model for health fields (Dever A 1991), that covers interventions on four fields: i) the biological field with the clinical management of cases and the elimination of the plasmodium human hosts, ii) the modification of lifestyles such as the clean house, clean patio-strategy and improvement of the personal hygiene, iii) environmental modification, through the EHCA interventions and the elimination of the use of persistent insecticides, iv) the improvement of the provision of diagnostic and treatment services, as well as the integration of the general services in this activity.
    - Transdisciplinary approach (Level J 2003), which involved multidisciplinary and intersectoral approaches with the integration of several professionals from different disciplines (doctors, biologists, nurses, educators, etc), several institutions and organizations, municipalities, universities and investigation institutes. The experience with the project showed that the municipalities play a very important role in the implementation of malaria control strategies. The reasons are the following: i) they can act in a wide range of levels and create a proper environment for successful local interventions; ii) they can support community participation and intersectorial collaboration iii) they can offer funding for infrastructure, logistical support and personnel; iv) the municipal governments can act as agents for structural change (social, cultural and physical change) through the formulation of public policies.
    - Community participation which in the project was situated to a central axis of the vector control activities, with participation in planning, execution, and monitoring of activities.
    - Equity: Due to the fact that areas chosen as demonstration sites were the ones with persistence of malaria and most of them were rural areas with highly vulnerable (critical poverty) native population, the concept of social equity was accomplished. Additionally, the focalization of interventions at the malarious houses, allowed the neediest people to receive major interventions.
    - Environmental protection, through the integral strategy for malaria control without using persistent toxic substances.

5. Strengthen the local capability for basic information (monitoring, evaluation and surveillance), and investigation.

6. ***Sustainable and replicable interventions.*** The interventions are ecologically friendly, highly sustainable, easy to adopt by communities and health workers, and easy to replicate with small resources.

Table 14. OVERALL RATINGS

Criterion	**Evaluator's Summary Comments**	**Evaluator's Rating**
A. Attainment of project objectives and results (overall rating)	All countries have adapted techniques of vector control without using persistent insecticides. However, objective 3 (elimination of DDT stockpiles) has not been achieved completely. The establishment of a regional network was developed and there was an active exchange of best practices and lessons learned among neighbouring countries.	Satisfactory
Effectiveness	A reduction of 63% of malaria cases and API decrease from 15,9 to 8,4 per 1000 in between 2002 to 2007 was registered. Several communities and several departments or provinces where the demonstrative areas were located reduced the incidence near the API of 1, which is considered the standard to qualify the elimination of malaria. Objective 3 has not been achieved completely	Satisfactory
Relevance	The results were coherent with the strategies used. Not only was the use of DDT and other POPs stopped, but also other types of insecticide were not used. The project contributed to progress towards the achievement of the Millennium Development Goals, the Roll Back Malaria goal and the possibility to eliminate the malaria transmission.	Highly Satisfactory
Efficiency	According to the study the project was cost effective. It did not invest in human resources because it used the existing ones. The major costs were those of payment of National Coordinators (NAP) and travel expenses for supervision and community support. But the interviewees from national levels of three counties and Chiapas's State in Mexico thought that the delays in the project partially affected cost-effectiveness. In Mexico, the project suffered from interruptions due to the delays"	Satisfactory
Sustainability of Project outcomes (overall rating)	Although the evaluation rates sustainability as highly satisfactory, there are places with high vulnerability. The influence of hurricanes and tropical storms, the reduction of financial resources due to the global crisis and the high level of migration in frontier areas, are factors that the actors consider might affect the sustainability of the project"	Likely
Financial	Financial sustainability was evaluated as "*likely*" on the regional level and in Guatemala and "*moderately likely*" in Panama, Costa Rica and Mexico. Although it does not diminish the influence of the global crisis, it was considered that the budget that was assigned for next years should not change significantly from what will be needed to support the reached achievements"	Likely
Socio Political	Only Mexico and Costa Rica National levels consider that the sustainability could be affected by socio-political factors, particularly because in the year 2009, there will be presidential election, which can cause change of health policies and health authorities.	Likely
Institutional framework and governance	All countries strengthened institutional technical capacity at a regional scale for malaria control and the capacity to assess and research impact of POP in human health and environment.	Likely
Ecological	Although the presence of hurricanes, tropical storms and floods, which are frequent in the demonstrative areas, in Guatemala, Costa Rica and Panama the health services and the communities reacted very well against the effects of tropical storms occurred at the end of 2008; until January, 2009 epidemics were not reported in the demonstrative areas.	Highly Likely
Catalytic Role	There was a high scaling up of the control strategy to other neighbouring localities and municipalities on own initiative of the community leaders and health workers. In Guatemala, Nicaragua and, Honduras the replication was very extensive for the alliances that were done with the Global Fund Projects and other projects.	Highly Satisfactory
Achievement of outputs and activities	In general, respondents felt that the project was successful in achieving each of the products in quality, size and utility; particularly in objectives 1, 2 and 4 but not in objective 3. All countries have developed in building institutional capacity activities. The methodology implemented is based on ecosystems approach and	Satisfactory

Comment [p7]: I would still rate this as likely

Criterion	**Evaluator's Summary Comments**	**Evaluator's Rating**
	Roll Back Malaria Strategy. The rapid impact achieved at the start of the project allowed that the model had a wide support from the community and local workers. The evidence generated by scientific studies and the systematization of experiences give the project a scientific authority and credibility.	
Monitoring and Evaluation (overall rating)	The M&E system of the project worked adequately but it did not allow quantifying activities, products and results. The surveillance system and M&E for control strategies data were gathered in the base line and at the post evaluation end of the project. The most important advances of the information system have been given at the GIS development. These applications allow seeing the power that the GIS has for the monitoring and evaluation.	Moderately Satisfactory
M&E Design	At the regional level and in each country *there were no specific units or persons responsible for M&E*, which was recognized as one of the limitations of the project (PO). Lack of uniformity of the surveillance systems for malaria in the countries caused a serious difficulty to evaluate the impact and results of the project	Moderately Satisfactory
M&E Plan Implementation (use for adaptive management)	Quarterly report was the main mechanism for monitoring the process, and result of the objectives planned. Only a few indicators defined in technical guide were used to evaluate the results and impact of the project in malaria epidemiological situation.	Satisfactory
Budgeting and Funding for M&E activities	Although there were enough funds to assure M&E activities, three communities from Mexico and one from Panama responded that "*no – not at all*" to the question if the project had *adequate budget provisions* for M&E. Six places, including regional interviewees, responded "*partially*" and in ten places, the answer was "*completely*."	Moderately Satisfactory
Preparation and readiness	There was a long preparation phase which included evaluations of feasibility and base line, contact and involving stakeholders. This preparation was not sufficient, many administrative arrangements and involving stakeholders were done along the implementation of the project and caused a one year delay in starting activities.	Satisfactory
Country ownership / driveness	At the national level, Technical Committees were constituted of delegates from several institutions (Health and Environment fundamentally), universities or researchers. At demonstrative areas Technical Local Committees were constituted with participation of Municipalities, NGOs. At the Community level, there was a high participation of delegates of the majority of the community organizations (Committees of Malaria Control or Groups of Health).	Highly Satisfactory
Stakeholders involvement	There was high empowerment of the health workers (vectors and environment) at the local levels and of community leaders. In all levels, the stakeholder participation was very good.	Highly Satisfactory
Financial planning and cofinancing	The administration of funds was made by the PAHO/WHO of each country.	Highly Satisfactory
UNEP Supervision and backstopping	Thanks to PAHO and UNEP permanent relation the problems were identified on time and there were no serious problems. PAHO staff provided quality support and advice to the project at country and local level, because that was no longer necessary the intervention of UNEP staff at these levels. UNEP approved modifications and restructures in time, particularly the approbation of the two extensions. According to the regional interviewees, the UNEP support improved from 2007. One of the problems was the lack of feedback to the quarterly reports, only one time in 16 reports (E1R).	Satisfactory
Overall Rating	Only one objective was not achieved completely due to limitation non attributable to project management.	Satisfactory

5. LESSONS LEARNED

The main lesson learnt was that it is possible to control or even eliminates malaria with environment-friendly methods and without the use of persistent insecticides. The main conditions are the combination of control strategies, the intersectorial approach and community participation. The strategies needed for this kind of intervention, such as the control of mosquito breeding sites, cleaning houses and patios are easily adopted by the communities. They also contribute to the empowerment of the communities and to the change of the understanding about their participation in malaria control (Salinas V & Narváez A 2009).

Control of mosquito breeding sites and refugees are strategies that are easiest to adopt by the community, and it is a means for the communities to change their conception about malaria and the empowerment of malaria control activities. The personal education in every house in prior localities and the Situation Room are better strategies to educate, to involve and to empower the communities.

Malaria control requires a multi methodological approach with the combination of interventions related to: diagnosis and complete treatment (compliance), reservoir plasmodium elimination (active search for asymptomatic and febrile persons), control of mosquito breeding sites with physical and biological methods (larvae eating fish), control of mosquito refugees (clean house and clean yard), barrier mosquito-persons (Insecticide Impregnated Bed Nets).

Most malaria cases are located in specific towns and houses. That is why epidemiological stratification allows focusing the interventions in a few locations and makes the intervention more effective.

The design of a new demonstration project requires the development of a comprehensive protocol before the start of execution of: the systematization of experiences, impact assessment, cost effectiveness evaluation and surveillance, and monitoring system adapted to the strategy.

Relating to the elimination of DDT stockpiles, although PAHO has handled the component (including all difficulties) very well, a more experienced organization to conduct this type of highly specialized activity would have been more efficient. FAO is the UN entity with comparative advantage and experience in dealing with these specific activities.

For future complex and multi country projects, the duration of the project should be six years, considering one year for the organization and institutional arrangements, four for implementation and one for evaluation and preparation of final reports.

6. SUGGESTIONS FOR SIMILAR PROJECTS

PAHO and UNEP have to make advocacy with Ministries of Health to declare the eradication of malaria as a medium-term goal in Mesoamerica to avoid reducing the political and financial support. PAHO could help countries to design new projects to replicate the strategy in other areas of high incidence of malaria transmission and hold the localities where it has been able to eliminate the indigenous transmission. National Malaria Control Programs have to keep track of the areas and towns as a strategy of long term impact evaluation. It is important to homogenize and improve surveillance, monitoring and evaluation systems of the Mesoamerican countries.

UNEP, PAHO and country partners have to identify the strategies, as well as the national and regional sources of funding that could support the countries in the region of the Americas and throughout the world to expand the model in other areas with high transmission.

UNEP and PAHO have to continue the promotion and dissemination of the project achievements and experiences with regional and global reach. The publication of scientific papers is an important task.

PAHO and UNEP should fund a new study to assess the impact of the project strategy used, correcting the problems that presented the evaluation of project impact, particularly the absence of control locations.

Once there is evidence regarding the success of the application of the control model, it is necessary to initiate a process for gathering scientific evidence, for which it would be suggested to strengthen alliances between national programs with universities and research centres. Following is a description of some studies that should be performed in order to obtain scientific evidence of the model:

1. Impact assessment of the model in the improvement of quality of life of families.
2. Comparative entomological studies amongst localities intervened with the DDT-GEF model and control localities, with the objective to demonstrate that the first strategy not only impacts in the reduction of cases, but also in the risk of reintroducing malaria. The measurement indicators are: vector species, vector habitats, vector density of adult mosquitoes and mosquito bites index.
3. Assessment of the process, product, results and impact of community participation with intercultural approach in the decrease of malaria.
4. Assess the impact of a clean house and patio in the transmission of malaria and dengue, in order to define its contribution on the effectiveness of the model. This is important because this intervention, as is the daily bath and clothing change, are based in one case study not published in Mexico.
5. Evaluation or the process, products and results of the replication in the rest of the localities of the demonstrative areas.

Extend or replicate the OPS-DDT-GEF strategy to the rest of the localities of the municipality, department or province. Expand from the locality and demonstrative areas to the demonstrative municipalities and departments, which has already been done spontaneously. Costs are relatively small compared to the costs to maintain spraying to reduce vector density.

In this sense it is necessary to broaden the objectives or problems to be solved by the communities. Integrate the interventions in developmental programs or integral disease control programs. For example the promotion of family gardens in the yards would allow greater sustainability to the clean patio strategy and additionally improve food safety and intake of vegetables and beans which is already reduced in malaria communities. The experience of Community Epidemiology in Borbon, Ecuador may be taken as reference, where the communities participated in the control of other prevalent diseases prioritized by the communities, which allowed maintaining the motivation of leaders and volunteers (Tognoni, 1998).

At the preparation phase, early diagnosis and prompt treatment were not considered a priority intervention, but when the Technical Guidelines (Mendez J, Betanzos A, & Tapia R 2004) were formulated, there was no agreement on what scheme to use, so each country used its own. Consequently all the countries, except Mexico, changed their protocols to those recommended by PAHO. Additionally in every country, mainly Guatemala and Nicaragua, strategies to improve the adherence to treatment were adopted: supervised mouth treatment or graphic prescription to reduce loss of memory and control of compliance of complete treatment through visits and supervision of the last dose taken. According to the evaluator, these interventions are the foundation of the control strategy and have a great weight in the control of malaria, reason why in any malaria control project or program, improvement of treatment adherence should be prioritized as main element of the universal interventions in all the localities disregarding its priority level.

Strengthen health systems: mainly the access to adequate and complete treatments; and increase laboratory networks, which will not only allow the control and elimination malaria transmission, but will also rapidly detect reintroduction of transmission in the area in which native transmission was eliminated. The improvement of laboratory networks will contribute to a need to improve surveillance in low transmission areas. In order to improve efficiency, laboratory staff should not only be trained to work with malaria, but also with other health problems, such as tuberculosis, leischmaniasis, river blindness, HIV, etc.

Maintain monitoring and elimination of breeding sites through community work, followed by periodical assessments of the sites by vector control workers.

Evaluate the convenience of the use of insecticide impregnated bed nets or residual spraying in localities where native transmission of malaria has not been eliminated; mainly in those localities where large breeding sites exist and which cannot be controlled by the community, nor vector control workers. In some places with temporary high migration (farm workers), a residual spraying cycle with piretroids may be sufficient, without violating the objective of the malaria control project without persistent insecticides.

Regarding the parasite reservoir elimination strategy in the current situation for the reduction of transmission, in order to reduce the efforts and assure sustainability, it is necessary to review the national norm in three aspects, mainly in Panama and Nicaragua:

- Revise the massive population treatment strategy. In Nicaragua, one dose is given to farmers and in Panama they are providing massive treatments to neighbouring localities of the demonstrative areas. Prevalence studies should be performed to asymptomatic patients and its association with the presence of febrile episodes during the last 12 months using the quality assurance sampling technique by lots in order to provide a more selective intervention.

- Focalized treatment. Assess the prevalence of asymptomatic patients in collateral families and in houses nearby to the malaria cases, in order to reduce the treatment radius without diagnosis which is currently performed to control the focus.
- Integrate to surveillance, the analysis of age of the patients and the time span between the onset date of symptoms and the beginning of the treatment, in order to evaluate if the transmission is native or imported, evaluate its transmission intensity and the opportunity of initiating treatment to redefine focus control strategies.

Continue ongoing training of health workers (mainly new employees of the Ministry of Health and new epidemiologists) in the control and epidemiological surveillance of malaria.

Establish lobbying activities at national and local level of every country in order assure continuity of temporary hired personnel in prioritized areas and improve the surveillance, monitoring and evaluation system for malaria.

In those localities where the number of malaria cases have been reduced to zero, diversification of functions should be suggested for vector control workers and volunteers, so they can become promoters of primary environmental care and could also perform monitoring of other activities, such as vaccination, food safety, etc.

Assess the strategy used to provide complete treatment to family and neighbour contacts without laboratory diagnosis in currently low transmission areas. Besides the IPA, the use of ILP, cases of children under 10 years (Kazembe L et al. 2006) of age and the presence of gametocytes in positive blood smears for *P. falciparum*, are indicators that should be included in the surveillance and decision making for the treatment of collateral cases without microscopic confirmation (Narvaez A 2007).

Advance from the surveillance of cases to the surveillance of meteorological conditions, breeding sites, and the risk for malaria reintroduction. For this latter objective, active surveillance should be maintained and screening goals should be determined in those localities as strategy to early detect outbreaks and epidemics, and the prevention of reintroduction of new cases.

Strengthen mechanisms within the Municipalities in order to continue supporting efforts and seek their involvement in the expansion of the strategy to other localities.

For the replication of the model in new localities, joint stratification should be performed every 6 months or every year, in order to concentrate efforts in new prioritized places.

The influence of global warming is a fact that should be addressed and re-evaluated, since community and services response was evaluated in disasters such as floods and storms, but not in situations as drought and hunger, as occurred towards the end of 2009 in the intervention areas of the project in Guatemala. Population poverty could also reduce the sustainability of the model.

TERMS OF REFERENCE

Terminal Evaluation of the UNEP GEF project
"Regional Program of Action and Demonstration of Sustainable Alternatives to DDT for Malaria Vector Control in Mexico and Central America"

Project No. GF/2732-03-4680 PMS: GF/4030-03-22

1. PROJECT BACKGROUND AND OVERVIEW

Project rationale

During the last decade Mexico and Central American countries have gradually discontinued DDT sprayings for vector control. Malaria, however, still poses a serious risk for the population of these countries. The project aimed at preventing reintroduction of DDT for malaria control by promoting new integrated vector control techniques and implementing a coordinated regional program to improve national capacities. Major project components were to be: the implementation of demonstration projects of vector control without DDT or other persistent pesticides that can be replicable in other parts of the world and which are cost-effective, environmentally sound, and sustainable; the strengthening of national and local institutional capacity to control malaria without the use of DDT; and the elimination of DDT stockpiles in the eight participating countries.

There was a need to strengthen institutional technical capacity at a regional scale for assessment and control of malaria disease vectors. Countries with less capacity to address malaria control without DDT needed help from their neighbours who had had successful experiences. Only a long-term regional cooperative program could help deter some countries from returning to use DDT or using other persistent pesticides to control endemic malaria vectors. The participating countries were committed to developing and implementing comprehensive management practices that were to build and strengthen awareness about the importance of environmental conservation and sound water management in the control and prevention of endemic diseases with the active participation of local communities, particularly in immigration corridors. The principles which formed the basis for the proposed project were: integrated inter-institution and inter-sectoral (environment and health) approaches; broad community participation in all steps of the project; integration of the work to existing national institutions so that no parallel structures were created; technical, financial and organizational sustainability of the new approaches to malaria control; and widespread dissemination of the information generated by the project.

The overall objective of the project was to demonstrate those methods for malaria vector control without DDT or other persistent pesticides are replicable, cost-effective and sustainable, thus preventing the reintroduction of DDT in the region. Human health and the environment were expected to be protected in Mexico and Central America by promoting new approaches to malaria control, as part of an integrated and coordinated regional program. The establishment of a regional network was expected to facilitate the exchange of best practices and lessons learned among neighbouring countries. A major outcome was to increase government and local community awareness of DDT and other pesticides hazards to the

environment and human health, and adjustment of future behaviour regarding the use of persistent pesticides.

The results of this project was expected be felt at three levels: **(i)** At the national level, each one of the 8 participating countries was to have the documented results of a well monitored demonstration project of malaria vector control without DDT or other persistent pesticides; **(ii)** At the regional level the lessons learned in each country were to be exchanged and a regional consensus built; **(iii)** At the global level the results of this project were expected to define replicable models for malaria control based on cost effective, environmentally sound and sustainable strategies. These models which were to be thoroughly tested and documented in a series of interconnected demonstration projects were to constitute a set of best practices which may have been applied in other regions of the world.

Relevance to GEF Programmes

This project conforms with the "Contaminant-based" Operational Programme No 10 and was to "*help demonstrate ways of overcoming barriers to the adoption of best practices that limit contamination of the International Waters environment*". The proposed activities were expected to be also consistent with several provisions of the recently adopted Stockholm Convention on POPs, and with the draft Operational Programme on POPs under development. Five of the participating countries have already signed the POPs convention: El Salvador, Honduras, Mexico, Nicaragua and Panama. The other three countries have expressed their intention to sign it.

Executing Arrangements

The project was implemented by UNEP and executed by the Pan American Health Organization (PAHO) under the overall responsibility of the Director, Division of Health and Environment and National Executing Agencies (i.e. Ministries of Health). The UNEP Division of GEF Co-ordination, in association with PAHO, monitored activities undertaken during the execution of the project. The Director, Division of Health and Environment, PAHO was responsible for maintaining systematic overview of the implementation of the project through monthly project monitoring meetings or consultation and preparing monitoring reports.

A regional coordinator contracted by PAHO and residing in Guatemala was responsible for the day-to-day operation of the project, including, soliciting national reports, preparation of consolidated progress and financial reports, preparation of substantive reports and review, etc. Each country had a national focal point for this project, appointed by the executing ministry, and a national coordinator selected and contracted by PAHO in consultation with the governments and UNEP for the duration of the project.

At the beginning of the project implementation National Steering/Operational Committees (NOCs) were established in each country as a mechanism for coordination of national project activities. The NOCs were coordinated by the national focal point with the participation of the other ministries, technical coordinator and representative of community organizations and NGOs involved in the project. The technical body, the Regional Operational Committee chaired by the regional coordinator would include national focal

points (Ministries of Health and national technical coordinators) were expected to meet to discuss, plan and evaluate the technical activities of the project.

Project Activities

The initial project duration was 36 months starting August 2003 and end in July 2006. The Project was extended to December 2008 to enable continuous collection of field data, the sustaining of the already achieved project results and important international out-reach of achievements.

The project activities were organised under the following four components:

Component 1: ***Demonstration Projects and Dissemination.*** The objective was to implement, evaluate, and disseminate the alternative strategies of malaria vector control without use of DDT which were developed during the PDF-B phase. The main outcome was to avoid future reintroduction of DDT or other persistent pesticides in national malaria control programs.

Component 2: ***Strengthening of national institutional capacity to control malaria without DDT***. The objective was to strengthen national and local institutional capacities to control malaria with methods that do not rely on DDT or other persistent pesticides. The outcome of this component was to be strengthened national capacities of malaria risk assessment, development of analytical laboratory infrastructure, community participation and training regarding malaria vector control and pesticide management.

Component 3: ***Elimination of DDT stockpiles.*** This component was to address the existing problem of stockpiles in six of the eight participating. All activities were to be documented and management plans were to be put into place to prevent further accumulation of stockpiles of pesticides

Component 4: ***Coordination and Management.*** A regional coordinator was to be hired for this project under terms of reference established by the steering committee. Each country was to have a national coordinator. This component also included three annual meetings of the steering committee, three regional meetings for planning and evaluation of activities, and three regional annual reports.

Budget

The total budget is estimated at USD 13,905,400 of which USD 7,495,000 is from the GEF and USD 5,026,400 in co-financing from national budgets for malaria control programs specifically oriented to the population of the demonstration project areas. USD 654,000 is in kind contribution from PAHO and CEC is contributing USD 200,000 to be directed to assessment of pesticides residues in the two demonstration project areas in Mexico. The initial budget was adequate to cover the extension period.

TERMS OF REFERENCE FOR THE EVALUATION

1. Objective and Scope of the Evaluation

The objective of this terminal evaluation is to determine the extent to which the project objectives were achieved, or are expected to be achieved, and assess if the project has led to any other positive or negative consequences. If possible the extent and magnitude of any project impacts to date will be documented and the likelihood of future impacts will be determined. The evaluation will also assess project performance and the implementation of planned project activities and planned outputs against actual results. The evaluation will focus on the following main questions:

- Assess how the project has demonstrated at global, regional, national and local levels that methods for malaria vector control without DDT or other persistent pesticides are replicable, cost effective and sustainable, thus preventing the reintroduction of DDT in the region
- Has the projected eliminated the DDT stock piles in the participating countries and prevented its re-introduction for malaria prevention?
- Has the project strengthened national and local institutional technical capacity to control malaria with methods that do not rely on DDT or other persistent pesticides?
- Has the project raised awareness on the hazards of DDT and other pesticides to the environment and human health, documented lessons learned and established mechanisms to share the lessons at national, regional and global levels?

2. Methods

This terminal evaluation will be conducted as an in-depth evaluation using a participatory approach whereby the UNEP/DGEF Task Manager, key representatives of the executing agencies and other relevant staff are kept informed and regularly consulted throughout the evaluation. The consultant will liaise with the UNEP/EOU and the UNEP/DGEF Task Manager on any logistic and/or methodological issues to properly conduct the review in as independent a way as possible, given the circumstances and resources offered. UNEP/EOU is responsible for contracting and logistic matters. The draft report will be circulated to UNEP/DGEF Task Manager, key representatives of the executing agencies and the UNEP/EOU. Any comments or responses to the draft report will be sent to UNEP / EOU for collation and the consultant will be advised of any necessary revisions.

The findings of the evaluation will be based on the following:

- A desk review of project documents including, but not limited to: The project documents, financial and monitoring reports such as progress and financial reports to UNEP and GEF annual Project Implementation Review reports, the quarterly and semi-annual reports to UNEP, and relevant correspondence; as well as other M&E reports, if available.

- Desk review of reports and minutes of meetings of the Steering and Operational Committees.

- Field visits to Guatemala, Mexico, Costa Rica and Panama, including meetings with national focal points, national coordinators, local governments, national committee members, demonstration site coordinators.

- Interviews by phone or in person of members of the project Committees.

- Phone interviews with project staff in PAHO in Washington, D.C. and telephone conference with UNEP/DGEF in Nairobi.

Key Evaluation principles.
In attempting to evaluate any outcomes and impacts that the project may have achieved, evaluators should remember that the project's performance should be assessed by considering the difference between the answers to two simple questions ***"what happened?***" and ***"what would have happened anyway?"***. These questions imply that there should be consideration of the baseline conditions and trends in relation to the intended project outcomes and impacts. In addition it implies that there should be plausible evidence to attribute such outcomes and impacts to the actions of the project.

Sometimes, adequate information on baseline conditions and trends is lacking. In such cases this should be clearly highlighted by the evaluator, along with any simplifying assumptions that were taken to enable the evaluator to make informed judgements about project performance.

3. Project Evaluation Parameters

A. Attainment of objectives and planned results:

The assessment of project results seeks to determine the extent to which the project objectives were achieved, or are expected to be achieved, and assess if the project has led to any other positive or negative consequences. While assessing a project's outcomes the evaluation will seek to determine the extent of achievement and shortcomings in reaching the project's objectives as stated in the project document and also indicate if there were any changes and whether those changes were approved. If the project did not establish a baseline (initial conditions), the evaluator should seek to estimate the baseline condition so that achievements and results can be properly established (or simplifying assumptions used). Since most GEF projects can be expected to achieve the anticipated outcomes by project closing, assessment of project outcomes should be a priority. Outcomes are the likely or achieved short-term and medium-term effects of an intervention's outputs. Examples of outcomes could include but are not restricted to stronger institutional capacities, higher public awareness (when leading to changes of behaviour), and transformed policy frameworks or markets. The evaluation should assess the extent to which the project's major relevant objectives were effectively and efficiently achieved or are expected to be achieved and their relevance.

- **Effectiveness:** Evaluate how, and to what extent, the stated project objectives have been met, taking into account the "achievement indicators" specified in the project document and logical framework[1] together with any additional monitoring tools. In particular, the analysis of outcomes achieved should include, *inter alia*, an assessment of whether and to what extent the results of this project have informed national, regional or international processes.

[1] In case in the original or modified expected outcomes are merely outputs/inputs then the evaluators should assess if there were any real outcomes of the project and if yes then whether these are commensurate with the realistic expectations from such projects.

- **Relevance:** In retrospect, were the project's outcomes consistent with the focal areas/operational program strategies and country priorities? The evaluation should also assess whether outcomes specified in the project document and or logical framework are actually outcomes and not outputs or inputs. Ascertain the nature and significance of the contribution of the project outcomes to the wider portfolio of Operational Programme on POPs.
- **Efficiency:** Cost-effectiveness assesses the achievement of the environmental and developmental objectives as well as the project's outputs in relation to the inputs, costs, and implementing time. Include an assessment of outcomes in relation to inputs, costs, and implementation times based on the following questions: Was the project cost-effective? Was the project the least cost option? Was the project implementation delayed and if it was then did that affect cost-effectiveness? The evaluation should assess the contribution of cash and in-kind co-financing to project implementation and to what extent the project leveraged additional resources.

B. Assessment of Sustainability of project outcomes:

Sustainability is understood as the probability of continued long-term project-derived outcomes and impacts after the GEF project funding ends. The evaluation will identify and assess the key conditions or factors that are likely to contribute or undermine the persistence of benefits after the project ends. Some of these factors might be outcomes of the project, e.g. stronger institutional capacities or better informed decision-making. Other factors will include contextual circumstances or developments that are not outcomes of the project but that are relevant to the sustainability of outcomes. The evaluation should ascertain to what extent follow-up work has been initiated and how project outcomes will be sustained and enhanced over time.

Four aspects of sustainability should be addressed: financial, socio-political, institutional frameworks and governance, and ecological. The following questions provide guidance on the assessment of these aspects:

- *Financial resources.* To what extent are the outcomes of the project dependent on continued financial support? What is the likelihood that any required financial and economic resources will be available to sustain the project outcomes/benefits will be sustained once the GEF assistance ends (resources can be from multiple sources, such as the public and private sectors, income generating activities, and market trends that support the project's objectives)? Was the project successful in identifying and leveraging co-financing?
- *Socio-political:* To what extent are the outcomes of the project dependent on socio-political factors? What is the likelihood that the level of stakeholder ownership will allow for the project outcomes/benefits to be sustained? Is there sufficient public/stakeholder awareness in support of the term objectives of the project?
- *Institutional framework and governance:* To what extent are the outcomes of the project dependent on issues relating to institutional frameworks and governance? What is the likelihood that institutional and technical achievements, legal frameworks, policies and governance structures and processes will allow for, the project outcomes/benefits to be sustained? While responding to these questions consider if the required systems for

accountability and transparency and the required technical know-how are in place.

- *Environmental:* Are there any environmental risks that can undermine the future flow of the project's environmental benefits? Are there any risks to the ecological sustainability of this project? The Terminal Evaluation should assess whether certain activities in the project area will pose a threat to the sustainability of the project outcomes. For example, construction of dam in a protected area could inundate a sizable area and thereby negatively impact the biodiversity related gains made by the project or, a newly established pulp mill might jeopardise the viability of nearby protected forest areas by increasing logging pressures.

As far as possible, also assess the potential longer-term impacts considering that the evaluation is taking place upon completion of the project and that longer term impact is expected to be seen in a few years time. Frame any recommendations to enhance future project impact in this context. Which will be the major 'channels' for longer term impact from the project at the national and international scales? The evaluation should formulate recommendations that outline possible approaches and necessary actions to facilitate an impact assessment study in a few years time.

C. Catalytic role

The terminal evaluation will also describe any catalytic or replication effect of the project. What examples are there of replication and catalytic outcomes that suggest increased likelihood of sustainability? Replication approach, in the context of GEF projects, is defined as lessons and experiences coming out of the project that are replicated or scaled up in the design and implementation of other projects. Replication can have two aspects, replication proper (lessons and experiences are replicated in different geographic area) or scaling up (lessons and experiences are replicated within the same geographic area but funded by other sources). If no effects are identified, the evaluation will describe the catalytic or replication actions that the project carried out.

D. Achievement of outputs and activities:

- Assess the soundness and effectiveness of the methodologies used for developing regional programme of action
- Assess the establishment of the necessary legal, institutional, technical and financial capacities and mechanisms within the region which should have allowed the effective joint implementation of the project.
- Assess to what extent the project outputs produced have the weight of scientific authority / credibility, necessary to influence policy and decision-makers, particularly at the national or regional levels.
- Delivered outputs: Assessment of the project's success in producing each of the programmed outputs, both in quantity and quality as well as usefulness and timeliness.

E. Assessment of Monitoring and Evaluation Systems:

- **M&E design.** Did the project have a sound M&E plan to monitor results and track progress towards achieving project objectives? The Terminal Evaluation will assess whether the project met the minimum requirements for project design of M&E and the application of the Project M&E plan (Minimum requirements are specified in Annex 4). The evaluation shall include an assessment of the

quality, application and effectiveness of project monitoring and evaluation plans and tools, including an assessment of risk management based on the assumptions and risks identified in the project document. The M&E plan should include a baseline (including data, methodology, etc.), SMART (see Annex 4) indicators and data analysis systems, and evaluation studies at specific times to assess results. The time frame for various M&E activities and standards for outputs should have been specified.

- **M&E plan implementation.** Was an M&E system in place and did it facilitate tracking of results and progress towards projects objectives throughout the project implementation period. Were Annual project reports complete, accurate and with well justified ratings? Was the information provided by the M&E system used during the project to improve project performance and to adapt to changing needs? Did the Projects have an M&E system in place with proper training for parties responsible for M&E activities to ensure data will continue to be collected and used after project closure?
- **Budgeting and Funding for M&E activities.** Were adequate budget provisions made for M&E made and were such resources made available in a timely fashion during implementation?
- **Long-term Monitoring.** Was long-term monitoring envisaged as an outcome of the project? If so, comment specifically on the relevance of such monitoring systems to sustaining project outcomes and how the monitoring effort will be sustained.

F. Assessment of processes that affected attainment of project results.

The evaluation will consider, but need not be limited to, consideration of the following issues that may have affected project implementation and attainment of project results:

i. **Preparation and readiness.** Were the project's objectives and components clear, practicable and feasible within its timeframe? Were capacities of the executing institutions and counterparts properly considered when the project was designed? Were lessons from other relevant projects properly incorporated in design? Were the partnership arrangements properly identified and the roles and responsibilities negotiated prior to implementation? Was availability of counterpart resources (funding, staff, and facilities), passage of enabling legislation, and adequate project management arrangements in place at project entry?

   - Ascertain to what extent the project implementation mechanisms outlined in the project document have been closely followed. In particular, assess the role of the various committees established and whether the project document was clear and realistic to enable effective and efficient implementation, whether the project was executed according to the plan and how well the management was able to adapt to changes during the life of the project to enable the implementation of the project.
   - Evaluate the effectiveness and efficiency and adaptability of project management and the supervision of project activities / project execution arrangements at all levels (1) policy decisions: Steering Group; (2) day to day project management; (3) GEF guidance: UNEP DGEF

ii. **Country ownership/Driveness.** This is the relevance of the project to national development and environmental agendas, recipient country commitment, and regional and international agreements. Examples of possible evaluative questions include: Was the project design in-line with the national sectoral and development priorities and plans? Are project outcomes contributing to national development priorities and plans? Were the relevant country representatives, from government and civil society, involved in the project? Did the recipient governments maintain its financial commitment to the project? Have the governments approved policies or regulatory frameworks been in-line with the project's objectives? Specifically the evaluation will:

iii. Assess the level of country ownership and commitment. Specifically, the evaluator should assess whether the project was effective in providing and communicating information that catalyzed action in participating countries to improve decisions relating to the use of alternative strategies of malaria vector control without use of DDT.

iv. **Stakeholder involvement.** Did the project involve the relevant stakeholders through information sharing, consultation and by seeking their participation in project's design, implementation, and monitoring and evaluation? For example, did the project implement appropriate outreach and public awareness campaigns? Did the project consult and make use of the skills, experience and knowledge of the appropriate government entities, NGOs, community groups, private sector, local governments and academic institutions in the design, implementation and evaluation of project activities? Were perspectives of those that would be affected by decisions, those that could affect the outcomes and those that could contribute information or other resources to the process taken into account while taking decisions? Were the relevant vulnerable groups and the powerful, the supporters and the opponents, of the processes properly involved? Specifically the evaluation will:

- Assess the mechanisms put in place by the project for identification and engagement of stakeholders in each participating country and establish, in consultation with the stakeholders, whether this mechanism was successful, and identify its strengths and weaknesses.
- Assess the degree and effectiveness of collaboration/interactions between the various project partners and institutions during the course of implementation of the project.
- Assess the degree and effectiveness of any various public awareness activities that were undertaken during the course of implementation of the project both within the countries as well as in the international context.

v. **Financial planning.** Did the project have the appropriate financial controls, including reporting and planning, that allowed management to make informed decisions regarding the budget and allowed for timely flow of funds? Specifically, the evaluation should:

- Assess the strength and utility of financial controls, including reporting, and planning to allow the project management to make informed decisions regarding the budget and allow for a proper and timely flow of funds for the payment of satisfactory project deliverables throughout the project's lifetime.
- Present the major findings from the financial audit if one has been conducted.

- Did promised co-financing materialize? Identify and verify the sources of co-financing as well as leveraged and associated financing (in co-operation with the IA and EA).
- Assess whether the project has applied appropriate standards of due diligence in the management of funds and financial audits.
- The evaluation should also include a breakdown of final actual project costs by activities compared to budget (variances), financial management (including disbursement issues), and co- financing. This information will be prepared by the relevant DGEF Fund Management Officer of the project for scrutiny by the evaluator (table attached in Annex 1 Co-financing and leveraged resources).

vi. **UNEP Supervision and backstopping.** Did UNEP Agency staff identify problems in a timely fashion and accurately estimate its seriousness? Did UNEP staff provide quality support and advice to the project, approved modifications in time and restructure the project when needed? Did UNEP and Executing Agencies provide the right staffing levels, continuity, skill mix, frequency of field visits?

vii. **Co-financing and Project Outcomes & Sustainability.** If there was a difference in the level of expected co-financing and actual co-financing, then what were the reasons for this? Did the extent of materialization of co-financing affect the project's outcomes and/or sustainability, and if it did affect outcomes and sustainability then in what ways and through what causal linkages?

viii. **Delays and Project Outcomes & Sustainability.** If there were delays in project implementation and completion, the evaluation will summarise the reasons for them. Did delays affect the project's outcomes and/or sustainability, and if so in what ways and through what causal linkages?

The ***ratings will be presented in the form of a table*** with each of the categories rated separately and with **brief justifications for the rating** based on the findings of the main analysis. An overall rating for the project should also be given. The rating system to be applied is specified in Annex 1.

4. Evaluation Report Format and Review Procedures

The report should be brief, to the point and easy to understand. It must explain; the purpose of the evaluation, exactly what was evaluated and the methods used. The report must highlight any methodological limitations, identify key concerns and present evidence-based findings, consequent conclusions, recommendations and lessons. The report should provide information on when the evaluation took place, the places visited, who was involved and be presented in a way that makes the information accessible and comprehensible. The report should include an executive summary that encapsulates the essence of the information contained in the report to facilitate dissemination and distillation of lessons.

Evidence, findings, conclusions and recommendations should be presented in a complete and balanced manner. The evaluation report shall be written in English, be of no more than 50 pages (excluding annexes), use numbered paragraphs and include:

i) An **executive summary** (no more than 3 pages) providing a brief overview of the main conclusions and recommendations of the evaluation;

ii) **Introduction and background** giving a brief overview of the evaluated project, for example, the objective and status of activities;

iii) **Scope, objective and methods** presenting the evaluation's purpose, the evaluation criteria used and questions to be addressed;

iv) **Project Performance and Impact** providing factual evidence relevant to the questions asked by the evaluator and interpretations of such evidence. This is the main substantive section of the report and should provide a commentary on all evaluation aspects (A − F above).

v) **Conclusions and rating** of project implementation success giving the evaluator's concluding assessments and ratings of the project against given evaluation criteria and standards of performance. The conclusions should provide answers to questions about whether the project is considered good or bad, and whether the results are considered positive or negative;

vi) **Lessons learned** presenting general conclusions from the standpoint of the design and implementation of the project, based on good practices and successes or problems and mistakes. Lessons should have the potential for wider application and use. All lessons should 'stand alone and should:
   - Specify the context from which they are derived
   - State or imply some prescriptive action;
   - Specify the contexts in which they may be applied (if possible who when and where)

vii) **Recommendations** suggesting *actionable* proposals regarding improvements of the current project. They may cover, for example, resource allocation, financing, planning, implementation, and monitoring and evaluation. Recommendations should always be specific in terms of who would do what, provide a timeframe, and a measurable performance target. In general, Terminal Evaluations are likely to have very few (only two or three) actionable recommendations;

viii) **Annexes** include Terms of Reference, list of interviewees, documents reviewed, brief summary of the expertise of the evaluator / evaluation team, a summary of co-finance information etc. Dissident views or management responses to the evaluation findings may later be appended in an annex.

Examples of UNEP GEF Terminal Evaluation Reports are available at www.unep.org/eou

Review of the Draft Evaluation Report

Draft reports submitted to UNEP EOU are shared with the corresponding Programme or Project Officer and his or her supervisor for initial review and consultation. The DGEF staff and senior Executing Agency staff are allowed to comment on the draft evaluation report. They may provide feedback on any errors of fact and may highlight the significance of such errors in any conclusions. The consultation also seeks agreement on the findings and recommendations. UNEP EOU collates the review comments and provides them to the evaluators for their consideration in preparing the final version of the report.

All UNEP GEF Evaluation Reports are subject to quality assessments by UNEP EOU. These incorporate GEF Office of Evaluation quality assessment criteria and are used as a tool for providing structured feedback to the evaluator (see Annex 3).

5. Submission of Final Terminal Evaluation Reports.

The final report shall be submitted in electronic form in MS Word format and should be sent to the following persons:

Segbedzi Norgbey, Chief, Evaluation and Oversight Unit
UNEP, P.O. Box 30552
Nairobi, Kenya
Tel.: (254-20) 7623387
Fax: (254-20) 7623158
Email: segbedzi.norgbey@unep.org

With a copy to:

Maryam Niamir-Fuller
Director
UNEP/Division of GEF Coordination
P.O. Box 30552
Nairobi, Kenya
Tel: + 254-20-7624165

Fax: + 254-20-624041/4042

Email: Maryam.Niamir-Fuller@unep.org

Jan Betlem
UNEP/GEF Task Manager
United Nations Environment Programme (UNEP)
Division of GEF Coordination (DGEF)
P. O Box 30552
Nairobi, Kenya
Tel: 254 20 7624607
Fax: 254 20 7624041/2
Email: Jan.Betlem@unep.org

Carmen Tavera
Portfolio Manager
United Nations Environment Programme (UNEP)
Division of GEF Coordination (DGEF)
P.O Box 30552
Nairobi, Kenya
Tel: 254 20 7624153
Email:Carmen.Tavera@unep.org

The final evaluation report will be printed in hard copy and published on the Evaluation and Oversight Unit's web-site www.unep.org/eou. Subsequently, the report will be sent to the GEF Office of Evaluation for their review, appraisal and inclusion on the GEF website. In addition the final Evaluation report will disseminated to: The relevant GEF Focal points, Relevant Government representatives, UNEP DGEF Professional Staff, The project's Executing Agency and Technical Staff. The full list of intended recipients is attached in Annex 5.

1. Resources and schedule of the evaluation

This terminal evaluation will be undertaken by an international evaluator contracted by the Evaluation and Oversight Unit, UNEP. The contract for the evaluator will begin on 8th December 2008 and end on 9th March 2009 (2 months spread over 3 months). The evaluator will submit a draft report on 15th February 2009 to UNEP/EOU, the UNEP/DGEF Task Manager, and key representatives of the executing agencies. Any comments or responses to the draft report will be sent to UNEP / EOU for collation and the consultant will be advised of any necessary revisions. Comments to the final draft report will be sent to the consultant by 28th February 2009 after which, the consultant will submit the final report no later than 9th March 2009.

In accordance with UNEP policy, all UNEP projects are evaluated by an independent evaluator contracted by the EOU. The evaluator should not have been associated with the design and implementation of the project. The evaluator will work under the overall supervision of the Chief, Evaluation and Oversight. The evaluator should have the following minimum qualifications: (i) technical experience in the area of pesticides and insecticides; (ii) expertise in human and environmental health related issues; (iii) experience with implementation and management of GEF projects, in particular demonstration projects (desirable); (iv) experience in project evaluation and (v) working experience in the region. Excellent command of spoken and written English and Spanish a requirement.

The evaluator will travel to office of regional coordinator located in Guatemala. He will also travel to demonstrations sites in Guatemala, Mexico, Costa Rica and Panama. Mexico has the two largest demonstration sites, and the Guatemala site is close to the Mexican border. Costa Rica reportedly has a high level local participation and prepared well for demonstration site activities. Costa Rica and Panama have developed border cooperation on malaria control.

7. Schedule Of Payment

Lump-Sum Option
The evaluator will receive an initial payment of 30% of the total amount due upon signature of the contract. A further 30% will be paid upon submission of the draft report. A final payment of 40% will be made upon satisfactory completion of work. The fee is payable under the individual Special Service Agreement (SSA) of the evaluator and IS **inclusive** of all expenses such as travel, accommodation and incidental expenses.

In case, the evaluator cannot provide the products in accordance with the TORs, the timeframe agreed, or his products are substandard, the payment to the evaluator could be withheld, until such a time the products are modified to meet UNEP's standard. In case the evaluator fails to submit a satisfactory final product to UNEP, the product prepared by the evaluator may not constitute the evaluation report.

Annex 1. OVERALL RATINGS TABLE

Criterion	**Evaluator's Summary Comments**	**Evaluator 's Rating**
Attainment of project objectives and results (overall rating) Sub criteria (below)		
Effectiveness		
Relevance		
Efficiency		
Sustainability of Project outcomes (overall rating) Sub criteria (below)		
Financial		
Socio Political		
Institutional framework and governance		
Ecological		
Achievement of outputs and activities		
Monitoring and Evaluation (overall rating) Sub criteria (below)		
M&E Design		
M&E Plan Implementation (use for adaptive management)		
Budgeting and Funding for M&E activities		
Catalytic Role		
Preparation and readiness		
Country ownership / driveness		
Stakeholders involvement		

Criterion	Evaluator's Summary Comments	Evaluator 's Rating
Financial planning		
UNEP Supervision and backstopping		
Overall Rating		

RATING OF PROJECT OBJECTIVES AND RESULTS

Highly Satisfactory (HS): The project had no shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

Satisfactory (S): The project had minor shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

Moderately Satisfactory (MS): The project had moderate shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

Moderately Unsatisfactory (MU): The project had significant shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

Unsatisfactory (U): The project had major shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

Highly Unsatisfactory (HU): The project had severe shortcomings in the achievement of its objectives, in terms of relevance, effectiveness or efficiency.

Please note: Relevance and effectiveness will be considered as critical criteria. The overall rating of the project for achievement of objectives and results **may not be higher** than the lowest rating on either of these two criteria. Thus, to have an overall satisfactory rating for outcomes a project must have at least satisfactory ratings on both relevance and effectiveness.

RATINGS ON SUSTAINABILITY

Sustainability will be understood as the probability of continued long-term outcomes and impacts after the GEF project funding ends. The Terminal evaluation will identify and assess the key conditions or factors that are likely to contribute or undermine the persistence of benefits after the project ends. Some of these factors might be outcomes of the project, i.e. stronger institutional capacities, legal frameworks, socio-economic incentives /or public awareness. Other factors will include contextual circumstances or developments that are not outcomes of the project but that are relevant to the sustainability of outcomes..

Rating system for sustainability sub-criteria
On each of the dimensions of sustainability of the project outcomes will be rated as follows.

Likely (L): There are no risks affecting this dimension of sustainability.

Moderately Likely (ML). There are moderate risks that affect this dimension of sustainability.

Moderately Unlikely (MU): There are significant risks that affect this dimension of sustainability

Unlikely (U): There are severe risks that affect this dimension of sustainability.

All the risk dimensions of sustainability are critical. Therefore, overall rating for sustainability will not be higher than the rating of the dimension with lowest ratings. For example, if a project has an Unlikely rating in either of the dimensions then its overall rating cannot be higher than Unlikely, regardless of whether higher ratings in other dimensions of sustainability produce a higher average.

RATINGS OF PROJECT M&E

Monitoring is a continuing function that uses systematic collection of data on specified indicators to provide management and the main stakeholders of an ongoing project with indications of the extent of progress and achievement of objectives and progress in the use of allocated funds. Evaluation is the systematic and objective assessment of an on-going or completed project, its design, implementation and results. Project evaluation may involve the definition of appropriate standards, the examination of performance against those standards, and an assessment of actual and expected results.
The Project monitoring and evaluation system will be rated on 'M&E Design', 'M&E Plan Implementation' and 'Budgeting and Funding for M&E activities' as follows:

Highly Satisfactory (HS): There were no shortcomings in the project M&E system.

Satisfactory(S): There were minor shortcomings in the project M&E system.

Moderately Satisfactory (MS): There were moderate shortcomings in the project M&E system.

Moderately Unsatisfactory (MU): There were significant shortcomings in the project M&E system.

Unsatisfactory (U): There were major shortcomings in the project M&E system.

Highly Unsatisfactory (HU): The Project had no M&E system.

"M&E plan implementation" will be considered a critical parameter for the overall assessment of the M&E system. The overall rating for the M&E systems will not be higher than the rating on "M&E plan implementation."

All other ratings will be on the GEF six point scale.

GEF Performance Description		Alternative description on the same scale
HS	= Highly Satisfactory	Excellent
S	= Satisfactory	Well above average
MS	= Moderately Satisfactory	Average
MU	= Moderately Unsatisfactory	Below Average

U	= Unsatisfactory	Poor
HU	= Highly Unsatisfactory	Very poor (Appalling)

Annex 2. Co-financing and Leveraged Resources

Co-financing (basic data to be supplied to the consultant for verification)

Co financing (Type/Source)	IA own Financing (mill US$)		Government (mill US$)		Other* (mill US$)		Total (mill US$)		Total Disbursement (mill US$)	
	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual
– Grants										
– Loans/Concessional (compared to market rate)										
– Credits										
– Equity investments										
– In-kind support			90,000		654,000		744,000			
– Other (*) - - - - -	7,165,000		5,026,000		200,000		12,391,000			
Totals	7,165,000	7,165,000	5,116,000	5,116,000	854,000		13,135,000			

* Other is referred to contributions mobilized for the project from other multilateral agencies, bilateral development cooperation agencies, NGOs, the private sector and beneficiaries.

Leveraged Resources

Leveraged resources are additional resources—beyond those committed to the project itself at the time of approval—that are mobilized later as a direct result of the project. Leveraged resources can be financial or in-kind and they may be from other donors, NGO's, foundations, governments, communities or the private sector. Please briefly describe the resources the project has leveraged since inception and indicate how these resources are contributing to the project's ultimate objective.

Table showing final actual project expenditure by activity to be supplied by the UNEP Fund management Officer. (insert here)

Global Budget: Regional Program of Action and Demonstration of Sustainable Alternatives to DDT for Malaria Vector Control in Mexico and Central America

ACTUAL EXPENDITURES AS AT 06.11.2008, PAHO ARE YET TO REPORT JULY TO DEC 2008 EXPENDITURES

	2003	2004	2005	2006	2007	2008	Total
	ACTUAL	ACTUAL	ACTUAL	ACTUAL	ACTUAL	ACTUAL	
1101 National Project Coordinator					82,110	-82,110	0
1102 Regional Coordinator	0	107,752	93,085	141,082	149,473	114,594	605,985
1103 Technical Consultant for Admin & Techn Support	15,134	18,486	1,987	30,366	51,586	6,888	124,447
Total	**15,134**	**126,238**	**95,072**	**171,448**	**283,169**	**39,372**	**730,433**
1201 Baseline and technical evaluation of Demo Projects	0	6,829	0	0	61,753	9,075	77,657
1202 Assesment of Environment and human exposure					375	-375	-1
1203 Communication plan to promote public awareness and participation Demo					14,940	-14,940	0
1204 Strenghtening of National malaria reference centres for data gathering					4,284	-4,284	0
1205 Devpt of Technical Guide for Demo Projects	0	3,469	13,715	0	1		17,185
1206 Webpage and internet maintenance of info and results of Demo Projects	0	23,121	0	4,520	9,743		37,384
1207 Establishment of a national/regional malaria surveillance system	0	0	0	0	0	0	0
1208 Rapid Test Validation for assessment of human exposure to DDT	0	0	0	0	0		0
1209 Inter-Laboratory quality control program and capacity building	0	0	0	0	0		0
1210 Implementation of GIS application with maps and data of Demo projects	0	49,999	16,805	61,519	31,243	8,148	167,714

1211 Updating of national inventories of DDT stockpiles and evaluation of the problem at regional level.	0	22,338	-9,538	1,651	49,253		63,704
1212 Identification and mapping of areas perviously sprayed with DDT	0	0	0	0	4,443		4,443
1281 Terminal Evaluation (to be paid directly by UNEP)	0	0	0	0	176,034	0	176,034
Total	**0**	**105,756**	**20,982**	**67,690**	**176,034**	**-2,376**	**368,085**
1381 Project Support Cost (PAHO 8%)	4,779	43,841	51,255	97,109	186,309	54,343	437,637
1382 Project Preparatory Costs Recovery	38,380	0	0	-384	0	4	38,000
Total	**43,159**	**43,841**	**51,255**	**96,726**	**186,309**	**54,347**	**475,637**
1601 Travel of local participants (ntl coordinators and local leaders)	0	0	0	1,311	94,597	12,643	108,551
1602 Short term travel for malaria technicians	0	2,630	0	-2,630	1,834	-1,834	0
1603 Regional Staff travel	3,710	10,299	11,061	26,174	20,000	15,072	86,316
Total	**3,710**	**12,929**	**11,061**	**24,855**	**116,431**	**25,881**	**194,867**
1999 Component Total	**62,003**	**288,764**	**178,370**	**360,719**	**761,943**	**117,223**	**1,769,022**
2101 Environment field interventions and analyticals costs	0	166	0	-166	151,619	-151,619	0
2201: Belize	0	34,954	38,660	43,656	23,937	29,512	170,719
2202: Costa Rica	0	16,653	35,159	45,082	54,100	25,391	176,384
2203: El Salvador	0	34,892	40,451	62,414	62,035	60,897	260,689
2204: Guatemala	0	31,531	67,430	72,114	90,934	135,089	397,098
2205: Honduras	0	36,452	86,067	55,709	133,859	82,475	394,562
2206: Mexico	0	77,485	56,554	384,352	411,107	349,390	1,278,888
2207: Nicaragua	0	24,248	67,670	95,652	84,473	78,319	350,362
2208: Panama	0	45,426	52,816	17,718	17,987	55,606	189,553
Total	**0**	**301,807**	**444,807**	**776,531**	**1,030,051**	**665,059**	**3,218,255**
2999 Component Total	**0**	**301,807**	**444,807**	**776,531**	**1,030,051**	**665,059**	**3,218,255**
3101 Fellowship for qualified lab technicians for training in center of excellence	0	0	0	0	0	3,620	3,620
Total	**0**	**0**	**0**	**0**	**0**	**3,620**	**3,620**
3201 Training courses and educational activities					81,197	-81,197	0
3202 Technical Regional Workshop to discuss Technical Guide and Activities of Demo. Projects	0	11,473	-2,221	0	2,244	-2,244	9,252
3203 Training courses for demo projects with local communities					464	-464	0

Total	**0**	**11,473**	**-2,221**	**0**	**83,904**	**-83,905**	**9,251**
3301 3 Steering Committee Meetings	40,324	-10,462	23,651	36,471	63,272	47,107	200,364
3302 Regional Meetings of Operational Committee	0	0	22,013	55,625	1,780	0	79,418
3303 Local meetings with Demo Projects communities	0	0	27,992	52,964	14,210	-1,218	93,947
3304 Evaluation of demo projects with locals					15,169	-15,169	0
Total	**40,324**	**-10,462**	**73,656**	**145,060**	**94,431**	**30,720**	**373,729**
3999 Component Total	**40,324**	**1,011**	**71,435**	**145,060**	**178,336**	**-49,565**	**386,601**
4101 Repackage of DDT and other persistent pesticides in UN approved containers					120,556	0	120,556
4201 Basic equipment for monitoring Demo Projects	0	257	4,607	11,845	5,604	725	23,039
4202 Strengthening of analytical infrastructure and technical capacity for assessing pesticide exposure	0	0	13,592	7,521	359,476	2,736	383,325
Total	**0**	**257**	**18,199**	**19,366**	**485,637**	**3,461**	**526,920**
4999 Component Total	**0**	**257**	**18,199**	**19,366**	**485,637**	**3,461**	**526,920**
5201 3 Regional Annual Reports	0	0	0	0	5,189	8,578	13,767
5202 Publication of Final Report (CD, Video, Book) on alternative strategies of malaria control	0	0	2,498	0	6,791	22,252	31,541
Total	**0**	**0**	**2,498**	**0**	**11,980**	**30,830**	**45,308**
5999 Component Total	**0**	**0**	**2,498**	**0**	**11,980**	**30,830**	**45,308**
GRAND TOTAL	**102,327**	**591,839**	**715,309**	**1,301,676**	**2,467,946**	**767,009**	**5,946,106**
Previous Budget	**102,327**	**591,839**	**715,309**	**5,186,561**	**568,964**	**0**	**7,165,000**
Variance Rev. 03	**0**	**0**	**0**	**-3,884,885**	**1,898,982**	**767,009**	**-1,218,894**

Annex 3

Review of the Draft Report
Draft reports submitted to UNEP EOU are shared with the corresponding Programme or Project Officer and his or her supervisor for initial review and consultation. The DGEF staff and senior Executing Agency staff provide comments on the draft evaluation report. They may provide feedback on any errors of fact and may highlight the significance of such errors in any conclusions. The consultation also seeks agreement on the findings and recommendations. UNEP EOU collates the review comments and provides them to the evaluators for their consideration in preparing the final version of the report. General comments on the draft report with respect to compliance with these TOR are shared with the reviewer.

Quality Assessment of the Evaluation Report
All UNEP GEF Mid Term Reports are subject to quality assessments by UNEP EOU. These apply GEF Office of Evaluation quality assessment and are used as a tool for providing structured feedback to the evaluator.

The quality of the draft evaluation report is assessed and rated against the following criteria:

GEF Report Quality Criteria	**UNEP EOU Assessment**	**Rating**
A. Did the report present an assessment of relevant outcomes and achievement of project objectives in the context of the focal area program indicators if applicable?		
B. Was the report consistent and the evidence complete and convincing and were the ratings substantiated when used?		
C. Did the report present a sound assessment of sustainability of outcomes?		
D. Were the lessons and recommendations supported by the evidence presented?		
E. Did the report include the actual project costs (total and per activity) and actual co-financing used?		
F. Did the report include an assessment of the quality of the project M&E system and its use for project management?		
UNEP EOU additional Report Quality Criteria	**UNEP EOU Assessment**	**Rating**
G. Quality of the lessons: Were lessons readily applicable in other contexts? Did they suggest prescriptive action?		
H. Quality of the recommendations: Did recommendations specify the actions necessary to correct existing conditions or improve operations (‘who?’ ‘what?’ ‘where?’ ‘when?)’. Can they be implemented? Did the recommendations specify a goal and an associated performance indicator?		
I. Was the report well written? (clear English language and grammar)		
J. Did the report structure follow EOU guidelines, were all requested Annexes included?		
K. Were all evaluation aspects specified in the TORs		

adequately addressed?		
L. Was the report delivered in a timely manner		

GEF Quality of the MTE report = 0.3*(A + B) + 0.1*(C+D+E+F)
EOU assessment of MTE report = 0.3*(G + H) + 0.1*(I+J+K+L)
Combined quality Rating = (2* 'GEF EO' rating + EOU rating)/3
The Totals are rounded and converted to the scale of HS to HU

Rating system for quality of terminal evaluation reports

A number rating 1-6 is used for each criterion: Highly Satisfactory = 6, Satisfactory = 5, Moderately Satisfactory = 4, Moderately Unsatisfactory = 3, Unsatisfactory = 2, Highly Unsatisfactory = 1, and unable to assess = 0.

Annex 4 GEF Minimum requirements for M&E

Minimum Requirement 1: Project Design of M&E[2]

All projects must include a concrete and fully budgeted monitoring and evaluation plan by the time of Work Program entry (full-sized projects) or CEO approval (medium-sized projects). This plan must contain at a minimum:

- SMART (see below) indicators for project implementation, or, if no indicators are identified, an alternative plan for monitoring that will deliver reliable and valid information to management
- SMART indicators for results (outcomes and, if applicable, impacts), and, where appropriate, corporate-level indicators
- A project baseline, with:
  - a description of the problem to address
  - indicator data
  - or, if major baseline indicators are not identified, an alternative plan for addressing this within one year of implementation
- An M&E Plan with identification of reviews and evaluations which will be undertaken, such as mid-term reviews or evaluations of activities
- An organizational setup and budgets for monitoring and evaluation.

2 http://gefweb.org/MonitoringandEvaluation/MEPoliciesProcedures/MEPTools/meptstandards.html

Minimum Requirement 2: Application of Project M&E

- Project monitoring and supervision will include implementation of the M&E plan, comprising:
- Use of SMART indicators for implementation (or provision of a reasonable explanation if not used)
- Use of SMART indicators for results (or provision of a reasonable explanation if not used)
- Fully established baseline for the project and data compiled to review progress
- Evaluations are undertaken as planned
- Operational organizational setup for M&E and budgets spent as planned.

SMART INDICATORS GEF projects and programs should monitor using relevant performance indicators. The monitoring system should be "SMART":

1. **Specific**: The system captures the essence of the desired result by clearly and directly relating to achieving an objective, and only that objective.
2. **Measurable:** The monitoring system and its indicators are unambiguously specified so that all parties agree on what the system covers and there are practical ways to measure the indicators and results.
3. **Achievable and Attributable:** The system identifies what changes are anticipated as a result of the intervention and whether the result(s) are realistic. Attribution requires that changes in the targeted developmental issue can be linked to the intervention.
4. **Relevant and Realistic:** The system establishes levels of performance that are likely to be achieved in a practical manner, and that reflect the expectations of stakeholders.
5. **Time-bound, Timely, Trackable, and Targeted:** The system allows progress to be tracked in a cost-effective manner at desired frequency for a set period, with clear identification of the particular stakeholder group to be impacted by the project or program.

Annex 5 List of intended additional recipients for the Terminal Evaluation

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