

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

**Progress Report for the Period:  
January 1, 2010 – October 31, 2010**

**Submitted to: WHO-AFRO, MDAST Executive Agency**  
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**Submitted by: Duke University and University of Pretoria  
on behalf of the project partners shown below:**

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National Institute of Medical Research (Tanzania)	Dr. Leonard Mboera
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# Table of Contents

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**Table of Contents**.....2

**Project background**.....3

**Narrative** .....3

**Annex 1: Project Inception Meeting Report** .....5

**Annex 2: Regional Steering Committee Report**.....10

**Annex 3: MDAST Stakeholder Survey: Preliminary Analysis** .....14

*Appendix 1: Graphical Representations of Survey Data*..... 23

**Annex 4: Report on the Stakeholder Workshops in Project Countries**.....29

*Appendix 1: Workshop Participants* ..... 40

*Appendix 2: Influence Diagram Example* ..... 42

**Annex 5: Report on the Prototype MDAST Model** .....44

**Annex 6: Interim Update on Activity 3: Barriers and Incentives for Implementation of Optimal Policies**.....49

## **Project Background:**

The Malaria Decision Analysis Support Tool (MDAST) project is working to improve the protection of human health and the environment by promoting sustainable malaria control strategies that are consistent with the successful implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs). The project has been developed in a collaborative manner with various stakeholders involved in POPs implementation and malaria control policy making and implementation, and responds to a need for capacity building for improved policy formulation. The aim of the project is to promote evidence-based, multi-sectoral malaria control policy-making in Kenya, Tanzania, and Uganda, serving as pilot for other malaria-prone countries. The project employs a comprehensive framework to assess the full range of health, social, and environmental risks and benefits associated with alternative malaria control strategies.

To accomplish this goal, the project is focusing on achieving four main outcomes:

- (1) Development of a Malaria Decision Analysis Support Tool (MDAST) that jointly incorporates health, social and environmental priorities for malaria control in Kenya, Tanzania, and Uganda.
- (2) Increased capacity for evidence-based malaria control policy making through the regular use of MDAST in Kenya, Tanzania, and Uganda.
- (3) Creation of an agenda for policy-relevant malaria research through development of MDAST and identification of key knowledge gaps.
- (4) Elucidation of requirements for replication of MDAST in other malaria-prone countries around the world.

These outcomes are being pursued through a range of activities including stakeholder and expert consultations, conceptual modeling, policy dialogue workshops, training and information sharing, partnership building, incentives analysis, and identification of knowledge gaps and research priorities. The project is establishing an inter-disciplinary network of practitioners and policymakers, and is building research, monitoring, and analytical capacity to make more informed decisions about alternative approaches to malaria prevention and treatment.

## **Narrative of work carried out during the period 1 January - 31 October 2010:**

The project partners have made excellent progress on project activities during the first year of the Malaria Decision Analysis Support Tool (MDAST) project covering the period of January 1, 2010 to October 31, 2010. Activities were undertaken in this phase according to the Year One Workplans, which defined the objectives of developing a prototype MDAST model based on literature review,

conceptual modeling and an evidence-base obtained from consultations with malaria experts, policy makers and other stakeholders. According to the Year One Workplans, the emphasis was on Activities 1, 2, and 3 as described in the Project Proposal. Activity 1 drafts a prototype of the MDAST model, Activity 2 engages in country-specific development activities related to the MDAST, and Activity 3 identifies barriers to implementation of optimal policies.

Specifically, in the period of January 1, 2010 to October 31, 2010, the project partners accomplished the following: 1) Co-organized and participated at the MDAST inception meeting in Nairobi and the first Regional Steering Committee Meeting; 2) conducted and analyzed in-country stakeholder surveys on MDAST (Activity 2); 3) conducted and analyzed stakeholder workshops in each of the three project countries (Activity 2); 4) developed and refined the MDAST model prototype according to stakeholder feedback (Activity 1); and 6) continued with research tasks including barriers to implementation of optimal malaria control policies as well as incentives for overcoming these barriers (Activity 3). The partners also had regular teleconferences mainly involving Duke University, University of Pretoria, the National Institute of Medical Research (NIMR) in Tanzania, and the WHO regional office.

This report contains the deliverables for the period of January 1, 2010 to October 31, 2010, as specified in the Year One Workplans for Duke University and the University of Pretoria. The deliverables and their location within this progress report are as follows:

- **Deliverable 1: Project Inception Meeting Report (Annex 1)**
- **Deliverable 2: Regional Steering Committee Report (Annex 2)**
- **Deliverable 3: MDAST Stakeholder Survey: Preliminary Analysis (Annex 3)**
- **Deliverable 4: Report on the Stakeholder Workshops in Project Countries (Annex 4)**
- **Deliverable 5: Report on the Prototype MDAST Model (Annex 5)**
- **Deliverable 6: Interim Update on Activity 3: Barriers and Incentives for Implementation of Optimal Policies (Annex 6)**

# **ANNEX 1:**

## ***Project Inception Meeting Report***

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### **INCEPTION MEETING OF THE MALARIA DECISION ANALYSIS SUPPORT TOOL (MDAST) PROJECT**

**March 9, 2010**

**Fairview Hotel, Nairobi, Kenya**

#### **1. Background**

The Malaria Decision Analysis Support Tool Project is designed to improve the protection of human health and the environment by promoting sustainable malaria control strategies. The project has been developed collaboratively with various stakeholders involved in malaria control policy making and implementation, and responds to a need for capacity building for improved policy formulation. The project's aim is to promote evidence-based, multi-sectoral malaria control policymaking in Kenya, Tanzania, and Uganda. It is intended to serve as a pilot for other malaria-prone countries, through the use of a comprehensive framework for assessing the full range of health, social, and environmental risks and benefits associated with alternative malaria control strategies.

An inception meeting was held on March 9, 2010 at the Fairview Hotel in Nairobi to; (1) review the project proposal for a common understanding on the project framework; (2) develop a work plan for the 1<sup>st</sup> year of the project; and (3) agree on specific contributions expected from the involved stakeholders. There were 16 participants from 6 countries representing governmental and international organizations (see list of participants at end of report).

#### **2. Meeting agenda**

The meeting began with overviews of malaria control policy making presented by representatives from each of the three project countries - Kenya, Uganda, and Tanzania (see agenda at end of report). In addition, participants completed a draft survey on malaria control policy. Clifford Mutero presented an overview of the project objectives and rationale, and this was followed by a discussion among the participants. After lunch,

Randall Kramer presented project activities and a timeline. Birkinsh Ameneshewa discussed coordination with WHO offices and the roles of each partner. Marie Lynn Miranda summarized key discussion points. Jan Betlem presented closing remarks and reflections on the day. A summary of main points of the day follows.

### **3. Main Points of Discussion:**

#### a. Importance of Reliable Information

- Understanding the distribution of burden of disease across time and geography
- Determining areas for targeting
- Distinguish between clinical versus confirmed cases
- Evaluating effectiveness of interventions

#### b. Implications of Data Issues

- Importance of co-strengthening health information systems
- Importance of databases that are understandable and accessible to multiple users
- Using better technologies to improve quality and reliability of data
  - web-based systems for uploading data from districts
  - move from paper- to digitally-based reporting systems
  - RDT combined with microscopy

#### c. Getting the Right/Enough Parameters

- Thorough review of the literature
- Critical to get country program inputs
- Importance of explicitly including behavioral change
- Recognition of uncertainty and missing data – sensitivity analysis key
- Think about making the tool useful at different geographic scales and across time

#### d. Clarify Project Purpose

“Tell me clearly in one sentence what the project is about.”

- Needs to work for multiple stakeholders
- Needs to be concise and to the point
- Needs to be consistently used in project activities

#### e. Bringing Researchers and Policymakers Together

- Critical to effecting change

- Researchers need to understand how to address policymakers
- Policymakers need to believe that the meetings/interactions will be relevant for them
- How the meetings are initiated and who does the initiation are important

#### 4. Next Steps

On the following day, March 10, the smaller steering committee met to discuss implementation details and the roles of each partner organization. The membership of each country's project steering committee was also discussed. Plans were made for a survey in each country, stakeholder workshops in each country, and a working prototype model later this year. The steering committee reviewed the draft survey instrument and provided a number of suggestions for improvement. WHO will oversee the activities of the country partners, and the universities will provide technical support. A web portal will be available shortly to serve as a central repository for project documents.

#### Final Agenda, MDAST Inception Meeting, March 2010

<b>Arrival: 8 March 2010</b>	
<b>19:00</b>	Welcome Dinner
<b>Tuesday, 9 March 2010</b>	
	<b>Session Chair: Dr. Kabula</b>
<b>8:30-9:00</b>	Welcome, introductions and opening remarks– <i>Dr. Many and Dr. Ameneshewa</i>
<b>9:00-9:15</b>	Participant questionnaire
<b>9:15-10:15</b>	Presentation on current malaria policy decision making in the 3 countries – <i>Dr. Kabatereine, Dr. Many, Dr. Mkude</i>
<b>10:15-10:30</b>	Initial discussion
<b>10:30-11:00</b>	Coffee break
	<b>Session Chair: Dr. Katureebe</b>

<b>11:00-11:40</b>	Project Overview – <i>Dr. Mutero</i>
<b>11:40-12:30</b>	General discussion of morning presentations – All participants
<b>12:30-14.00</b>	Lunch
	<b>Session Chair:</b> <i>Dr. Ngindu</i>
<b>14:00-15:00</b>	Project timeline and activities – <i>Prof. Kramer</i>
<b>15:00-15:30</b>	Tea break
<b>15:30-16:00</b>	Next steps – <i>Prof. Kramer and Dr. Mutero</i>
<b>16:00-16:30</b>	Coordination with WHO offices and AFRO GEF project – <i>Dr. Amenshewa</i>
<b>16:30-17:15</b>	General discussion – All participants
<b>17:15-17:30</b>	Discussion Points Summary – <i>Prof. Miranda</i>
<b>17:30-17:45</b>	Wrap-up – <i>Mr. Betlem</i>
<b>18:30</b>	Closing dinner

### List of participants of the MDAST Inception Meeting, 9 March 2010

	<b>Participant</b>	<b>Title</b>	<b>Organization</b>	<b>Email</b>
1	Jan Betlem	POPs Task Manager	GEF Coordination, UNEP	<a href="mailto:Jan.Betlem@unep.org">Jan.Betlem@unep.org</a>
2	Leonard Mboera	Chief Research Scientist	National Institute for Medical Research, Tanzania	<a href="mailto:lmboera@nimr.or.tz">lmboera@nimr.or.tz</a>
3	Narcis Kabatereine	Head, Vector Control Division	Ministry of Health, Uganda	<a href="mailto:vcdmoh@gmail.com">vcdmoh@gmail.com</a>
4	Rebecca Kiptui	Vector Control Focal Point	Ministry of Health, Kenya	<a href="mailto:rkiptui@domckkenya.or.ke">rkiptui@domckkenya.or.ke</a>
5	Randall Kramer	Professor	Duke University	<a href="mailto:Kramer@duke.edu">Kramer@duke.edu</a>
6	Marie Lynn	Associate Professor	Duke University	<a href="mailto:mmiranda@duke.edu">mmiranda@duke.edu</a>

	Miranda			
7	Clifford Mutero	Senior Researcher, School of Health Systems and Public Health	University of Pretoria	<a href="mailto:c.mutero@mweb.co.za">c.mutero@mweb.co.za</a>
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12	Augustine Ngindu	National Professional Officer (NPO) – Malaria	WHO, Kenya	<a href="mailto:nindua@ke.afro.who.int">nindua@ke.afro.who.int</a>
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14	Akpaka Kalu	International Professional Officer (IPO) – Malaria	WHO, Kenya	<a href="mailto:kalua@ke.afro.who.int">kalua@ke.afro.who.int</a>
15	Birkinesh Ameneshewa	Regional Vector Control Operations Officer	WHO-AFRO	<a href="mailto:ameneshewab@zw.afro.who.int">ameneshewab@zw.afro.who.int</a>
16	Irene Kanyi	Programme Assistant	GEF Coordination, UNEP	<a href="mailto:Irene.Kanyi@unep.org">Irene.Kanyi@unep.org</a>

## **ANNEX 2:**

### ***Regional Steering Committee Report***

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#### **MALARIA DECISION ANALYSIS SUPPORT TOOL (MDAST): EVALUATING HEALTH, SOCIAL AND ENVIRONMENTAL IMPACTS AND POLICY TRADEOFFS**

##### **REPORT OF THE FIRST MEETING OF THE PROJECT STEERING COMMITTEE (PSC)**

**March 10, 2010  
Fairview Hotel, Nairobi, Kenya**

#### **1. Background**

The Malaria Decision Analysis Support Tool (MDAST) project is designed to improve the protection of human health and the environment by promoting sustainable malaria control strategies. The project has been developed collaboratively with various stakeholders involved in malaria control policy making and implementation, and responds to a need for capacity building for improved policy formulation. The project's aim is to promote evidence-based, multi-sectoral malaria control policymaking in Kenya, Tanzania, and Uganda. It is intended to serve as a pilot for other malaria-prone countries, through the use of a comprehensive framework for assessing the full range of health, social, and environmental risks and benefits associated with alternative malaria control strategies.

The first meeting of the Project Steering Committee (PSC) was held on March 10, 2010 at the Fairview Hotel in Nairobi to: (1) discuss coordination and the roles and specific contributions expected from the key project partners, (2) discuss communication, (3) develop a timeline for activity milestones for the remainder of the 1<sup>st</sup> year of the project. The PSC meeting followed a full day Inception Meeting that involved a larger group of project stakeholders.

#### **2. Composition of the Project Steering Committee (PSC)**

The PSC comprises of representatives from the following key project partners:

- UNEP/GEF Coordination

- WHO-AFRO
- Duke University
- University of Pretoria
- Ministry of Health, Uganda
- Ministry of Health, Kenya
- National Institute of Medical Research, Tanzania

The following were the participants at the first PSC meeting:

**Birkinesh Ameneshewa**, Regional Vector Control Operations Officer, WHO-AFRO (Chair);

**Jan Betlem**, POPs Task Manager, GEF Coordination, UNEP;

**Randall Kramer**, Professor, Duke University;

**Clifford Mutero**, Senior Researcher, University of Pretoria - School of Health Systems and Public Health;

**Leonard Mboera**, Chief Research Scientist, National Institute of Medical Research, Tanzania;

**Narcis Kabatereine**, Head Vector Control Division, Ministry of Health, Uganda;

**Rebecca Kiptui**, Vector Control Focal Point, Ministry of Health, Kenya;

**Marie Lynn Miranda**, Professor, Duke University (Rapporteur).

### 3. Main Points of Discussion

#### 3.1 Coordination and roles of key project partners:

The meeting started by finalizing the discussion on project coordination and the respective roles of key project implementation partners, which was initiated during the previous day's inception meeting. The agreed roles and responsibilities are as follows:

#### **United Nations Environment Programme (UNEP)**

GEF Implementing Agency:

- Provides oversight on behalf of Global Environment Facility (GEF);
- Facilitates disbursement of funds from GEF to World Health Organization Regional Office for Africa (WHO-AFRO).

#### **WHO-AFRO**

Executive Agency for the project:

- Coordinates project implementation;
- Advises and guides on involvement and cooperation of international, regional, and national institutions;
- Convenes annual Project Steering Committee meetings;
- Expands platform for extension of MDAST to additional countries;
- Disburses project funds to Duke and Pretoria universities; and to national partners through WHO country offices.

Through WHO country offices:

- Engages national stakeholders through the project's national steering committee;
- Facilitates and follows up on guidance and communication from WHO regional office;
- Assists in retrieval of published and unpublished secondary data of relevance to development of parameters database;
- Ensures linkages with other regional projects in which WHO-AFRO is involved, particularly the project on sound pesticide management supported by UNEP and the malaria vector control capacity-building project funded by Bill and Melinda Gates Foundation.

### **Duke University and Pretoria University**

Technical partners providing the following support:

- Conceptual modeling for MDAST;
- Development of questionnaires for data collection from various stakeholders;
- Drafting of agenda for stakeholder workshops;
- Facilitator roles in discussions with experts in malaria-related fields, policy makers and other stakeholders during regional and in-country stakeholder workshops;
- Development of parameters database and analysis of data and information from various sources including stakeholder consultations, review of peer-reviewed publications, and secondary data mainly provided by country partners;
- Refinement of MDAST model;
- Publication of results in peer-reviewed journals and as policy briefs.

### **Country partners (MOH Uganda, MOH Kenya, NIMR Tanzania)**

Country partners will provide the main link with the local context. Each country partner will:

- Constitute a national steering committee for the project with representation from the ministry of health and other relevant sectors such as agriculture and environment;
- Compile a list of names, contact addresses and e-mails of experts in malaria-related fields, policy makers and other stakeholders to be interviewed during MDAST surveys;
- Conduct the actual surveys by interviewing the stakeholders using the questionnaire developed with support from Duke and Pretoria universities;
- Compile a short-list of 20-25 representatives of key stake-holders to participate at in-country stakeholder workshops;
- Organize the in-country stakeholder workshops including sending out invitations and making logistical arrangements for venue, travel and accommodation;
- Provide available secondary data of relevance to development of parameters database.

## **3.2 Action points and follow-up:**

### **National steering committees**

Country representatives discussed the composition of the national steering committees and project leadership. Several alternate institutional arrangements for project leadership in Uganda and Kenya were discussed. In Tanzania the project would be managed through the National Institute of Medical Research as originally planned.

### **Communication**

The WHO project officer, Birkinsh Ameneshewa, asked to be included on communications sent to the national counterparts and the national steering committees. Steering committee members should maintain open communication to ensure optimal coordination. Tele-conferences of the project steering committee will be held quarterly, with technical details to be worked out at a later date.

### **Workplan**

Initial activities will include the implementation of the survey on malaria control policy-making and the stakeholder workshops, in order to prepare the completed prototype of the tool for review. The first year work plan has been finalized for Tanzania and approved by the WHO country office. Plans for Kenya and Uganda need to be submitted as soon as possible.

### **Preliminary stakeholder Survey**

The draft survey, filled out on the previous day by meeting participants, was re-circulated for discussion. A number of suggestions were made for improving questions, wording and format. In addition, project steering committee members made recommendations for implementation of the survey. It was agreed that the in-country partners would take the lead in implementing the survey. The survey will target individuals in ministries, NGOs, and research institutes at the national and district levels. A revised survey will be circulated in May for further comments.

## **4. Timeline of key events during 2010**

- April 1 – Internet Web Portal established to share files
- May 15 - Revise survey and circulate to steering committee
- June 1– Quarterly teleconference of project steering committee
- June 1-30 - Implement survey in Kenya, Tanzania, and Uganda
- August 9-21 – Stakeholder Workshops to be held in Kenya, Tanzania, Uganda (University of Pretoria to disburse funds for the workshops to the country partners).
- September 1 – Quarterly teleconference
- October 15 - Utilizing input from survey and workshops, a completed MDAST prototype will be distributed for review
- December 1 – Quarterly teleconference

## **ANNEX 3**

### ***MDAST Stakeholder Survey: Preliminary Analysis***

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#### ***Background***

The stakeholder survey was a sub-activity of MDAST project's Activity 2, "*Conduct country-specific development activities to create initial MDAST for Tanzania, Kenya and Uganda*". According to the project proposal, a wide range of stakeholders in project countries would participate through interviews, surveys and workshops.

#### ***Identification of Stakeholders***

The survey respondents were drawn from a non-random purposeful sample of stakeholders selected by the in-country MDAST leaders. The survey targeted individuals in ministries, NGOs, universities and research institutes whose policy decisions and actions are likely to have impact on the status of malaria or influence malaria control decision-making in the respective countries. The primary sectors represented in the survey were those dealing with health, agriculture and environment issues.

#### ***Survey Administration***

A draft version of the survey was first prepared jointly by Duke University and University of Pretoria. The draft was pre-tested by administering the questionnaire among participants attending the project inception meeting in Nairobi in March 2010. The draft was then reviewed by all project partners in more detail at the first steering committee meeting held immediately after the inception workshop. The Steering Committee made a number of suggestions for improving the questions, wording and format. In addition, the Committee made recommendations for implementation of the survey. It was agreed that the in-country partners would take the lead in its implementation. A revision of the survey was undertaken by Duke and Pretoria universities and electronic copies sent to the MDAST country lead persons.

The country partners started by compiling a list of potential respondents drawn from a representative sample of the pre-determined sectors. In Kenya and Uganda, the respondents were interviewed a few days prior to some of them attending the respective country's stakeholder workshop in August 2010. This arrangement was not feasible in Tanzania, where about half the number of respondents completed the survey on the day they also attended the country's MDAST stakeholder workshop. The remaining respondents did not attend the workshop and were to complete the survey afterwards. The survey was administered to respondents in hard-copy. Respondents completed surveys by hand, after which the original copies were returned to the MDAST lead persons' offices for recording and storage. Identical copies of the completed surveys were sent by courier to Duke and University of Pretoria for data entry and analysis.

#### ***Data Entry and Preliminary Analysis***

The surveys were entered into a Microsoft Access database by MDAST collaborators at Duke University. Data entry accuracy was corroborated by two MDAST collaborators not involved in the initial entry of data. The preliminary analysis was conducted using Microsoft Excel.

This interim report on the MDAST Stakeholder Survey constitutes a preliminary analysis of most items contained in the survey. This preliminary analysis contains summary measures of the survey data aggregated across all three project countries. Therefore, where averages are reported, they are aggregate averages. The ability to draw conclusions from the preliminary aggregate summary measures is limited, but these measures nonetheless suggest interesting and potentially important trends and relationships to pursue through more in-depth analysis in the future.

Future analysis will enhance the ability to draw meaningful conclusions and policy implications from the data by applying more in-depth analytical activities such as determining standard deviations to ascertain respondent range, measure of statistical significance, and correlations of interest by and across countries as well as for individual respondents. Future analysis will make use of Excel and STATA.

The preliminary survey analysis is presented here according to the sections of the survey as it was administered: Section I: Professional Background of Stakeholder Respondents, Section II: National Malaria Control Decision Making, Section III: Criteria and Indicators for Policy Decisions, and Section IV: Malaria Control. Section IV contains the following sub-sections: Part A: Vector Control ( ITNs / LLINs, IRS with pyrethroids or DDT, & larviciding); Part B: Treatment (ACTs, IPTp / IPTi); and Part C: Diagnosis (RDTs, Microscopy, Clinical diagnosis). Figures summarizing responses to each item addressed herein are contained in Appendix 1: Graphical Representations of Survey Data.

### ***Section I: Professional Background of Stakeholder Respondents***

A total of 83 surveys were collected and analyzed for this preliminary report (Tanzania: 17, Uganda=33, Kenya= 33). A number of additional surveys remain to be received and entered into the database for analysis. Table 1, Appendix 1 summarizes key information on the participants' professional backgrounds.

#### **Q1. Please tell us the type of organization for which you work. Please check only one category .**

The first survey question generated information on the type of organizations in which stakeholder participants were primarily involved. The choices from which to select were: Government; University/Research Institution; Donor Agency; NGOs/Civil Societies/Faith-based Organization; and Other (Please specify).

Table 1 summarizes this information by country and combined across all three project countries. More respondents worked for a government entity than for any other type of organization (39 out of the 83 respondents across all countries). The second most represented organization type among respondents was "University/Research Institution" (20 of all 83 respondents). Across all countries, 13 respondents marked "Other" as their professional organization type, while 7 respondents marked "NGO/Civil Society/Faith-based organization" and 3 marked "Donor Agency". Table 1 shows the breakdown of organization type represented by respondents in each country.

**Q2. Please tell us in which sector you primarily work. Please check only one category.**

The second survey question generated information on the professional sector in which the stakeholder respondents worked. The choices from which to select were: Health; Environment; Agriculture; Education; Finance/Trade; and Other (Please specify).

Table 1 summarizes this information by country and combined across all three project countries. More stakeholder respondents worked for the health sector than for all other sectors combined (57 of the 83 respondents across all countries). Other well-represented sector selections were agriculture (10), environment (7), and "Other". The sectors of education (4 respondents overall) and finance/trade (1 respondent) were less represented in the sample.

***Section II: National Malaria Control Decision Making***

A series of survey questions sought to ascertain stakeholder perspectives on national malaria control decision making. This section gathered information from stakeholder participants in each country on who is involved in determining national malaria control policies and how frequently different actors meet with the agency chiefly responsible for national malaria control policy-making. This section also asked respondents to juxtapose the current situation and the ideal situation in their respective countries with regards to the importance of various factors influencing national malaria control policies.

**Q5. How frequently does the agency with main responsibility for malaria control policies meet with each of the following actors to discuss malaria control issues?**

Figure 1 summarizes stakeholder responses on the frequency with which the main agency responsible for national malaria control policy meets with six selected actors (Members of Parliament, Executive Government, Ministry of Environment, International Donor Agencies, University researchers, and NGOs/Civil Societies/Faith-based organizations). Respondents were asked to comment on the frequency with which each actor met with the agency primarily responsible for malaria control policies according to a 5-point Likert scale (1=Never, 3=Occasionally, 5=Frequently), with the option of selecting "Don't Know".

The aggregate average frequency across all countries according to the Likert scale is represented for each actor type in Figure 1. Aggregated across countries, stakeholders reported that the main agency for malaria control policy met with international donor agencies significantly more often than with other key actors (4.4 on the 5-point Likert scale, or nearly frequently). Other actors with which the main agency was perceived to meet with occasionally or more than occasionally were NGOs/Civil Societies/Faith-based organizations (3.5, or more than occasionally), university researchers (3.3, more than occasionally) and the Ministry of Environment (3.0, occasionally). Stakeholders reported that the agency mainly responsible for malaria control policies met with members of parliament (2.6) and the executive government (2.4) less than occasionally.

**Q6. How important is each of the following factors currently in determining your country's national malaria control policies?**

**&**

**Q7. Now please tell us how important do you think these factors should be in determining your country's national malaria control policies.**

Stakeholders were asked to evaluate the importance of selected factors in determining national malaria control policies in their country, both in the current situation (Q6) and in an ideal situation (Q7). Respondents were asked to rate factors on a 5-point Likert scale (1=Not important; 3=Neutral; 5=Very Important), with the option of selecting "Don't Know". Respondents were asked to rate the following factors: Costs of alternative strategies, Opinions of key leaders, Scientific research, Donor preferences/agenda, Popular pressure/opinion, and Other (please specify).

Figure 2 compares the average ratings according to the 5-point Likert scale aggregated across all project countries for both the current situation and the desired situation. It will be necessary to disaggregate by country before drawing any conclusions from these values. Nonetheless, the juxtaposition reveals a number of observations of preliminary interest:

- 1) The average rating of importance (aggregated across all countries) for the costs of alternative strategies was highly similar in the current and desired scenarios (4.6, nearly very important). However, it is necessary to disaggregate by country before drawing any conclusions from these values.
- 2) The average rating of importance aggregated across countries was also similar for the current and desired situations for the factor of "Popular pressure/opinion" (3.1 and 3.0 – neutral, respectively).
- 3) The biggest gap between average aggregate ratings in the current and desired situations was for the factor of "Donor preferences/agenda" (3.9 and 2.8, respectively).

### ***Section III: Criteria and Indicators for Policy Decisions***

Section III of the survey was designed to gather information on stakeholder input and perspectives on criteria and indicators for policy decisions regarding malaria control. This section asked stakeholder participants in each country to juxtapose the current situation and the ideal situation in their respective countries with regards to the importance of various objectives influencing national malaria control policies. This section also asked for stakeholder input on the importance of various indicators and risks with regards to malaria control activities and decision-making.

**Q8. How important are the following objectives as currently considered by policymakers in deciding among alternative malaria control policies?**

**&**

**Q9. How important should these objectives be in considerations by policymakers among alternative malaria control policies?**

Stakeholders were asked to evaluate the importance of selected objectives in policymakers' considerations, both in the current situation (Q8) and in an ideal situation (Q9). Respondents were asked to rate objectives on a 5-point Likert scale (1=Not important; 3=Neutral; 5=Very Important), with the option of selecting "Don't Know". Respondents were asked to rate the following objectives: Reducing malaria prevalence/incidence, Reducing the risk of epidemics, Minimizing costs, Minimizing environmental impacts, Reducing poverty, Avoiding impacts on international trade and tourism, and Other (please specify).

Figure 3 compares the average ratings according to the 5-point Likert scale aggregated across all project countries for both the current situation and the desired situation. It will be necessary to disaggregate by country before drawing any conclusions from these values. Nonetheless, the juxtaposition reveals a number of observations of preliminary interest:

- 1) Overall, the average aggregate importance value assigned to objectives was consistently higher in the desired situation than in the current situation (often markedly so).
- 2) The largest gap in the average aggregate importance value between the current and desired situation was for the objective "Reducing poverty" (3.7 and 4.5, respectively, a gap of 0.8 on the 5-point Likert scale).
- 3) The smallest gap in the average aggregate importance value between the current and desired situation was for the objective "Reducing malaria prevalence/incidence".

**Q10. How important are the following indicators of the human health impacts of malaria for policymakers?**

Respondents were asked to evaluate the importance of selected indicators of the human health impacts of malaria in policymakers' considerations. Respondents were asked to rate indicators on a 5-point Likert scale (1=Not important; 3=Neutral; 5=Very Important), with the option of selecting "Don't Know". Respondents were asked to rate the importance of the following indicators: Malaria prevalence/incidence, Malaria prevalence among children, Malaria prevalence among pregnant women, Number of uncomplicated malaria cases, Number of uncomplicated malaria cases among children, Number of uncomplicated malaria cases among pregnant women, Number of severe malaria cases, Number of severe malaria cases among children, Number of severe malaria cases among pregnant women, Malaria-related mortality, Overall child mortality, Overall mortality, and Other (please specify).

Figure 4 shows the aggregate average importance given to each of the aforementioned selected indicators of the human health impact of malaria in policymakers' considerations according to stakeholder respondent

perceptions. Many of the indicators were ranked very high, near the 5.0 value for “Very important” on the Likert scale (Prevalence/incidence: 4.9, Prevalence/Incidence among children:4.9, Prevalence among pregnant women:4.8, Number of severe cases:4.8, number of severe cases among children:4.8, malaria-related mortality:4.8). The indicator ranked as least important (number of uncomplicated cases) still had a high value of importance on the Likert scale (4.1).

**Q11. How important are the following risks for human health impacts of malaria control activities?**

Respondents were asked to evaluate the importance of selected risks for human health impacts of malaria control activities. Respondents were asked to rate risks on a 5-point Likert scale (1=Not important; 3=Neutral; 5=Very Important), with the option of selecting “Don’t Know”. Respondents were asked to rate the importance of the following risks: Exposure of residents to toxic chemicals, Exposure of control sprayers to toxic chemicals, Adverse effects of drug treatments, Allergy to nets/pesticides, Vector and parasite resistance, Other (please specify).

Figure 5 shows the aggregate average importance given to each of the aforementioned selected risks for human health impacts of malaria control activities. Overall, all risks ranked above “Neutral” (3.0) on the Likert scale for importance. The risk ranked of lowest importance was for “Allergy to nets/pesticides” (3.8). The risk ranked of highest importance was “Vector parasite resistance” (4.6, nearly very important).

**Section IV: Malaria Control**

A series of questions asked stakeholder participants to evaluate the importance of a range of selected factors when deciding on the use of specific malaria control strategies. For each question, respondents were asked to rate importance on a 5-point Likert scale (1=Not important; 3=Neutral; 5=Very Important), with the option of selecting “Don’t Know”. The questions were separated into three sub-sections (Part A: Vector Control, Part B: Treatment, and Part C: Diagnosis). The factors under consideration differed somewhat for each sub-section and strategy.

*Section A: Vector Control*

*(ITNs / LLINs, IRS with pyrethroids or DDT, & larviciding)*

**Q12. In a malaria control program, how important are the following factors when deciding on the use of Insecticide-Treated Nets (ITNs) or Long-Lasting Insecticide-Treated Nets (LLINs)?**

Respondents were asked to compare the importance of a range of factors in deciding on the use of ITNs or LLINs. The selected factors which respondents were asked to rate were: Costs, Effectiveness against malaria, Other human health impacts, Environmental impacts, Compliance/consistent use of nets by target population, Long term financial sustainability, Vector resistance, Other (please specify).

Figure 6 compares the aggregate average importance values in the decision-making process assigned to the factors for ITNs and LLINs. Overall, the aggregate average importance values were very nearly similar for a given factor between ITNs and LLINs (never more than a 0.1 point difference on the Likert scale). This suggests that the importance of a factor does not vary based on the type of net intervention being considered. The factor ranked of highest importance was “Effectiveness against malaria” (4.8 and 4.9 for ITNs and LLINs, respectively). The factor with the lowest importance value (Environmental impacts, 3.8 for both net interventions) was still ranked above neutral in importance.

**Q13. In a malaria control program, how important are the following factors when deciding on the use of indoor residual spraying (IRS) using pyrethroids or DDT?**

Respondents were asked to compare the importance of a range of factors in deciding on the use of IRS using pyrethroids or DDT. The selected factors which respondents were asked to rate were: Costs, Effectiveness against malaria, Other human health impacts, Environmental impacts, Compliance/acceptance by target population, Long term financial sustainability, Vector resistance, Trade restrictions (e.g., agricultural, horticultural, fisheries exports), and Other (please specify).

Figure 7 compares the aggregate average importance values in the decision-making process assigned to the factors for IRS using pyrethroids or DDT. Overall, many of the aggregate average importance values were very fairly similar for a given factor between using pyrethroids or DDT. However, the importance of trade restrictions was ranked higher for DDT (4.5) than for pyrethroids (3.6). Respondents also ranked “Other” factors of higher importance for DDT (4.1) than for pyrethroids (2.9). The factor ranked of highest importance was different between the methods of IRS; “Effectiveness against malaria” had the highest importance value for pyrethroids (4.8) with a similarly high value of 4.7 for DDT, while the highest importance value for DDT was assigned to environmental impacts (4.8), with a lower value of 4.3 for the importance of environmental impacts with regards to pyrethroids. The statistical significance of these relationships in the data remains to be established.

**Q14. In a malaria control program, how important are the following factors when deciding on the use of larvicides?**

Respondents were asked to compare the importance of a range of factors in deciding on the use of larvicides. The selected factors which respondents were asked to rate were: Costs, Effectiveness against malaria, Other human health impacts, Environmental impacts, Compliance/acceptance by target population, Long term financial sustainability, Vector resistance, Trade restrictions (e.g., agricultural, horticultural, fisheries exports), Other (please specify).

Figure 8 shows the aggregate average importance values assigned by respondents for the aforementioned factors with regards to larviciding. Overall, all specified factors were rated as above 4.0 in importance (“Other” factors were ranked on average as 3.9). The lowest-rated specified factor was “Compliance/acceptance by target population” (4.1). The highest-rated factor was “Effectiveness against malaria” (4.7).

*Section IV Part B: Treatment  
(ACTs, IPTp / IPTi)*

**Q15. In a malaria control program, how important are the following factors when deciding on the use of artemisinin combination therapies (ACTs) for malaria treatment?**

Respondents were asked to compare the importance of a range of factors in deciding on the use of artemisinin combination therapies (ACTs) for malaria treatment. The selected factors which respondents were asked to rate were: Costs, Effectiveness against malaria, Drug side effects, Acceptance by target population, Service delivery, Compliance with drug regimens, Long term financial sustainability, Parasite resistance to antimalarial drugs, and Other: (please specify).

Figure 9 shows the aggregate average importance values assigned by respondents for the aforementioned factors with regards to the use of artemisinin combination therapies (ACTs) for malaria treatment. Overall, all specified factors were rated as above 4.0 in importance ("Other" factors were ranked on average as 3.6). The lowest-rated specified factor was "Acceptance by target population" (4.2). The highest-rated factor was "Effectiveness against malaria" (4.9).

**Q17. How important are the following factors when deciding on the use (in a malaria control program) of intermittent preventative treatment for pregnant women and infants (IPTp and IPTi)?**

Respondents were asked to compare the importance of a range of factors in deciding on the use of intermittent preventative treatment for pregnant women and infants (IPTp and IPTi). The selected factors which respondents were asked to rate were: Costs, Effectiveness against malaria, Drug side effects, Acceptance by medical professionals, Acceptance by target population, Service delivery, Compliance with drug regimens, Long term financial sustainability, Parasite resistance to antimalarial drugs, and Other: (please specify).

Figure 10 shows the aggregate average importance values assigned by respondents for the aforementioned factors with regards to the use of intermittent preventative treatment for pregnant women and infants (IPTp and IPTi). Overall, all factors were rated as above 4.0 in importance. The lowest-rated factor was "Costs" (4.1). The highest-rated factor was "Effectiveness against malaria" (4.9).

*Part C: Diagnosis*  
*(RDTs, Microscopy, Clinical diagnosis)*

**Q18. How important are the following factors when deciding on the use (in a malaria control program) of Rapid Diagnostic Tests (RDTs) for the diagnosis of malaria?**

**&**

**Q19. How important are the following factors when deciding on the use (in a malaria control program) of microscopy for the diagnosis of malaria?**

**&**

**Q20. How important are the following factors when deciding on the use (in a malaria control program) of clinical diagnosis of malaria?**

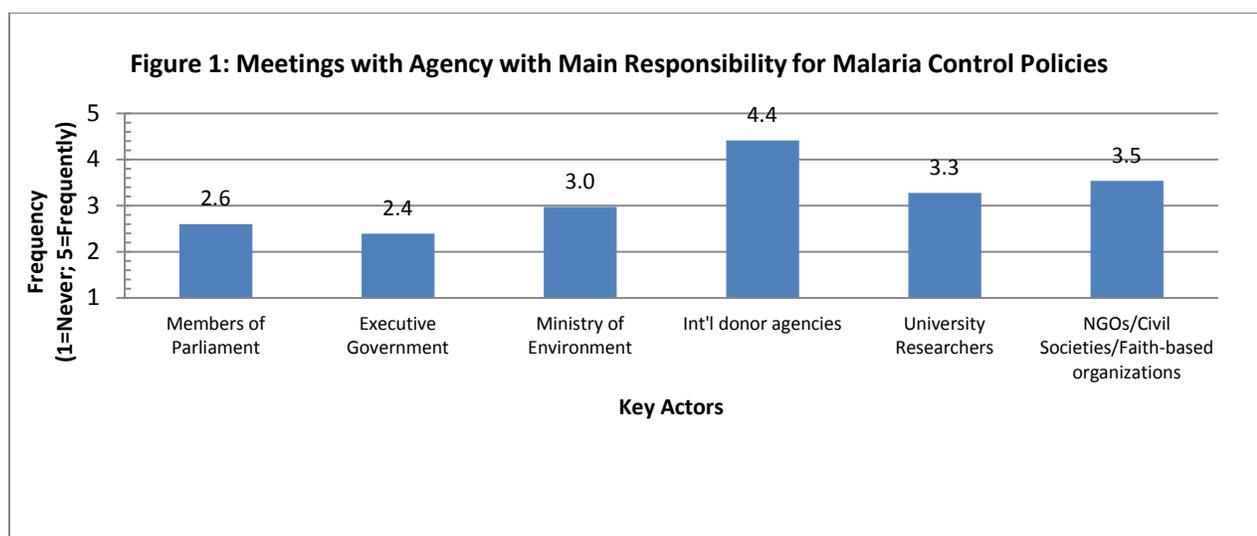
Respondents were asked to compare the importance of a range of factors in deciding on the use of different diagnostic strategies (RDTs, Microscopy, Clinical diagnosis). The selected factors which respondents were asked to rate for each diagnostic strategy were: Costs, Effectiveness/Accuracy, Acceptance by medical professionals, Acceptance by target population, Long term financial sustainability, Other: (please specify).

Figure 11 shows the aggregate average importance values assigned by respondents for the aforementioned factors with regards to the use of different diagnostic strategies (RDTs, Microscopy, Clinical diagnosis). Overall, all specified factors were rated as at or above 3.5 in importance for all diagnostic strategies. The lowest-rated specified factor was “Costs” for clinical diagnosis (3.5). The highest-rated factor was “Effectiveness/Accuracy” for RDTs (4.9). There was notable variation in importance values across diagnostic strategies for a number of factors (e.g., Costs, Effectiveness/Accuracy, Long-term financial sustainability), but the statistical significance of these relationships remains to be disaggregated by country and established.

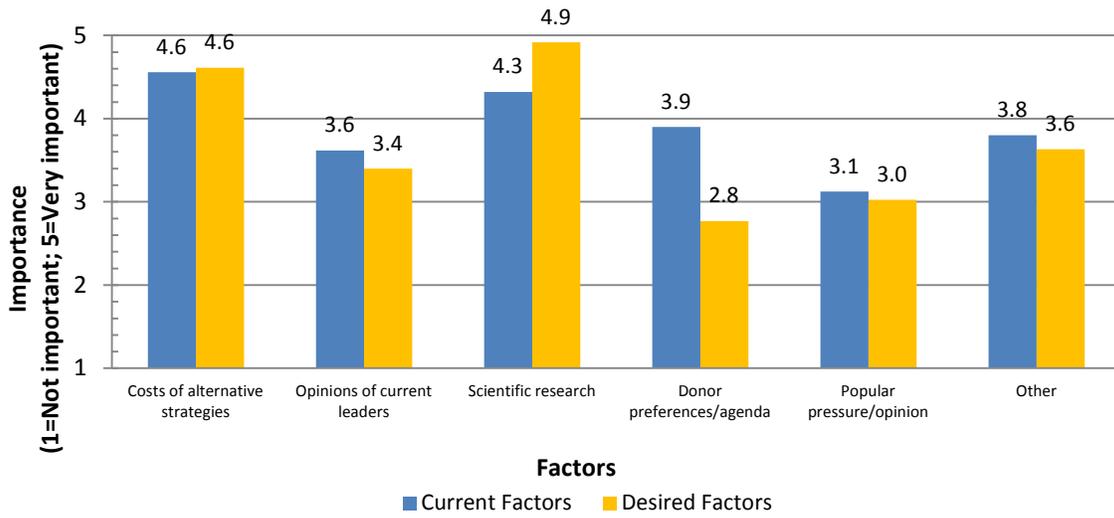
## Annex 3, Appendix 1: Graphical Representations of Survey Data

Table 1: Stakeholder Professional Background

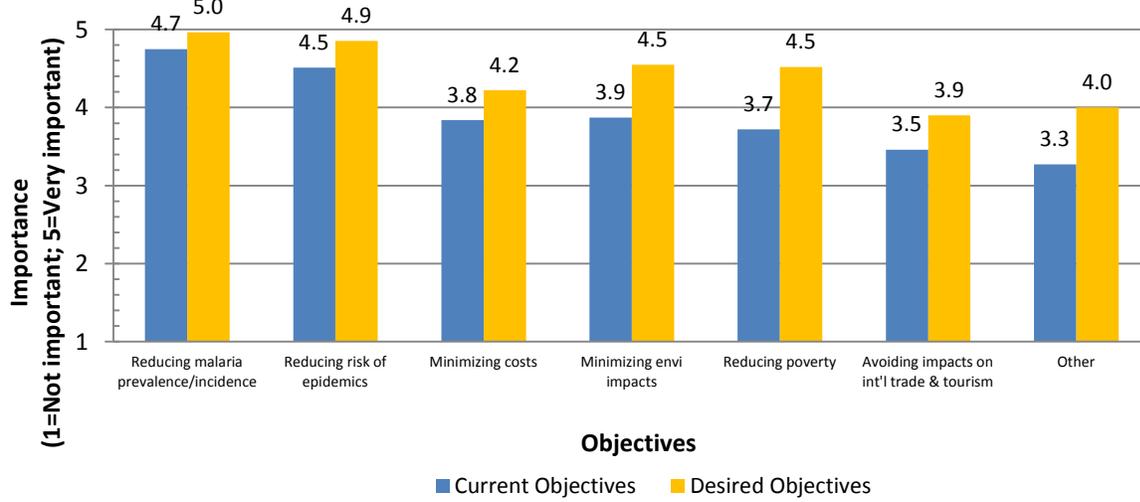
	Tanzania (N=17)	Uganda (N=33)	Kenya (N=33)	Combined (N=83)
<b>Q1: Organization</b>				
Government	7	15	17	39
University / Research Institution	7	8	5	20
Donor Agency	2	0	1	3
NGO/Civil Society/Faith-based organization	1	3	3	7
Other	0	6	7	13
<b>Q2: Sector</b>				
Health	12	25	20	57
Environment	2	2	3	7
Agriculture	3	3	4	10
Education	0	3	1	4
Finance/Trade	1	0	0	1
Other	2	1	4	7



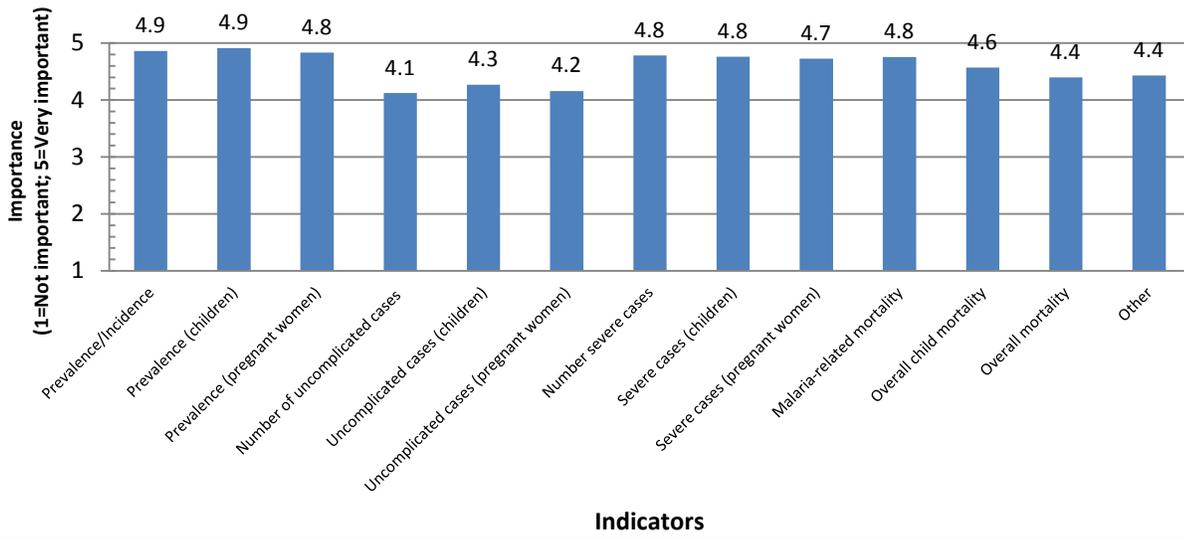
**Figure 2: Factors Determining National Malaria Control Policies (N=83)**



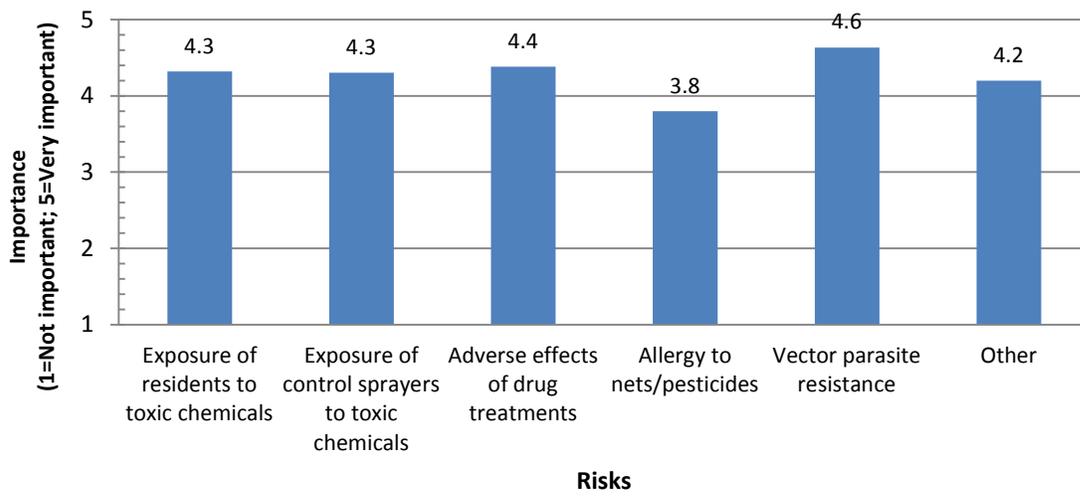
**Figure 3: Objectives for Malaria Control Policies (N=83)**



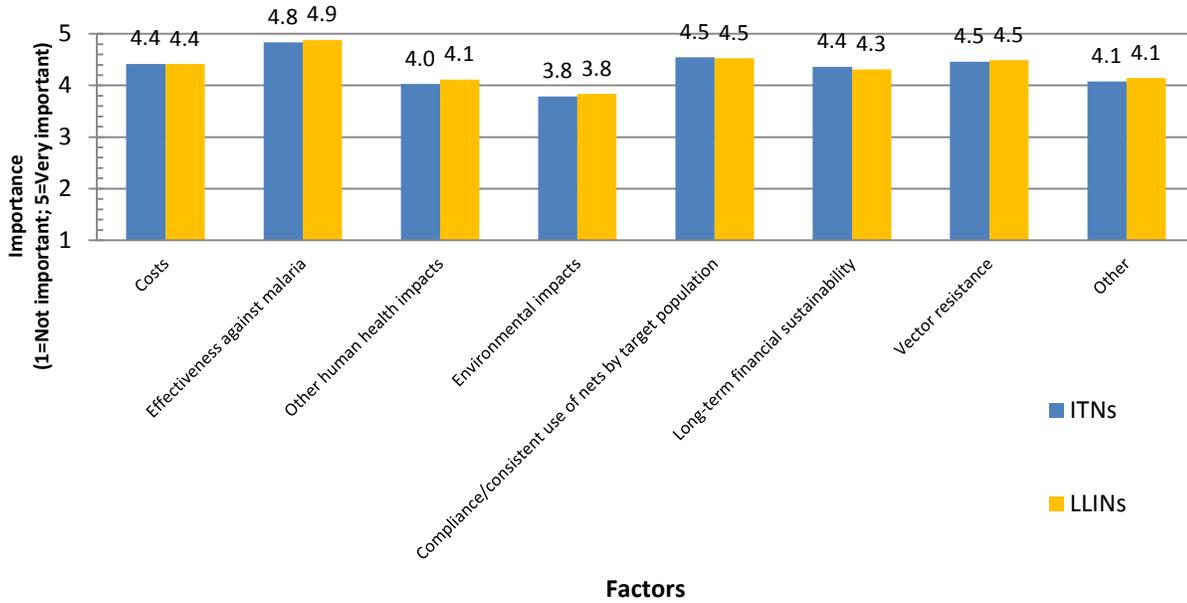
**Figure 4: Importance of Indicators for Policymakers (N=83)**



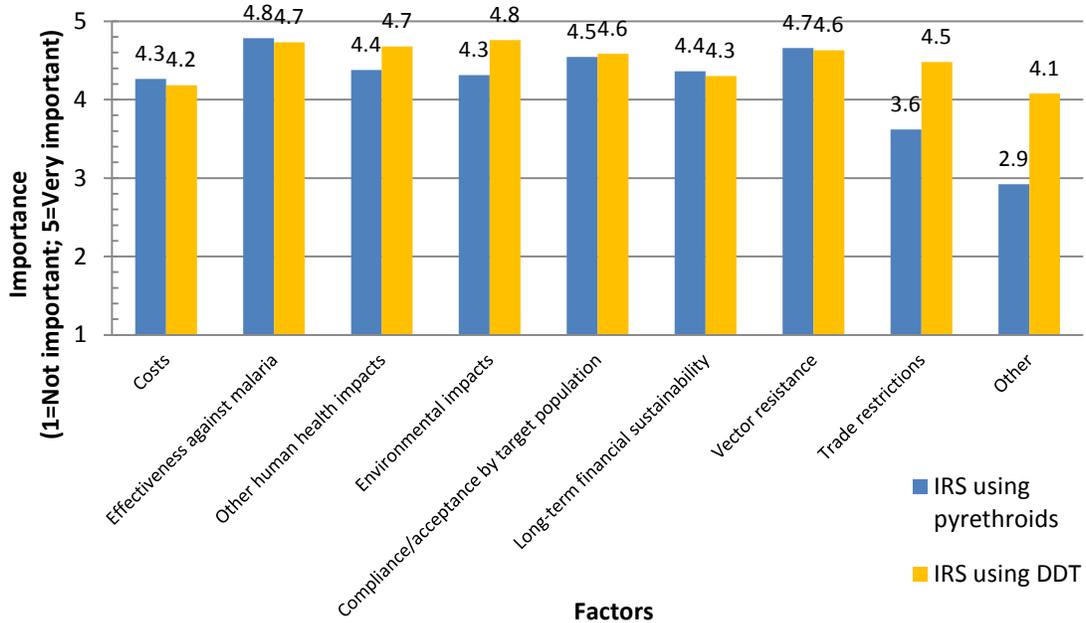
**Figure 5: Risks for Human Health Impacts of Malaria Control Activities (N=83)**



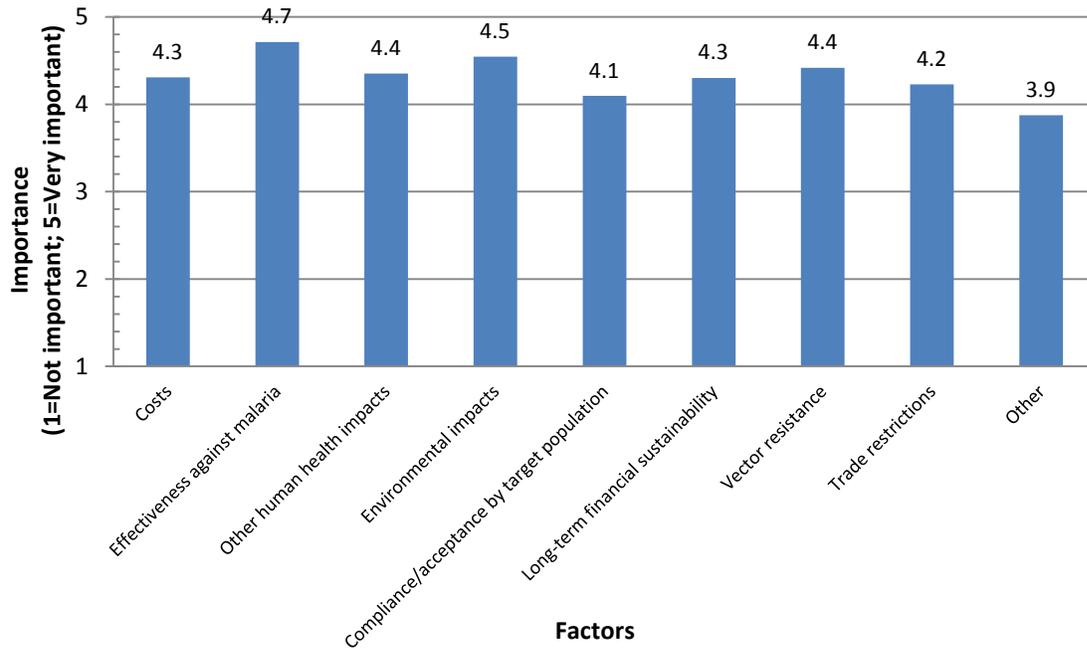
**Figure 6: Deciding on the Use of Nets (ITNs and LLINs) (N=83)**



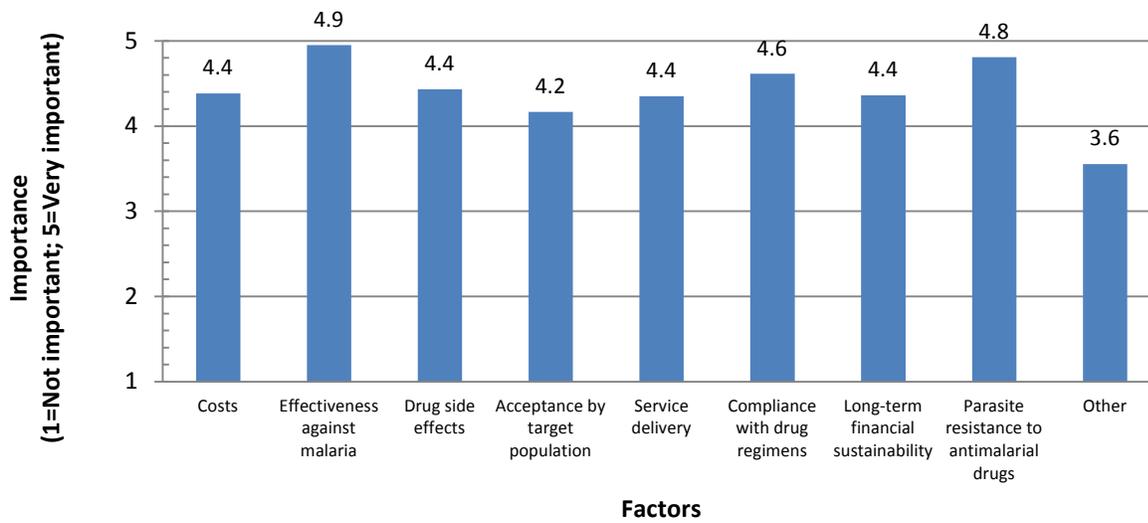
**Figure 7: Deciding on the Use of IRS (pyrethroids or DDT) (N=83)**



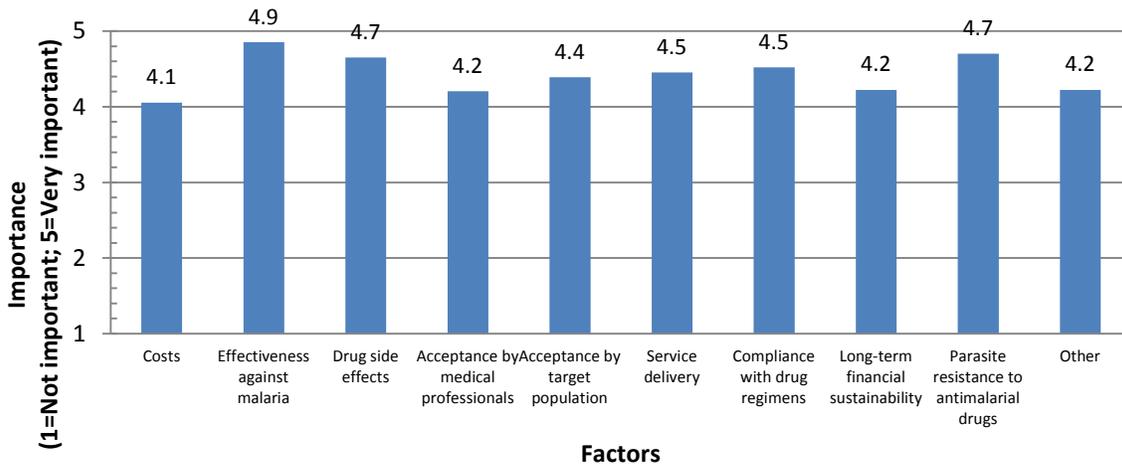
**Figure 8: Deciding on the Use of Larvicides (N=83)**



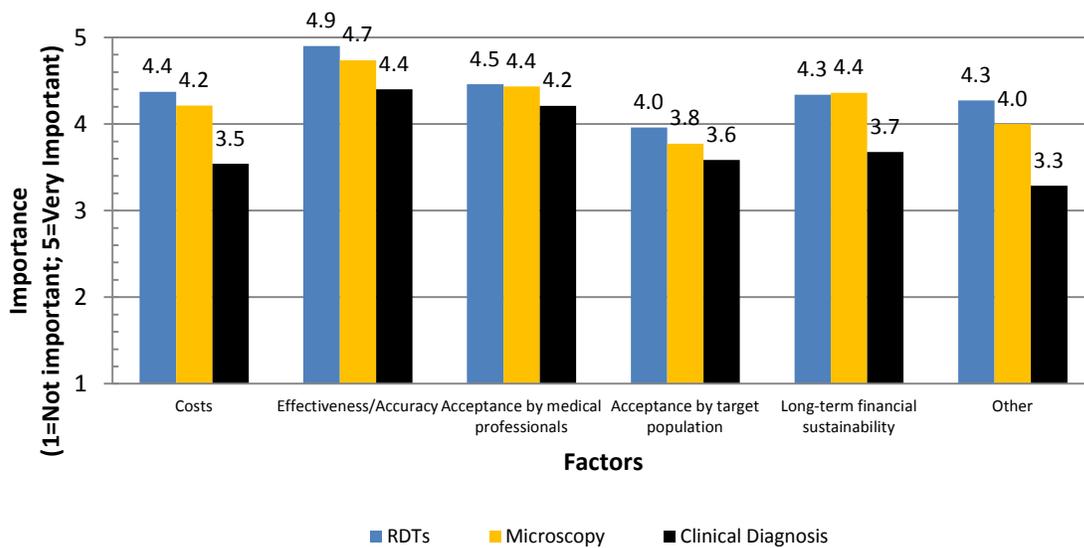
**Figure 9: Deciding on the Use of ACTs (N=83)**



**Figure 10: Deciding on the Use of IPTp and IPTi (N=83)**



**Figure 11: Diagnostic Priorities for Malaria (N=83)**



## **ANNEX 4:**

### ***Report on the Stakeholder Workshops in Project Countries***

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## **MALARIA DECISION ANALYSIS SUPPORT TOOL (MDAST) PROJECT**

### **Report on stakeholder workshops – for submission to WHO-AFRO and UNEP**

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- Uganda Workshop:** Held at Lake Victoria Serena Resort, Kampala, on Monday August 9, 2010. Co-organized by Vector Control Division (VCD), Ministry of Health
- Tanzania Workshop:** Held at National Institute of Medical Research (NIMR), Dar es Salaam, on August 13, 2010. Co-organized by NIMR
- Kenya Workshop:** Held at Garden Hotel, Machakos, on Tuesday August 17, 2010. Co-organized by Division of Malaria Control (DOMC) – Ministry of Health and WHO-Kenya

#### **Project Partners**

<b>Institution</b>	<b>Contact Researcher</b>
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National Institute of Medical Research (Tanzania)	Dr. Leonard Mboera
Ministry of Health (Uganda)- Vector Control Division	Dr. Narcis Kabatereine

# Table of Contents

<b>1. Background.....</b>	<b>31</b>
<b>2. Methodology of August 2010 Stakeholder Workshops.....</b>	<b>31</b>
<b>3. Key points from the workshops.....</b>	<b>35</b>
3.1 Points in common from the workshops	
3.2 Unique insights from each country workshop	
<b>4. Conclusion.....</b>	<b>38</b>
<b>5. Appendices.....</b>	<b>40</b>

## **1. Background**

The aim of the Malaria Decision Analysis Support Tool (MDAST) project is to promote evidence-based, multi-sectoral malaria control policymaking in Kenya, Tanzania, and Uganda, serving as pilot for other malaria-prone countries. The project employs a comprehensive framework to assess the full range of health, social, and environmental risks and benefits associated with alternative malaria control strategies. These project activities are carried out in partnership by collaborators based in each of the project countries (at the Ministry of Health in Uganda, the Ministry of Health in Kenya, and the National Institute of Medical Research in Tanzania) as well as collaborators at Duke University and the University of Pretoria. The project has been developed in a collaborative manner with multiple stakeholders involved in malaria control policy making and implementation. It responds to a need for capacity building for improved policy formulation in malaria control. The project has the following specific objectives:

- 1) To develop a Malaria Decision Analysis Support Tool (MDAST) that jointly incorporates health, social and environmental priorities for malaria control in Kenya, Tanzania, and Uganda;
- 2) To increase capacity for evidence-based malaria control policy making through the regular use of MDAST in Kenya, Tanzania, and Uganda;
- 3) To create an agenda for policy-relevant malaria research through development of MDAST and identification of key knowledge gaps;
- 4) To elucidate requirements for replication of MDAST in other malaria-prone countries around the world.

To accomplish these goals, it is important to engage a wide range of stakeholders in the project countries through interviews, surveys and workshops. Towards this end, a project inception workshop and the first steering committee meeting were held in Nairobi in March 2010. During these two meetings, all participants were briefed on the goals of MDAST. Discussions at the meetings centred on the current malaria control decision-making processes in each of the project countries. There was also considerable discussion about initial activities of the project, primarily the implementation of the stakeholder survey and the workshops in each country. Participants made a number of recommendations about how best to implement these activities. They also filled out and then critiqued a draft version of the stakeholder survey.

## **2. Methodology of August 2010 Stakeholder Workshops**

As the next stage in advancing the first-year work plan for MDAST, a stakeholder workshop was held in each of the three participant countries during August 2010. Stakeholder workshops were organized by collaborators based in each of the project countries (at the Vector Control Division in Uganda, the Division of Malaria Control in Kenya, and the National Institute of Medical Research in Tanzania) as well as collaborators at Duke University, the University of Pretoria, and the WHO. Relevant ministries within government including health, environment and agriculture, as well as representatives of district level governments, where appropriate, were invited to participate in the stakeholder workshops. In addition, participation was sought from other relevant organizations. The workshops were held as follows:

Uganda: Monday August 9, 2010



Tanzania: Friday August 13, 2010



Kenya: Tuesday August 17, 2010



See Appendix 1 for a list of participants in each of the workshops. The objectives for holding the workshops were to: 1) familiarize key stakeholders with the MDAST project and its objectives; and 2) collect inputs on malaria control decision-making from key stakeholders.

While there were some differences across the three workshops, in general, each workshop followed a very similar format as follows:

<b>8:30-9:00</b>	Welcome, introductions, and opening remarks
<b>9:00-9:15</b>	Objectives and expected outcomes
<b>9:15-10:00</b>	Introduction to influence diagrams
<b>10:00-10:30</b>	<i>Coffee break</i>
<b>10:30-12:00</b>	Breakout group design of malaria control influence diagrams
<b>12:00-13:30</b>	<i>Lunch</i>
<b>13:30-13:45</b>	How malaria control policy decisions at the program level are made
<b>13:45-15:15</b>	Group presentations and discussion
<b>15:15-15:45</b>	<i>Tea break</i>
<b>15:45-16:30</b>	Discussion of malaria control decision making
<b>16:30-17:15</b>	Discussion of MDAST development and next steps
<b>17:15-17:30</b>	Wrap-up
<b>18:00</b>	<i>Closing dinner</i>

Following welcoming remarks and introductions, an overview on the purpose of the MDAST project as a whole was provided, followed by the specific objectives of the stakeholder workshops. This session was followed by a presentation on how influence diagrams work. Because influence diagrams are essential to the development of MDAST, workshop leaders took time to formally convey the structure and purpose of influence diagrams. During the last 10 minutes of this component of the workshop, all participants were asked to draw a simple influence diagram related to malaria control policy making in the host country.

After a morning coffee break, the next stage of the workshop to the participants was explained. Workshop participants were assigned to teams, and each team was asked to develop a more complex influence diagram of how malaria control policy making happens at the program level in the respective country. These breakout sessions were characterized by lively discussions amongst the team members, demonstrating a clear interest in how influence diagrams might be used to better understand – and better design – malaria control policy making. Workshop participants were clearly enthusiastic about the

exercise, with teams asking for more time to complete their diagrams at each of the three country workshops. See Appendix 2, Figure 1 for an example of one of the influence diagrams developed during this exercise.

While the workshop broke for lunch, the teams' influence diagrams were transformed from paper-based drawings to PowerPoint slides (see, for example, Appendix 2, Figure 2). Each team had the opportunity to check the electronic representation of their influence diagrams before the afternoon session started up again. Immediately after lunch, a leader from the national malaria control policy program provided an overview presentation on how malaria control policy decisions are made at the program level. This served as an excellent opportunity to re-focus participants after lunch and to set the stage for the discussion of the group influence diagrams.

The MCP presentations were followed by presentations from each of the teams. These presentations engendered significant discussion regarding the strengths and weaknesses of each of the diagrams presented. The MDAST team views these influence diagrams and the discussion that ensued as invaluable inputs into the design and implementation of the MDAST. For example, a number of groups brought out the importance of advisory committees in shaping malaria control decision making. The influence diagrams of other groups distinguished between decisions that are made at the national level and those that are made at the district level. These important points will be reflected in the MDAST currently under development.

After a tea break, the workshop participants returned for a final round of discussions. During the March 2010 inception meeting, project staff discussed and refined a survey for key stakeholders to take and which would provide helpful information in developing the MDAST. Prior to the Uganda and Tanzania stakeholder workshop, the project coordinators from each country distributed the final survey to key stakeholders to complete. In Tanzania, participants filled out the survey during the workshop. Completed surveys were transmitted to MDAST project staff and data were entered for preliminary analysis. The late afternoon session began with a presentation of preliminary survey results. This presentation also engendered lively discussion.

The discussion of survey results was followed by a discussion of inter-sectoral collaboration. It was emphasized that MDAST in its current conceptualization focused on the making of distinct program choices and not necessarily the entire policy process from agenda setting to implementation of interventions. After this clarification the views of the participants were sought about the importance of involving different sectors in decision-making. Furthermore, participants were invited to air their views regarding status of collaboration and the main challenges in their countries. Their opinion was also sought regarding how they thought MDAST could be enhanced and used to promote policy dialogue and address concerns, including the political context of policy processes.

In the concluding discussion session, next steps for the MDAST project were discussed and input was invited from the group on the direction of the project team's work. A prototype user interface for MDAST was previewed as well. During this part of the meetings, participants suggested ways that the tool could be improved and implemented. For example, some participants expressed an interest in a web version of the tool. In Uganda, it was suggested that MDAST should be linked up with regional health initiatives so that the project could have a wider impact.

In the closing session, a summary of the key points made during the workshop was presented. Some points were common across all three workshops, while others were unique to each location.

### **3. Key points from the workshops**

#### **3.1 Points in common from the three workshops:**

- 1.** There was a common understanding and emphasis across all of the workshops that malaria control is a complicated process involving the intersection of varied stakeholders and strategies, as well as the dynamic nature of the disease. MDAST must be sufficiently sophisticated to reflect and address these layers of complexity.
- 2.** There were commonalities across workshops regarding the research agenda for malaria control:
  - a. At each of the workshops, participants expressed the need for malaria research to generate high-quality information and data specific to the situation in the country and/or the distinct regions within the country. In both the Kenya and Uganda workshops, participants stressed that the MDAST model in particular should be based on country-specific data.
    - i. Strategic integration of research efforts was a common theme across all of the workshops. Participants in Tanzania and Uganda specifically noted the importance of inter-sectoral collaboration in both research and malaria control implementation, e.g., related to (1) The agriculture sector regarding integrated vector management (IVM)
    - ii. Health systems regarding indoor residual spraying (IRS)
  - b. The Uganda and Tanzania workshops highlighted the importance of identifying clear metrics at the initial stages of data collection in order to establish a solid baseline.
- 3.** A common point of many discussions during the workshops was the importance of understanding and addressing the relationship between research and policy:
  - a. Workshop participants at all of the sites stressed the need for the research agenda on malaria control to be well-aligned with key policy questions and national health research priorities, and for the results of this research to be effectively translated and disseminated to the policy arena.
  - b. Participants in the Tanzania and Kenya workshops put emphasis on evidence-based approaches to policy-making.

Participants in both the Uganda and Tanzania workshops noted that even though good tools for malaria control may exist or are being developed, politics and issues in the political process can obstruct effective implementation.

#### **3.2 Unique insights from each country workshop:**

##### Uganda: Monday August 9, 2010

- 1.** Participants discussed the impact that culture, human behavior, and education can have on the effectiveness of malaria control strategies, as well as the interactions between control strategies and human behavior change.

- a. There was a feeling that cultural factors can obstruct the effective implementation of good tools.
  - b. Information dissemination and health education interventions are needed to combat misinformation and bring about appropriate behavior change in the affected populations.
2. Participants mentioned that the research agenda for malaria control must be forward-looking in addition to considering the current issues.
  - a. For example, there was concern that LLINs may become a much less effective approach to malaria control as vector resistance to pyrethroids builds; there is a future need for a safe and effective non-pyrethroid insecticide.
  - b. More sociological research should be done on human behavior and education interventions.
  - c. It is important to consider the issues surrounding ownership of agenda-setting for research, e.g., the NMCP does not define the research agenda. Moreover, an integrated research agenda should be emphasized.
3. The workshop addressed the issue of how decisions are made regarding malaria control policy and interventions. Findings included:
  - a. Referencing the WHO recommendations, in particular for insecticides and LLINs approved by the WHO Pesticide Evaluation Scheme, or WHOPES.
  - b. Making use of technical support from the WHO and Roll Back Malaria (RBM) partners.
  - c. The review of in-country research findings, e.g., efficacy studies on malaria drugs and IRS.
  - d. Discussions and coordination take place at various levels of government, e.g. at the Ministry of Health and in Parliament.
4. The workshop generated comments on specific malaria control strategies, such as:
  - a. The high value of combining case management and vector control strategies.
  - b. The need to manage evolving resistance, e.g. through close monitoring and employing drugs and/or insecticides in a rotating or mosaic pattern of use.
  - c. Given that Uganda has the highest Entomological Inoculation Rate (EIR), ITN interventions must be paired with IRS methods in highly endemic areas.
  - d. There is a need to coordinate with the agricultural sector to develop an effective integrated vector management approach. There is some controversy regarding the contribution of the agricultural sector to pesticide resistance.
5. Participants were concerned about the sustainability of funding and resources supporting the broad malaria control agenda. Politics, rather than objective need, often impact when and where resources are directed.
6. The workshop considered the role of the media in malaria control, particularly with regards to the broad dissemination of relevant health information and education to affected populations.
7. Regarding MDAST specifically, participants expressed the need to:
  - a. Consider how to best market the tool to policymakers, and
  - b. Introduce the tool to government ministries early on.

Tanzania: Friday August 13, 2010

1. Participants identified good government and strong institutions as essential to the effective development, enforcement, and implementation of malaria control policies, as well as for

building community buy-in and inter-sectoral collaboration. For example, there is no national funding for inter-sectoral collaborations at the local level.

2. There was a feeling that key institutions and politicians have failed to emphasize preventive approaches to malaria control, and that there must be a shift in the policy environment towards this end.
3. The workshop generated comments on malaria control strategies, such as:
  - a. There is an emphasis being put on the case management approach nationally. The use of both microscopy and RDT is expanding, with the goal to have RDT available in all regions by 2011.
  - b. It is important to define and mitigate the risks of different malaria control strategies.
  - c. There is not enough attention paid to the impacts that the introduction of DDT could have on trade and tourism.
4. It is important to consider the interaction between the internal and external motivations for change, e.g., at the national level in terms of donor preferences, as well as at the local level in terms of the implementation of strategies. Supportive laws and policy alone are insufficient; the policies need to be enforced, and community involvement and ownership in the process must be fostered.
5. The acceptability and effectiveness of strategies varies across regions of Tanzania.
6. Regarding MDAST specifically, participants commented that:
  - a. They perceive high potential value to themselves of an evidenced-based decision tool such as MDAST.
  - b. There is a need for clarification of the differences between decision trees and influence diagrams.
  - c. It is important to consider the distinction between decision analysts and decision makers, particularly with regards to the tradeoffs they perceive and consider.
  - d. The tool should consider incorporating metrics linked to the Millennium Development Goals.
  - e. The tool should be able to account for uncertainties.

#### Kenya: Tuesday August 17, 2010

1. Workshop participants pointed out a significant difference in the prevalence and characterization of malaria across different regions of the country, noting that the malaria situation in Kenya is much less homogeneous than in Uganda.
2. Regarding the research agenda, it was noted that some of the newer intervention strategies for malaria control require more research in order to build an understanding of their feasibility and efficacy.
3. Participants were eager to suggest ways to improve the effective translation of research results into the policy arena:
  - a. There is a need to establish a sustained, inclusive venue for bringing researchers and policy-makers together in Kenya (e.g., a national health research conference). For such a forum to be successful, the value of participation must be clear to all stakeholders involved.
  - b. There is a known inclusive process for engaging stakeholders in the policy process in Kenya because of the various advisory committees that work with the NMCP.. For it to

- be successful there must be a strong relationship between research institutions, programs, and policy makers.
- c. The Intersectoral Coordination Committee process in Kenya makes it possible to evaluate the national impact of malaria intervention strategies overall, including its effects on outcomes other than malaria (e.g., quality and freedom of choice regarding reproductive health care).
  - d. Researchers need to learn to be better communicators, particularly with regards to making their findings accessible and meaningful to policy-makers.
4. There was significant discussion during the workshop about the influence of politics on malaria control research and interventions:
- a. International donor agencies exert considerable influence on many aspects of malaria control, including shaping the research agenda, choosing interventions, and attracting the attention of policy makers. However, a participant commented that Kenya's comparatively strong decision-making structure facilitates good in-country evaluation and coordination of donor contributions and advice.
  - b. Politicians may often be crisis-oriented and/or have private business interests.
5. Regarding MDAST specifically, participants commented that:
- a. Influence diagrams are helpful for highlighting the relative weights that should be placed on different decision nodes and outcomes, e.g. health vs. cost outcomes.
  - b. Potential users of MDAST must be clear on what the tool does and what its results mean. Otherwise, people may misuse or fail to adopt MDAST.
  - c. The application and use of MDAST for day-to-day decision-making must be clarified.
  - d. It is important that MDAST incorporates both the big picture view as well as the underlying details of the malaria situation and control strategies.
  - e. Policy makers should be included in the stakeholder process in developing MDAST.
  - f. The tool should be flexible enough for use at different levels of decision-making, i.e., at both the policy and implementation levels. The tool should consider and reflect Kenya's move towards decentralization in terms of the level at which interventions are targeted.
  - g. The tool should be able to account for uncertainties.

## 4. Conclusion

The MDAST project aims to promote evidence-based, multi-sectoral malaria control policymaking in Kenya, Tanzania, and Uganda, serving as pilot for other malaria-prone countries. The first round of workshops was held in August 2010 in Uganda, Tanzania, and Kenya. The objectives for holding the workshops were to: 1) familiarize key stakeholders with the MDAST project and its objectives; and 2) collect inputs on malaria control decision-making from key stakeholders. During the workshops, representatives from relevant government ministries, district level government entities, and other organizations shared valuable information on the policy environment and research agenda for malaria control as well as their specific input on the MDAST model. Themes in common across all of the workshops included the complex and dynamic nature of malaria and its control, concern and advice regarding the research agenda for malaria control, and the need to address the relationship between research and policy. Each workshop also yielded unique insights on malaria control research and policy as well as the development and uptake of MDAST. The information gained from the August 2010 stakeholder workshops will be essential to the process of refining the MDAST model so that it can better

address the full range of health, social, and environmental risks and benefits associated with alternative malaria control strategies. The next round of stakeholder workshops to be held in July-August 2011 will present another opportunity to further refine the tool according to an enhanced understanding of the situation on the ground as well as the needs of its anticipated users.

## **Annex 4: APPENDICES**

### **APPENDIX 1: WORKSHOP PARTICIPANTS**

#### **Uganda:**

- Clifford Mutero
- Sam Zaramba
- Anne Akol
- Louis Mukwaya
- D. Mubangizi
- T. Lakwo
- Randall Kramer
- Moses Kanya
- Edridah Tukahebwa
- Stephen Byantwale
- M. Lugemwa
- G.S. Bimenya
- Christopher Paul
- Marie Lynn Miranda
- Francis Kazibwe
- Christine Kasedde
- Michael Okia
- Narcis Kabatereine
- A. Onapa
- D. Rubahika
- Ebony Quinfo
- Jassy Nasiima
- Patrick Turyaguma
- Richard Ndyomugenyi
- Charles Katureebe
- Helen Biyomire Ndagije

#### **Tanzania:**

- Acleus Rutta
- W.L. Kilama
- Randall Kramer
- Annette Mahende
- Denise Masuwe
- Julius Massaga
- Benjamin Mayala
- Leonard Mboera
- Marie Lynn Miranda

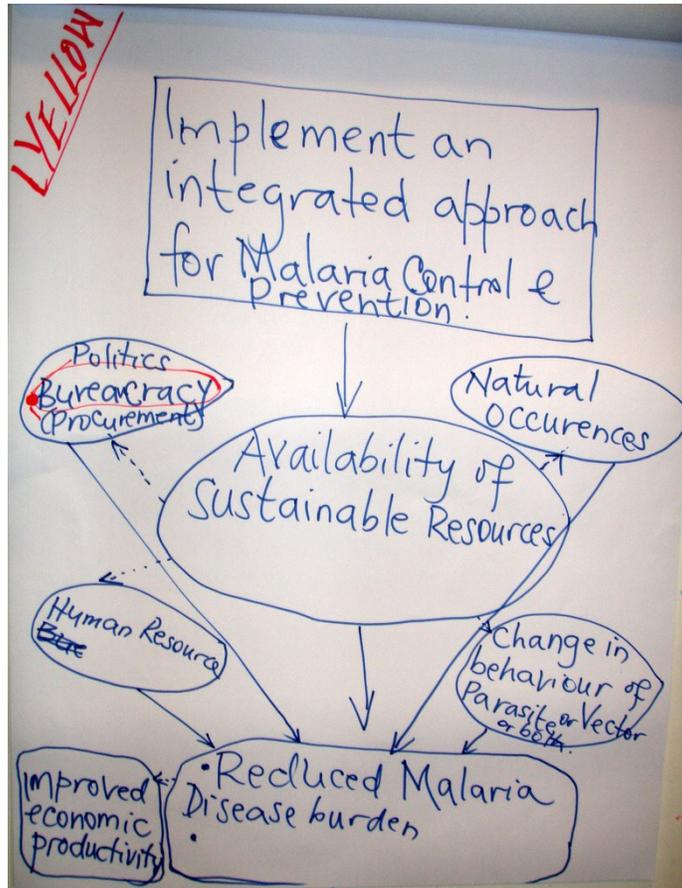
- Sigsbert Mkude
- Malongo Mlozi
- Peter Mmbuji
- Amina Msengwa
- Judith Msovela
- William Mtenga
- Clifford Mutero
- Stewart Mwanjala
- Lumumba Mwita
- Koleta Njelekela
- G. Nsengwa
- Robert Ntakamulenga
- Sospeter Nyanda
- Chris Paul
- Winna J. Shango
- Elizabeth Shayo

**Kenya:**

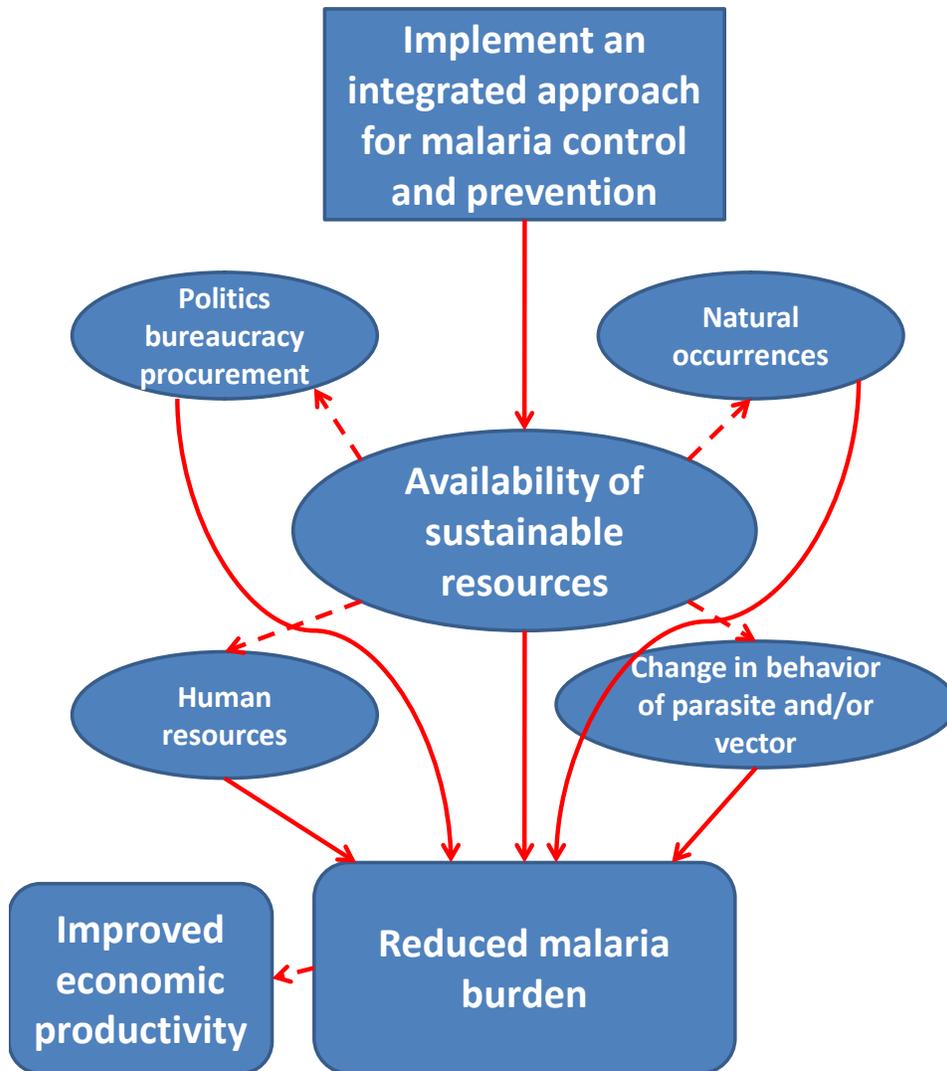
- Randall Kramer
- Marie Lynn Miranda
- Clifford Mutero
- Christopher Paul
- Elizabeth Juma
- Rebecca Kiptui
- Kiambo Njagi
- Paul Kiptoo
- Ibrahim Longolomoi
- John Githure
- Laetitia Kanja
- Faith Ndiwa
- Daniel Wacira
- Paul Saoke
- Wilfred Ndegwa
- Augustine Ngindu
- Alfred Langat
- Samuel Muiruri
- Evan Methenge

APPENDIX 2: INFLUENCE DIAGRAM EXAMPLE

**Figure 1: Example of a Hand-Drawn Team Influence Diagram (Uganda, “Yellow Team”)**



**Figure 2: Example of a Computerized Team Influence Diagram (Uganda, “Yellow Team”)**



## ANNEX 5:

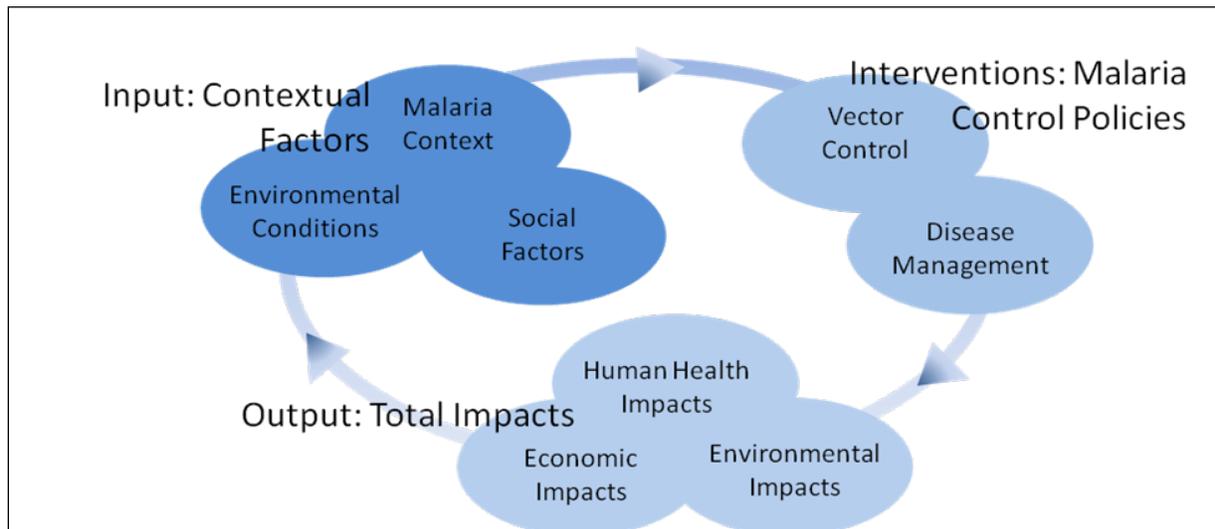
### Report on the Prototype MDAST Model

#### 1. Refinement of conceptual framework

All MDAST project investigators (i.e., from in-country leads, University of Pretoria, and Duke University) have actively collaborated to refine a conceptual decision analysis framework for a malaria decision analysis support tool (MDAST). At this stage, MDAST is an iterative model undergoing refinement to further incorporate input from key stakeholders gathered through systematic processes (i.e., the MDAST Stakeholder Survey and stakeholder workshops).

The conceptual decision analysis framework provides a tool for systematically comparing alternative malaria control policy combinations (see **Figure 1**). First, input parameters describe local contextual factors, such as social factors, environmental conditions, malaria endemicity, drug resistance, and parasitological indices. Second, the outcomes of malaria control policies – including health, environmental, and economic impacts – are derived from the input parameters based on relationships identified through the literature, expert interviews, and field-based experiments. Third, each policy combination can then be described in terms of its negative and positive impacts. Policy combinations can then be compared across user-selected metrics, including inputs (e.g., cost or personnel requirements) and outcomes (e.g., predicted malaria morbidity and mortality by age group or insecticide exposure). This last step provides decision-makers with a powerful, evidence-based tool for optimizing malaria control strategies.

**Figure 1.** Overview of a conceptual model of malaria control



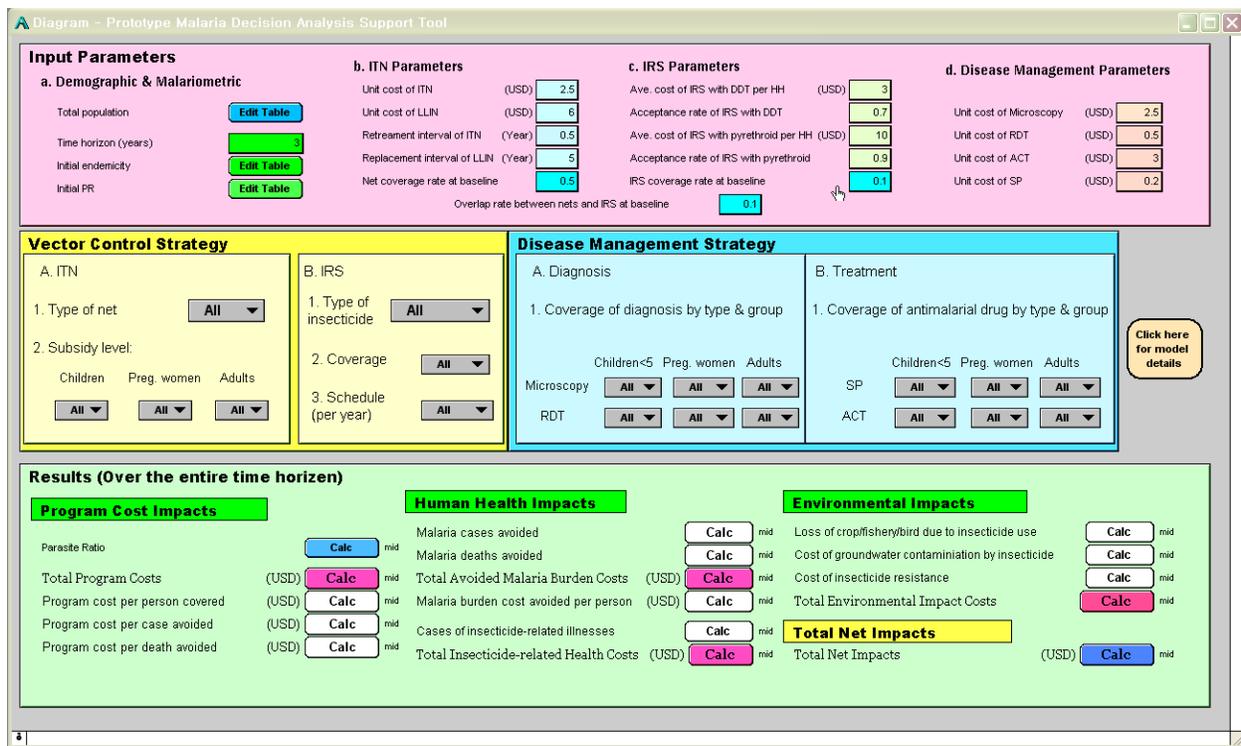
The decision analysis framework allows analysis of alternatives for implementing technologies, as well as of different mechanisms for delivering the technology to the target population. The decision analysis framework can promote an integrated approach to malaria management by drawing attention to a wide range of malaria control options and allowing policymakers to explore the impacts of varying combinations of control strategies on both

the disease management and vector control sides. The concepts and general framework of the malaria decision analysis tool are described in the recently-published paper: Kramer, R., et al. Using Decision Analysis to Improve Malaria Control Policy Making. *Health Policy*, 2009.

## 2. Development of draft prototype MDAST

Based on the conceptual decision analysis framework, the team has developed a prototype MDAST as described below and is currently developing a fully-implemented MDAST by employing Analytica® 3.1 (Lumina Decision Systems, Inc., Los Gatos, CA). **Figure 2** shows a screen shot of the prototype MDAST, which illustrates the top-level interface for decision makers who can use the tool to analyze policy trade-offs. The details of the main features of MDAST are discussed below.

**Figure 2.** Screenshot of prototype MDAST created with Analytica®



### Input Parameters

The purpose of MDAST is to allow decision makers to explore the likely impacts of different malaria control strategies on health, environmental, and economic outcomes and to optimize health delivery across both disease management and vector control options. Because the impacts of different decisions are dependent on local context, parameters describing this context may be entered by the user. Such parameters include population size by age cohort, malariometric indicators, and the cost of various health delivery options, such as the costs of ITNs and RDT kits. Population data and malariometric indicators are stratified by three demographic cohorts (children under 5, pregnant women, and other adults). The age classification system is motivated by the common knowledge that the severe symptoms of the disease are more commonly associated with children and pregnant women.

The initial level of malariometric indicators, such as the parasitemia rate (PR) and malaria endemicity status, can be entered directly into the model by the user, as shown in **Figure 2**. In this model, the PR is defined as the fraction of individuals who have bloodstage parasites, measuring malaria prevalence in the policy area. The malaria endemicity is defined as the initial fraction of the population which has acquired immunity, describing how “native” malaria currently is in the area. Also, in order to provide a platform for systematically comparing alternative malaria control policy combinations over time, the prototype MDAST model is developed to incorporate the dynamics of malaria transmission and control over different timeframes. Thus, the user can define the number of years for which the output parameters of each malaria control policy combination are estimated.

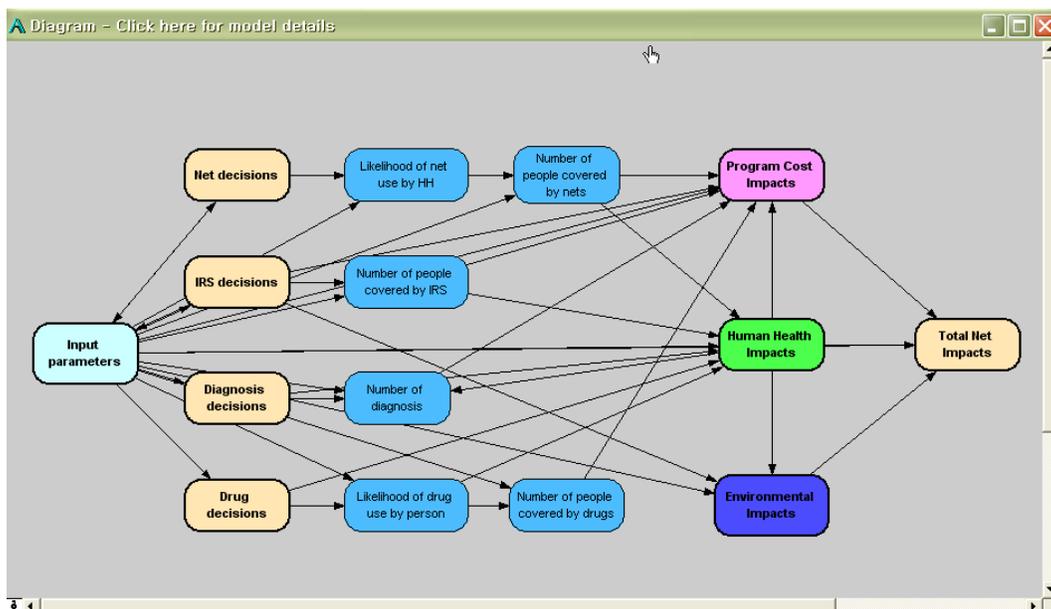
*Health Delivery Decisions: Vector Control and Disease Management*

The current version of the MDAST prototype requires the user to input decisions regarding preventive measures, which include net type (ITN or LLIN) and subsidy level, IRS type (DDT or specific pyrethroid) and coverage level, retreatment schedule, diagnostic strategies (microscopy or RDT), as well as treatment strategy (SP or ACTs, as chloroquine resistance is widespread). All strategies on subsidy and coverage levels can be stratified by the three demographics mentioned above. All of the choices are made by the user with the gray buttons in the central section of the MDAST user interface. When clicking each button, a pull-down menu appears for each specific choice from which the user can select a particular option or “All”. The prototype presented above includes several of the more commonly used interventions. The suite of interventions available in MDAST will be revised based on stakeholder interviews and workshops during August 2010.

*Modeling and Output*

Once the input parameters and health delivery decisions are specified, MDAST calculates the outcomes of the user-defined health delivery strategy by combining parameters describing the malaria context with the health delivery decisions within a systematic modeling framework. The screenshot of the influence diagram for the underlying model is shown in **Figure 3**. As shown in the figure, we created a module for each of the three impacts components, where various output parameters are estimated based on theoretical equations and various scientifically-proven assumptions. The initial versions of the program cost impacts module and the human health impact module are complete, while the environmental impacts module remains under development.

**Figure 3.** Screenshot of basic influence diagram of the model

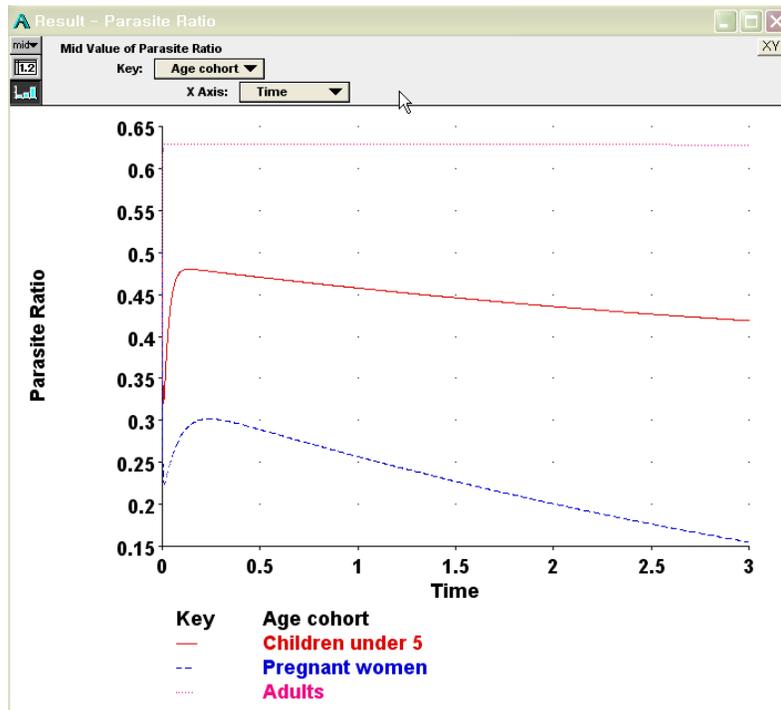


One of the most critical components of the modeling is to estimate the terminal level of parasitemia rate for each malaria control policy combination chosen by the user during the user-specified time interval. To estimate the PR, we developed a relatively standard epidemiological model of vector-borne disease transmission, incorporating vector control and drug therapy impacts. The functions and measures that must be assumed in this model introduce some significant uncertainties into the overall MDAST structure.

In order to validate the estimation process and calibrate the terminal PR estimates, the team is conducting a systematic literature review and meta-analysis for the effectiveness of vector control methods in reducing malaria risk or prevalence. So far, we have found approximately 50 peer-reviewed papers by a systematic search of five journal databases and will use the databases to develop meta-regression models using several covariates such as age, type, coverage, and so on. The findings of this meta-analysis will provide rigorous estimates of effectiveness measures of nets and IRS, along with the combined effects of both strategies.

Clicking a “Calc” box associated with a specific malaria control combination displays the parasitemia rate output window, as shown in **Figure 4**. It shows how the parasitemia rate changes for each age cohort over a period of 3 years for a given malaria control policy combination.

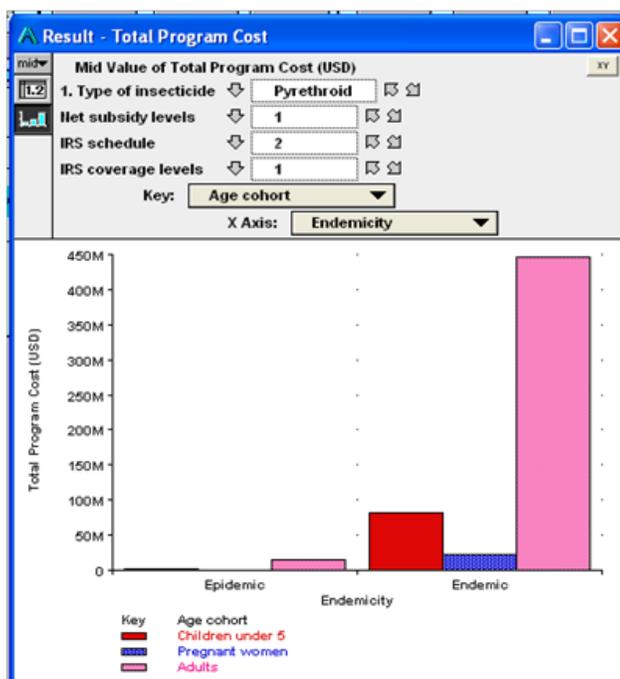
**Figure 4.** Screenshot of output window: parasitemia rate for 3 years



The estimated PR function is then used to generate: (1) economic impacts, (2) human health impacts, and (3) environmental impacts. In the current version of MDAST, economic impacts focus on program cost, human health impacts include both avoided malaria burden cost and insecticide-related health cost, and environmental impacts consist of (1) loss of crops, fisheries, and birds due to insecticide use, (2) cost of groundwater contamination by insecticide use, and (3) cost of insecticide resistance. Total program cost currently incorporates those costs associated with vector control and disease treatment strategies. This module accounts for all direct costs of malaria control, including those associated with materials and supplies (e.g., nets, drugs), as well as human resources and other costs (e.g., training people to conduct IRS, net retreatment, compliance improvement programs). Estimates of these costs are readily available in the literature. As an example, the costs of IRS for the selected insecticide (DDT or pyrethroid) are calculated by multiplying the selected coverage levels with the

average per-household cost of IRS. The former quantity is calculated by multiplying the user-selected coverage rate with the number of households and the acceptance rate among households. The latter is calculated by multiplying the number of IRS treatment rounds per year selected by the user with the cost per round per household. The results can be viewed in multiple formats. A sample screenshot is shown in **Figure 5**.

**Figure 5.** Screenshot of output window: total program cost



### 3. Work Plan

The team will continue to improve the current prototype model, with priority given to the following items:

- To revise input parameters and health delivery decision strategies based on stakeholder interviews and workshops during August 2010;
- To develop the environmental impacts module;
- To add socio-behavioral components of the model (acceptance rate for IRS, demand function for nets, actual usage rate for nets, etc.);
- To calibrate the terminal PR estimates with the findings from the meta-analysis;
- To perform sensitivity analyses for selective parameters to verify levels of uncertainty.

We plan to present a working version of the prototype MDAST model to local stakeholders and decision-makers in a workshop(s) scheduled for July/August 2011. The feedback from the workshop will enable us to refine the prototype model to reflect specific local contexts and decision preferences. We will develop the prototype model so that it can be rapidly deployed in a stakeholder workshop setting.

## **ANNEX 6:**

### ***Interim Update on Activity 3: Barriers and Incentives for Implementation of Optimal Policies***

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While the deliverables for Activity 3 are scheduled for completion in Year 2 of the MDAST project, foundational research and collaboration on barriers and incentives for implementation of optimal malaria control policies is already underway. This aim of this interim update is to provide an overview of the framework discussions and actions related to Activity 3 that have taken place during Year 1, and to lay out the plan for further developing Activity 3 deliverables during Year 2.

Activity 3 incorporates the collaboration of all MDAST investigators and draws upon the especial value of the in-country team leaders as malaria policy experts across a range of organizational levels in their countries and internationally. In addition to their own experiences and expertise in the policy arena, the in-country team leaders have tapped into their professional networks to gain access to the input and perspectives of a range of key stakeholders in malaria control policymaking. Stakeholder workshops and the MDAST Stakeholder Survey have gathered relevant input from these stakeholders in a systematic way. Rich qualitative and quantitative data from the stakeholder workshops and survey provide valuable information on barriers and incentives for implementation of optimal malaria control policies in their own right, as well as suggest areas for further research and analysis.

During Year 2 of the MDAST project, MDAST collaborators from a range of backgrounds will work together to identify, analyze, and draw conclusions on barriers and incentives for implementation of optimal malaria control policies in the three project countries. Chief components of the policy analysis will include a broad-reaching institutional analysis and as well as an incentives matrix.

The institutional analysis will develop an institutional diagnosis of current problems and what could be done to improve the prospects for different approaches through institutional changes. In particular, the institutional analysis will help validate factors already included in the prototype MDAST and well as provide guidance on additional factors that should be incorporated into the MDAST model. The institutional analysis will consider institutions at various levels, i.e.:

- International level: Including international donors and agencies with a direct role in malaria control, as well as international development and trade organizations.
- National level: Including different government ministries, as well as the “center of government” (executive, legislature, etc.).
- Local/regional level: Including issues of infrastructure and accessibility, as well as human resources.
- Individual/household level: Including culture, rules, and norms.

The project partners will also develop an incentives matrix. A given malaria control policy can be defined along at least two dimensions: 1) The technical/physical tool (or set of tools) that will be employed (e.g., ACTs, ITNs,

IRS), and 2) How the tool will be implemented or delivered to target populations. The *incentives matrix* should address the question of policy instruments, delivery mechanisms, and implementation. A partial list of “policy instruments” that could be employed for implementing malaria control policies include: carrots and sticks, laws and regulations. The incentives matrix will weigh the feasibility of potential malaria control tools (e.g., ACTs) across a range of considerations (e.g., political, economic, social/cultural, and legal feasibility).