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

Interim Progress Report for the Period:
January 1, 2011 – July 31, 2011

Submitted to: WHO-AFRO
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Submitted by: Duke University and University of Pretoria
on behalf of the project partners shown below:

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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 a prototype 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 focuses 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 throughout East Africa, 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 January 1 – July 31 2011:

The project partners have made excellent progress on project activities during the second year of the Malaria Decision Analysis Support Tool (MDAST) project covering the period of January 1 – July 31, 2011. Activities were undertaken in this phase according to the Year Two Work Plans, which defined the objectives of continuing to identify institutional barriers and incentives for implementing optimal policies; implementing country-specific training, testing, and refinement activities; beginning to conduct country-specific value of information (VOI) analyses; and disseminating preliminary project

results and lessons learned. According to the Year Two Work Plans, the emphasis was on Activities 3 (identifying barriers to implementation of optimal policies and incentives for overcoming these barriers), 4 (engaging in country-specific training, testing, and refinement activities), 5 (using country-specific MDAST modeling in value of information (VOI) analyses), and 6 (disseminating project results and lessons learned).

Specifically, in the period of January 1 – July 31, 2011, the project partners accomplished the following:

1) Co-organized and participated in the Second Regional Steering Committee Meeting;
2) Documented barriers to optimal malaria control policymaking and opportunities to overcome them through conducting a formal structured literature review, constructing a prototype incentives matrix, and establishing the basis for an institutional analysis that will develop an institutional diagnosis of current problems and what could be done to improve the prospects for new approaches through institutional change (Activity 3);
3) Continued to refine the MDAST tool by engaging in country-specific training and evaluation exercises, including consultations with in-country project partners, policy makers, and technical support entities on the use and modification of MDAST. Duke has applied results and lessons learned from these consultations towards further development of MDAST and generated a draft MDAST User Manual reflective of these updates (Activity 4);
4) Worked to disseminate project results and lessons learned, including through on-going preparation of a meta-analysis on a key malaria control intervention (IRS) employed in the model, and in-depth comparative analysis of stakeholder survey results by project country (Activity 6).

The final progress report at the close of Year Two will include the finalized deliverables associated with the period's activities according to the Year Two Work Plan. Below are the provisional interim deliverables and updates as appropriate for the select activities above which have been ongoing in the period from January 1 through July 31, as specified in the Year Two Work Plans. The interim deliverables and their location within this interim progress report are as follows:

Interim Deliverables:
- **Annex 1: Report of the Second Meeting of the Project Steering Committee**
- **Annex 2: Interim Report on Barriers and Incentives for Implementation of Optimal Policies**
- **Annex 3: Interim Report on MDAST Training, Evaluation, and Refinement Activities**

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

REPORT OF THE SECOND MEETING OF THE PROJECT STEERING COMMITTEE (PSC)

10 March 2011
Protea Courtyard Hotel, Dar es Salaam, Tanzania

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 second meeting of the Project Steering Committee (PSC) was held on March 10, 2011 at the Protea Courtyard Hotel in Dar es Salaam to: (1) Review and discuss progress made in Year 1 of the project, including stakeholder workshops, key stakeholder survey results, and MDAST tool development; (2) Review and discussion of Year 2 project activities, including stakeholder workshops and plans for further development of the MDAST model, and (3) Discuss coordination and the roles and specific contributions expected from the key project partners.

2. Composition of the Project Steering Committee (PSC)

The PSC is comprised 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 Steering Committee members were present at the second 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;

Note: (**Rebecca Kiptui**, Vector Control Focal Point, Ministry of Health, Kenya, was unable to attend).

The following individuals also attended the second PSC meeting:

Ritha Njau, NPO-MAL, WHO, Tanzania
Marie Lynn Miranda, Professor, Duke University
Irene Kanyi, Programme Assistant, GEF Coordination, UNEP;
Adriane Lesser, Associate in Research, Duke University.

3. Agenda of the Second Meeting of the Project Steering Committee

Time	Activity	Lead
8:30-8:45	Welcome, Introductions and opening remarks	Tanzania
8:45-9:00	Objectives	Birkinesh
9:00-10:30	Review of Year 1 Progress and discussion • Country presentation on workshops • Surveys in the three countries • The MDAST tool	Kenya, Tanzania, Uganda Cliff Randy
10:30-11:00	Tea Break	
11:00-12:30	Review of Year 2 Activities and discussion Workshops Administrative and Financial Issues	Kenya, Tanzania, Uganda Birkinesh
12:30-2:00	Lunch	
2:00-2:45	Plans for Stakeholder Workshops Round II (August 2011)	All
2:45-3:45	General Discussion	All
3:45-4:15	Wrap-up	All
18:00	Closing Dinner	

4. Main Points of Discussion

4.1 Meeting Objectives

The meeting began with a review of the meeting objectives as follows:

- To review progress in Year-1 project implementation;

- To Review Year-2 activities and discussion;
- To Plans for Round II Stakeholder Workshops in the 3 countries (August 2011).

4.2 Review and Discussion of Year 1 Progress

4.2.1 Stakeholder Workshops (Year 1)
- Towards advancing the first-year work plan for MDAST, a stakeholder workshop was held in each of the three project countries during August 2010.
- Stakeholder workshops were organized by collaborators based in each of the project countries 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.
- There was a brief presentation and discussion on the workshop in each country, including highlights and strengths as well as advice for organizing the stakeholder workshops in Year 2.
- The workshops in each country succeeded in bringing together representatives from many different sectors involved in malaria control, yielding engaging and productive discussions.
- There was enthusiasm among the Steering Committee regarding the potential of the MDAST tool to deeply engage National Malaria Control Program (NMCP) staff in each of the three countries. The project partners must continue and further develop targeted efforts to engage representatives of the NMCP in each country, while noting the country-specific contexts.
- A detailed account of the outcomes of the stakeholder workshops can be found in the relevant report included in the Annual Progress Report for Year 1.

4.2.2 Stakeholder Survey Results
- 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*". Data was collected in August 2010.
- According to the project proposal, the survey respondents were drawn from a wide range of stakeholders in project countries selected by the in-country MDAST leaders. The survey targeted individuals in ministries, NGOs, universities and research institutes. The primary sectors represented in the survey were those dealing with health, agriculture and environment issues since some of their actions and policies have important implications for malaria vector control.
- There was a brief presentation on preliminary results from the stakeholder surveys conducted in all three project countries in conjunction with the workshops.
- A number of graphs were shown to summarize key findings on stakeholder perceptions and priorities on malaria control programming in the three project countries.

- The survey results regarding donor preferences emphasize the need to strengthen national research systems in order to better articulate research priorities and provide the necessary guidance to researchers and decision-makers.
- The survey results on likelihood of using a tool like MDAST showed a strong enthusiasm for such a model; the reason why stakeholders did not rate their likelihood of use as high as possible may reflect that the tool was in its stages of inception during the workshop and participants were waiting for more information.
- Survey results should be interpreted with caution; the results represent respondents' opinions and may not accurately reflect the reality.
- Detailed preliminary results from the stakeholder survey can be found both in the relevant individual country reports, as well as the relevant report on all-country aggregated results contained within the Annual Progress Report for Year 1.
- Future analysis will enhance the ability to draw meaningful conclusions and policy implications from the data by applying more in-depth analytical activities by and across countries.

4.2.3 MDAST Tool Progress
- An interactive presentation of the MDAST prototype demonstrated the foundational concepts and currently operational components of the tool as well as provided a platform for discussion on the trajectory of its development.
- A number of screenshots displaying components of the MDAST prototype can be found in Appendix 1 of this report.
- There were suggestions to add more options, e.g. for pesticides, environmental costs, etc.
- "Costs" should incorporate more than the purchase cost (i.e. labor and administrative/management costs), while recognizing that input costs can be controversial.
- The tool should be reviewed for infeasible or inapplicable options (e.g., spraying every other year is not done and may confuse users).
- It is important for the model to incorporate up-to-date literature and information, e.g. a forthcoming DDT expert review, context-specific studies on the evolution of resistance, etc.

4.3 Review and Discussion of Year 2 Progress

4.3.1 Plans for MDAST Tool Development
- It is important for the Steering Committee to be able to view and give input on the tool in advance of the second round of workshops, initially scheduled to take place in August 2011.
- The Steering Committee talked about ways to improve communications and to continue the discussions on model development among all project collaborators in an engaging and dynamic way.
- One suggestion was to conduct webinars, although the logistical complexities of doing this in in-country contexts must be taken into account. A potentially more feasible method would be to share updates of the prototype by emailing progressive screenshots to the Steering Committee and other parties involved in the tool's development at this stage.

- It was agreed that the input of NMCP staff would be invaluable to the further development and improvement of the tool in advance of the next round of stakeholder workshops. After further discussion, the steering committee agreed that one-on-one tool consultation sessions with key collaborators, particularly with NMCP staff, should take place in August 2011 (with the stakeholder workshops planned for August 2011 to be shifted to April of 2012).

4.3.2   Second Stakeholder Workshops
- Objectives and Expected Outcomes:
  - The objectives of the stakeholder workshops in year two is to update key stakeholders on the status of the project and continue to engage them in its development.
  - In particular, the workshops will serve as a platform for introducing the most current MDAST prototype to the stakeholders and allowing them to pilot the tool themselves through feeding it context-specific information. The goal is for the end users to test the tool and give further feedback on areas for improvement.
  - It was suggested that in addition to the tool, the stakeholders should also be able to evaluate a draft user's manual.
  - The expected outcomes of the workshop beyond refining the tool itself include: 1) Heightening the interest in the tool among the NMCP in each country, 2) Increase awareness among decision makers and participants concerning consequences of different strategies in malaria control, 3) That the tool be viewed as practical.
- Participants:
  - In terms of numbers, the size of the workshops last year was manageable – each workshop was broken down into four appropriately-sized groups. There were 22-25 people at each workshop last year, and the aim is to keep the number of participants per workshop to under 30.
  - It would be ideal to have continuity and be able to follow-up with last year's participants.
  - It could be a good idea to issue a courtesy invitation to key politicians and WHO staff as it presents an opportunity to keep them abreast of project developments as well as inspire confidence among the other stakeholders. However, the potentially sensitive politics in each context must be taken into account when planning.
- Planning:
  - The workshops should be back-to-back to ensure consistency in the methods used and to simplify logistics for those coming from afar.
  - The suggested duration of the workshops is 1.5 days.
  - Before settling on dates, the local WHO offices should be consulted to make sure they are not having a major activity at that time as well.
  - In order to allow additional time to conduct and incorporate input from in-country one-on-one tool consultation sessions with key collaborators (particularly from the NMCP) in August 2011, it was discussed that the stakeholder workshops should take place in April of 2012 instead of in August 2011.

4.3.3 Administrative and Financial

- The carry-over of project funds to shift the Year 2 workshops to April 2012 was deemed feasible.
- The Steering Committee agreed on the importance of using necessary mechanisms for streamlining disbursement of Year 2 and Year 3 funding to project partners.
- The Steering Committee discussed planning for the upcoming Midterm Review. There is funding for one reviewer, and the process for selecting that person should start immediately. Ideally, the reviewer should attend the August 2011 consultation sessions with NMCP staff as an observer, in order for him/her to have a first-hand experience of the MDAST project's collaborative and interactive process.
- SC Members, particularly Duke and Pretoria partners, are to identify the reviewer in consultation with WHO-AFRO. The reviewer will preferably be from the (eastern) African region in order to be able to cover his/her costs within the available budget.

4.4 Schedule of Key Events 2011-2012

- June 2011: Steering Committee Teleconference
- August 2011: MDAST Tool Consultation Sessions with NMCP Staff; also attended by the project's mid-term reviewer
- December 2011: Steering Committee Teleconference
- March 2012: Third Steering Committee Meeting
- April 2012: In-country Stakeholder Workshops

APPENDIX 1: SCREENSHOTS OF THE MDAST PROTOTYPE

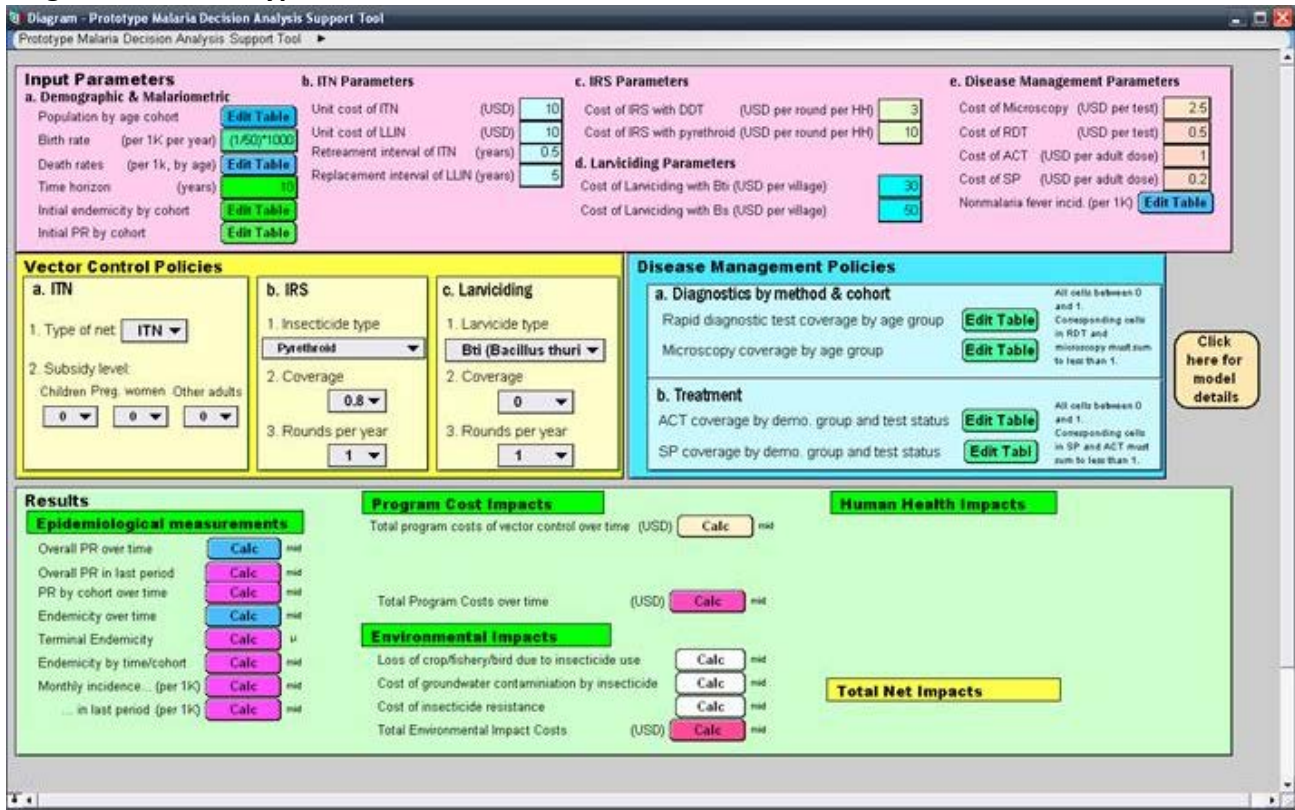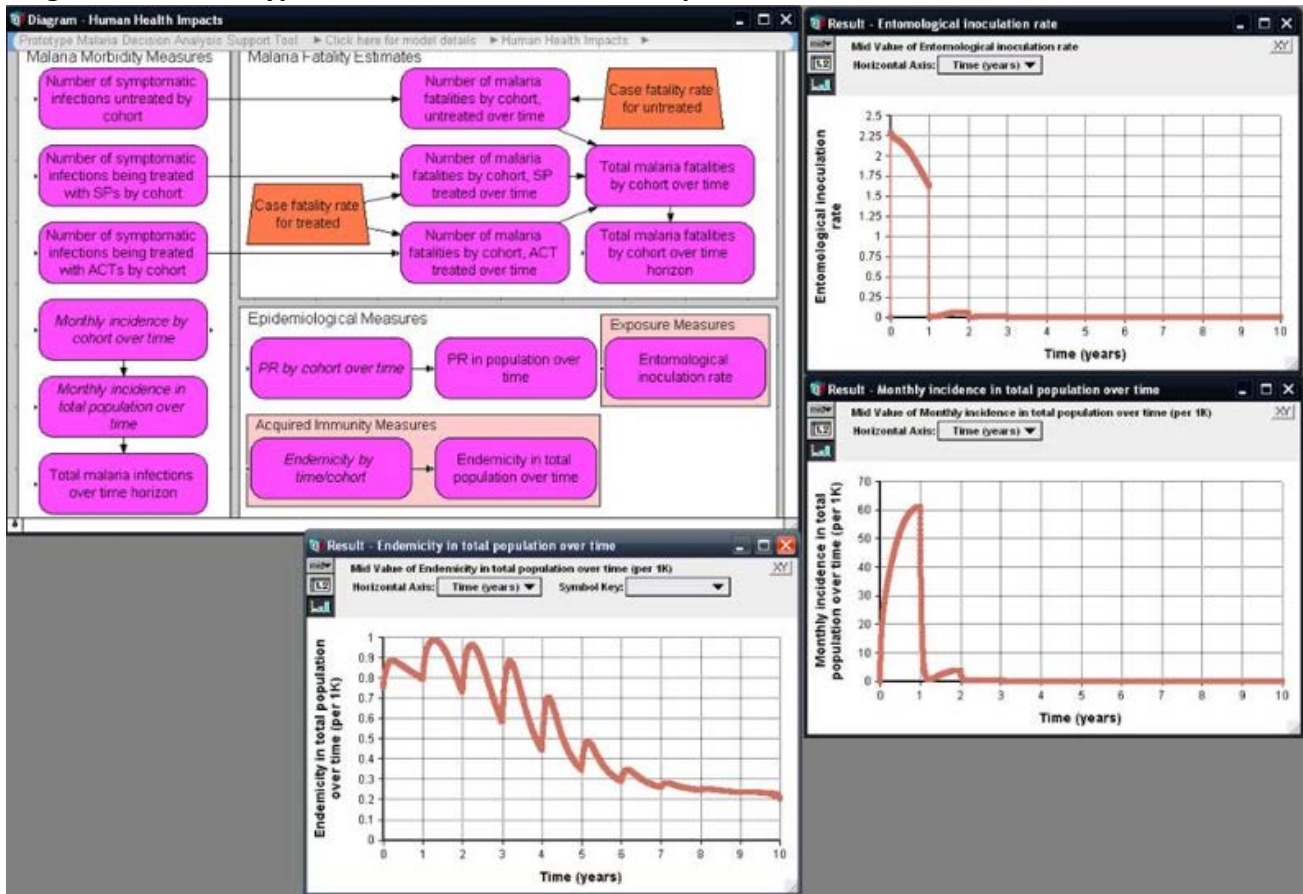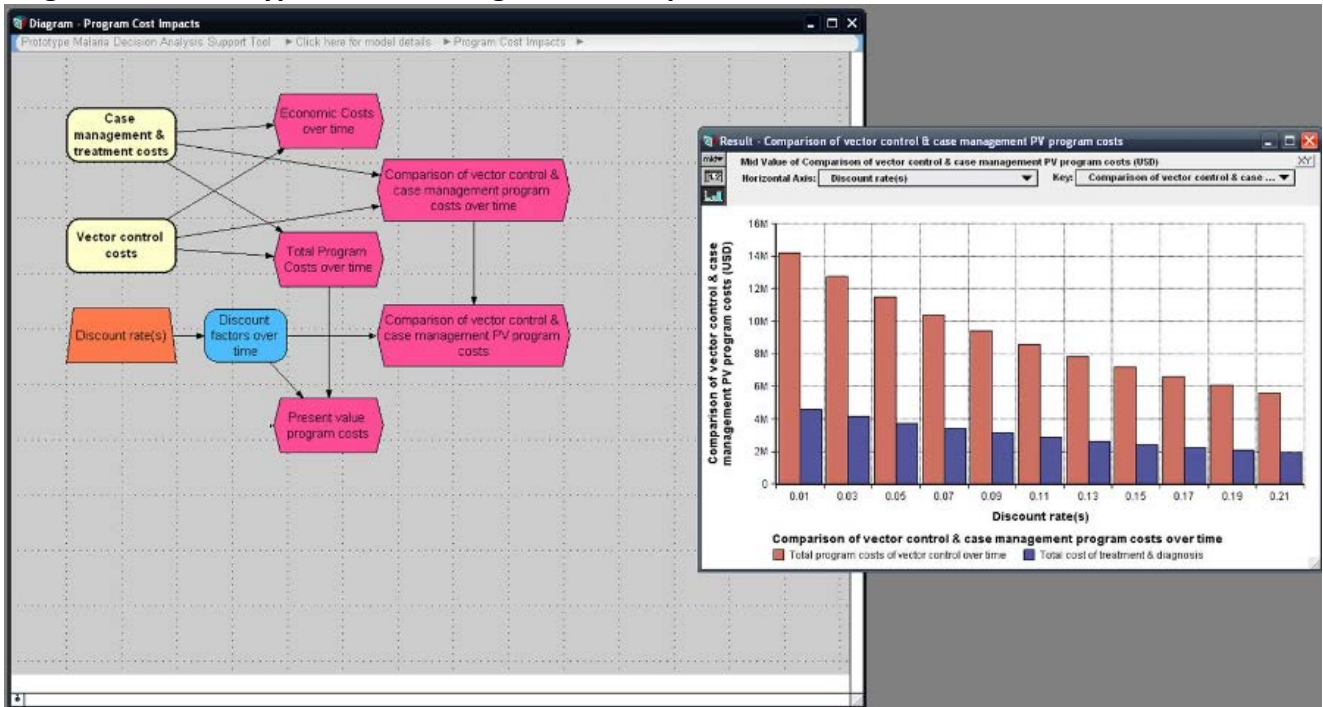## Diagram 1.1: Prototype MDAST – MDAST User Interface

Diagram 1.2: Prototype MDAST – Human Health Impacts

Diagram 1.3: Prototype MDAST – Program Cost Impacts

Annex 2: Interim Report on Barriers and Incentives for Implementation of Optimal Policies

Overview

As noted in the project proposal, "using the MDAST framework to select optimal malaria interventions will not result in policy or regulatory reform unless existing barriers to implementing these policies are eliminated and appropriate incentives are put into place to activate the new policies and monitor their results." Thus, a critical activity for year 2 of the project is the documentation of barriers to optimal malaria control and the opportunities to overcome them.

Significant progress has been made to date on Activity 3, documenting the barriers and incentives for implementation of optimal policies in malaria policy-making. A formal structured literature review was conducted in July 2011 to describe the extant literature on malaria policy barriers. Other project activities provide important inputs to Activity 3. These include 1) guidance and consultations with the MDAST steering committee and project partners, 2) the stakeholder survey conducted in 2010, 3) results from the first stakeholders' workshops in August 2010, and 4) other data collection efforts by team members, including surveys of policy makers in Uganda and Tanzania. Following the proposal activity plan, the information from these sources provided the input for a draft incentives matrix for identifying the barriers to preferred policies that may exist at the national and district level and to ascertain necessary incentives to overcome those barriers.

The matrix and data collected from the above efforts form the basis for an institutional analysis to describe means of improving the effectiveness of malaria policymaking. 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.

Ultimately, barriers and incentives related to conducting policy-relevant research and evaluating policy results will be identified in the process of MDAST dissemination and usage so that each round of policy reform can generate additional feedback for future policy deliberations.

Literature Review

A review of the literature from the previous 15 years (1996-2011) on the term 'malaria policy barriers' was conducted using Google Scholar in July 2011, which identified around 16,700 potential papers. Google Scholar is an appropriate tool for a structured literature review on barriers to malaria policy-making given the wide scope of disciplines which may document malaria interventions. Google's proprietary search algorithm indexes and analyzes results from across all available academic databases on the internet. The first 200 listings in the search results were evaluated for their relevance and classified by topical areas. Of the first 200 articles, 73, or 36.5% of the total were deemed relevant for inclusion in this summary. Articles were excluded if they were: not published in peer-reviewed articles; not on the topic of malaria control policy; on malaria but outside of the scope of policy barriers; and if they had a specific geographic focus outside of sub-Saharan Africa.

The categories identified in the literature review are:

-Access: Ability of populations to access healthcare system
-Adherence: Barriers to proper adherence to drug treatment regimes
-Availability: Availability of drugs and other malaria control measures.
-Culture: Barriers arising from cultural norms which conflict with optimal malaria control policy
-Education: Barriers arising due to lack of education, including about the causes of malaria and means to treat malaria.
-Equity: Barriers arising from structural inequity
-Funding and financing: Barriers arising from limited funding and financing for malaria control
-Gender: Barriers arising from gender norms and disparities
-Health Systems: Organizational and institutional capacity of health systems
-International Policy: Barriers arising from international policy and policy-making constraints
-Laboratory infrastructure: Barriers arising from the limitations of laboratory equipment
-Pesticide toxicity and contamination: Barriers arising from concern of pesticide toxicity and contamination
-Resistance: Barriers arising from the development of resistance by the malaria parasite or mosquito to treatment
-Research programming and priorities: Barriers to appropriate research programs and priorities
-Seasonality: Barriers arising from the seasonal/cyclical nature of malaria
-Taxes and tariffs on malaria control goods: Barriers of taxes and tariffs on goods for malaria control
-Vaccine: Barriers related to the success of a hypothetical vaccination program, such as acceptance and distribution
-Wealth: Barriers arising due to poverty or limited resources

Most prominent in the search results is the need for improvement in access to malaria treatment. Twenty-four of the 73 (32%) relevant articles in this search describe some element of access to care. Access to healthcare systems is determined by location of clinics and available transport, capacity for patients, and accessibility for those uneducated about the health system. Poor populations in particular are reported to have less access to care. Access for an individual is also dictated by their ability to afford care. Eight of the relevant articles dealt with the role of wealth as a barrier to malaria treatment or control.

Education level of both individuals and the population affect the outcomes of malaria control. Seventeen (23%) of the relevant publications mention education level as an important factor. At the household level, a number of studies indicate that the level of education is inversely correlated to the risk to the household for malaria.

The broad literature review reveals important discussions of the social barriers to malaria control. Literature in this search discussed how conditions of equity, or inequity, affect the outcomes of malaria control policies. Generally speaking, huge gaps of access to health related resources exist for the poor, rural, and vulnerable populations. The effectiveness of interventions is limited by inequity across the population. The average effect of an intervention may hide inadequate outcomes in lower resource settings. Institutional barriers such as a lack of effective systems for the identification and treatment of malaria patients pose a challenge for the organizational capacity in each country.

The literature review will provide the background for the final report on barriers and incentives, and underpin the potential barriers identified in the barriers matrix to be used in project activities.

Stakeholder Survey (July – August 2010)

As part of the MDAST project activities, malaria policy stakeholders in Kenya, Tanzania, and Uganda participated in a survey in July and August 2010 on current and optimal malaria policymaking activities in their country. A total of 97 individuals were surveyed, identified as key stakeholders by MDAST project collaborators. While not the primary objective of the survey, the responses have implications for perceptions of barriers to optimal malaria control policy.

Policymakers overwhelmingly (78%) reported that there are groups that should be included in malaria policymaking that are not currently, particularly local communities and researchers. Despite the widespread acknowledgement that communities should be more involved in policymaking, the responses vary from the community at large to local and regional elected leaders.

A number of questions from the survey indicate the differential between current practices and those practices considered optimal by the respondents. For example, respondents indicated that donors should have much less influence over policy-making than they currently have. Results also indicated policymakers should consider research more frequently in policymaking. The survey also provides input

on the primary concerns of policymakers in various malaria control activities such as treatment, the use of insecticide treated nets, and indoor residual spraying.

Stakeholders' Workshops (August 2010)

Stakeholder workshops were held in each of the three participant countries (Kenya, Uganda, and Tanzania) during August 2010. Feedback from stakeholders during the process of discussing malaria control in each country provides particular insight into the institutional structures creating barriers and opportunities for optimal malaria control policy.

Other Related Survey Work

Postgraduate student team members of MDAST conducted interviews and data collection activities in Uganda and Tanzania which provide useful input to the understanding of certain barriers in each country setting. In Uganda, 34 stakeholders were interview for their perceptions of malaria and vector control, particularly with regards to the use of integrated vector management. In Tanzania, an expert elicitation was conducted with 19 experts on the benefits and risks of insecticide treated nets and indoor residual spraying. This exercise reveals important insights into the primary concerns facing policymakers.

Draft Matrix of Barriers And Opportunities

The above activities provide the basis for a matrix of barriers and incentives associated with malaria control interventions. The draft matrix is not intended to be definitive of all barriers in all situations but rather provide the basis for identification of the key potential barriers in each setting. An example is displayed on the following page.

Example Section of Incentives Matrix

CONTROL METHOD:		SCALE OF ACTION:			
Vector Control		Individual/ Household	Local / District	National	International
IRS (DDT)	*Actions needed*	Consent to having home sprayed; Do not wash walls; Pay user fees?	Administer spraying program; education campaign	Fund spraying program Provide training, materials	Provide funding and/or insecticide Impose/ do not impose sanctions for spraying
	Barriers and opportunities	(+) Desire for reduced mosquito exposure & malaria control (-) Fears about DDT (-) Cleaning behaviors that conflict with IRS (-) Inability or unwillingness to pay user fees (if applicable)	(-) Local personnel and resource constraints (-) Local community relations	(-) National budgets and know-how	(-) Opposition to DDT, particularly among European trading partners (-) Threat of economic sanctions
IRS (pyrethroids)	*Actions needed*	Consent to having home sprayed Do not wash walls Pay user fees?	Administer spraying program; education campaign	Fund spraying program Provide training, materials	Provide funding and/or insecticide
	Barriers and opportunities	(+) Desire for reduced mosquito exposure & malaria control (-) Opposition to insecticide use in homes (-) Cleaning behaviors that conflict with IRS (-) Inability or unwillingness to pay user fees (if applicable)	(-) Local personnel and resource constraints	(-) National budgets and know-how	(+) Greater acceptance of non-DDT insecticides among international donors

Annex 3: Interim Report on MDAST Training, Evaluation, and Refinement Activities

During the project period of January 1, 2011- July 31, 2011, the project partners have engaged in numerous country-specific training, testing, and refinement activities with regards to MDAST, in accordance with Activity 4. In particular, the project partners have carried out the following:

1) **Continued incorporating feedback from the first round of MDAST Stakeholder Workshops into the model's development (January – February)**

   In further developing the tool throughout Year Two of the project, the team took into full consideration input from discussions and survey feedback gained during the first round of MDAST Stakeholder Workshops in all three project countries in the first year of tool development. The workshops provided a forum to solicit insights on the tool from a wide range of potential users, including staff of relevant government ministries (e.g., health, environment and agriculture), representatives of district level governments, and other relevant organizations. A summary of the feedback which project partners addressed during the tool's development in Year Two can be found in the Progress Report for Year One.

2) **Presented and gained feedback on prototype MDAST during the Second Meeting of the Project Steering Committee (March 10th)**

   A prototype MDAST incorporating comments from the MDAST Stakeholder Workshop participants was presented at the Second Meeting of the Project Steering Committee on March 10 in Dar es Salaam. Members of the Steering Committee gave valuable feedback on the tool, detailed in Annex 1 of this report.

3) **Conducted in-depth MDAST webinar consultations with key project partners (April – June);**

   Throughout the months of April, May, and June, the MDAST model development team conducted webinars on the tool with key in-country project partners for a total of five consultation sessions. In each session, the revised prototype model was presented, along with a series of brief, informative examples demonstrating the capabilities of the tool. Generally, the remote consultations were conducted in real-time through screen-sharing as data were entered into the model and the examples were performed. Where the internet connection did not support this technology, the presentations were conducted using a set of pre-constructed screen-shots of the tool operating in progressive stages, sent via email in advance of the meetings. Each consultation session generated important feedback on the tool, including highlighting areas where modifications would be valuable.

4) **Solicited an external review of the MDAST model (June)**

A review of the MDAST model and its development process was sought from a professor at Duke University (Katia Koelle, PhD) with a background in modeling and disease ecology. Dr. Koelle received a copy of the model in advance and was then asked to report her impressions, observations, and suggestions to the developers. As an external reviewer previously unfamiliar with the MDAST model, her fresh, informed perspective generated valuable feedback to take into account during further model development. The external review also offered an important opportunity to consider how to structure the presentation of background information on the tool and to evaluate first impressions of the model, both of which were valuable exercises in preparing to draft the MDAST User Manual.

5) **Engaged in continuous revisions and additions to the model, including incorporating feedback from the Second Meeting of the Project Steering Committee and project partner consultations (March – July)**

The current MDAST prototype reflects continuous efforts to respond to and incorporate feedback gained from the Second Meeting of the Project Steering Committee and the project partner consultations. Additional revisions were made based on planned development of the model. Changes made to the model since it was presented at the Second Meeting of the Project Steering Committee include:

- Further development on the underlying model (especially with regards to transmission), as informed by a review of the work of other current modeling groups (especially Griffin, et al., 2010[1]).

- The functionality to simultaneously run and compare three policy portfolios along with the "status quo" policy scenario,

- Further development of the environmental impacts module, including the ability to track insecticide and larvicide chemical use over time.

- Initial incorporation of uncertainty into the tool, as demonstrated through the mosquito abundance parameter.

- Further development to incorporate costs into the model – the cost per case of malaria avoided is now an output of the tool.

- Aesthetic improvements to give MDAST a cleaner, more contemporary style, including a simplified front-end parameter input section and adapting the top level modules to conform to the newly-designed MDAST color scheme.

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[1] Griffin, J.T., Hollingsworth, T.D., Okell, L.C., Churcher, T.S., White, M., et al. (2010) Reducing *Plasmodium falciparum* malaria transmission in Africa: A Model-based evaluation of intervention strategies. *PLoS Med* 7(8). Available at < http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.1000324 >

6) **Drafted a provisional MDAST User Manual for training purposes (June – July);**

A provisional MDAST User Manual has been developed and will be referenced at the consultation sessions with National Malaria Control Program staff as well as in the Mid-Term Review. This manual is a preliminary working draft for the final User Manual, and will be revised as the model undergoes further modifications and development. The preliminary User Manual is contained in a document separate from this report.

7) **Prepared for upcoming consultations eliciting feedback from National Malaria Control Program staff and in-country partners, including the preparation of a standardized written comments form (meetings to be held in August 2011)**

The next major MDAST training and refinement activity will be to conduct consultations on the current version of the tool with National Malaria Control Program staff in the project countries in August 2011. The objective of these consultations is to gain expert input on the tool from key stakeholders and potential future users of MDAST, as well as generate feedback on dissemination and promotion of the tool and user manual. The consultation sessions will include a presentation of the tool, user manual, and real-time demonstration of alternate policy scenarios, followed by a discussion session to elicit feedback on the tool. Participants in the session will also be asked to give feedback through a standardized written comments form.