HEALTHY FUTURES

Health, environmental change and adaptive capacity; mapping, examining & anticipating future risks of water-related vector-borne diseases in eastern Africa

Collaborative Project
Seventh Framework Programme
Cooperation

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www.healthyfutures.eu

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1st HEALTHY FUTURES Stakeholder Engagement Workshop Report

Held at the International Livestock Research Institute (ILRI), Nairobi, 24-25 February 2014

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with contributions from Jeff Mariner, Laragh Larsen, Tezira Lore and Ciara Egan

We would like to acknowledge the inputs of all stakeholder participants with special thanks to Dr Mukoko, Dr Myers and Dr Swai who prepared the case studies.

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1. Workshop objectives

The stakeholder workshop was held at the International Livestock Research Institute, in Nairobi, on the 24-25 February 2014. The aim of this first stakeholder workshop is to start a process that will enable the development and effective take-up of decision support tools of the HEALTHY FUTURES project, based on the work done so far. This process will contribute to more effective use of health resources in the region when it comes to anticipating the environmental change effects on the three target diseases.

Specifically, the workshop had the following objectives:

1. communicate the HF research outputs (modelling, mapping DSTs, etc) that are currently in progress for the 3 VBDs
2. collect feedback on the value of the research outputs and how to support their take-up by decision-makers, for example, integration of modelling results into DSTs
3. develop case studies for applications of DSTs
4. test different decision-making methods with the case study examples to compare the value of different intervention strategies
5. define the outputs and needs for further stakeholder engagement in HF and beyond

2. Scientific presentations

Presentations

The workshop began with plenary presentations from different project partners that introduced the project and provided updates on case studies on the three diseases. Presentations were made on the HEALTHY FUTURES project; malaria projections for 2050 and how climate information can be integrated into health planning; sources of climate data for national decision-making; what guidance models can provide for schistosomiasis control, and a decision support tool for Rift Valley fever.

*The HEALTHY FUTURES project – David Taylor*

The introductory presentation on the HEALTHY FUTURES project gave a general overview of the project. The project started in 2011 and comes to an end in December 2014. It is implemented by a consortium of 16 institutions, eight of which are in Africa, and is divided into seven work packages.
The main driver of the project is the link between disease outcomes and the environment, and the fact that there are environmental changes as well as changing patterns of disease distribution and transmission cycles in the region. Climate change was also noted as a key factor that influences the impact of diseases. Others include nutrition, lack of immunity and quality of housing. It was observed that the poorest countries are normally hardest hit by the impacts of climate change.

The presentation highlighted key research-based challenges, among which is the challenge to transform science into action so as to achieve research impact. The lack of accurate data can hamper decision-making. It was noted that the project has historical data on past disease outbreaks and environmental change. The presentation concluded by restating the importance of ensuring that the research outputs of the project are translated into formats that can support decision-making for human and animal health systems.

*Malaria projections for 2050: How can we integrate climate information into health planning?* – Adrian Tompkins

The presentation on malaria projections for 2015 discussed how different spatial scales can be used to present climate information in a format that can policymakers can find useful, as it was noted that policymakers usually make decisions based on short time frames (in the case of politicians, the time frame is the period before the next election) and thus they may not find a 40-year projection to be helpful for their purposes. The presentation discussed a model that allows spatial information to be condensed into a simple chart that decision-makers are likely to find useful. The model also allows for a hierarchy of metrics to be produced.

*Sources of climate data for national decision-making* – Madeline Thomson

The presentation on climate data for national decision-making was focused on approaches to translating and presenting the vast amount of climate data into information that decision-makers can use for planning, noting that “even when it’s raining data, there can be an information drought”. In Ethiopia, national climate data from meteorological stations has been analyzed and improved to provide national partners and the global community with high-resolution maps of rainfall and temperature. The same has also been done for climate data in Tanzania and Madagascar, and there is interest from Kenya and Rwanda to do the same for their historical rainfall data. It was noted that better data quality enables more accurate climate information for national planning, evaluation processes and early warning. The presentation concluded with reference to the climate and society map room, which is available online and is a useful climate analysis tool for decision-makers interested in monitoring climate conditions around the world.

*Schistosomiasis: What guidance could models provide?* – Mark Booth
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This was a recorded presentation as the speaker was unable to be present in person on the first day of the workshop. It featured a mathematical model that uses three different climate change scenarios in East Africa (low, medium and high warming) to predict how changes in the temperature of water bodies will affect the growth of snails (vectors of the *Schistosoma* parasite) and the free-living stages of the parasite. Based on the mathematical model, risk maps can be generated for the coming decades. It was, however, noted that the model does not consider human behaviour.

*Rift Valley fever decision support tool – Jeffrey Mariner*

The presentation on the risk-based Rift Valley Fever (RVF) decision support framework discussed the development of the tool as a participatory process in the aftermath of the 2006-07 outbreaks in Kenya. The framework is not a computer model. It is a decision support matrix of events indicated escalating outbreak risk linked to an inventory of preparedness and mitigation actions. An impact study was carried out using participatory epidemiology and a timeline of outbreak events and response constructed. This outbreak was characterized by a late response to tackling the disease. It was noted that an all or none approach to the decision-making process was used and it was not until the first human case was confirmed that the government authorities recognized the emergency and initiated both human and livestock responses to mitigate the impact of the disease. Noting the explosive nature of RVF outbreaks in East Africa, this was to late effectively change the course of the outbreak or substantially mitigate its impact.

A series of consultations of decision-makers was conducted were they were asked to develop a framework for decision-making framework for future events. It was agreed that a phased approach to decision-making would be more effective where the timeline of events leading up to an outbreak would be used as decision points where preparedness and mitigation actions would be incrementally implemented. The concept underlying the approach was that mitigation actions and investment should be directly linked to the escalating levels of risk of an outbreak. As the decision-makers constructed the framework themselves, there was a high level of ownership for the tool.

As an example, the tool was useful for decision support and to help answer questions such as the feasibility of vaccination, when can vaccination be effective, and the required timing of preparations to be able to carry out vaccination. It was noted that procurement and field placement of vaccines requires 145 days and that this must happen before the flooding associated with outbreaks. This means the decision to vaccinate to prevent an outbreak and key actions to procure vaccine must be taken before any of the existing early warning systems could alert stakeholders of a RVF risk. In the event of an early warning without advance preparations for vaccination, it is probably already to late to initiate a major vaccination effort.

The tool was used in the early stages of the 2008 Rift Valley fever warning, although an outbreak of the disease never occurred. Veterinary services took early action to vaccinate key
livestock populations that played an epidemiological significant role in the amplification of RVF outbreaks. One of the lessons learned from the 2006-07 outbreaks was the importance of involving the community in disease reporting, as the livestock keepers were the first to detect the disease. Following a meeting with livestock importers from countries in the Middle East in 2011, trade issues were incorporated into the decision-support framework. It was noted that the One Health approach and sectoral integration of ministries of agriculture, health and livestock can result in improved surveillance and notification of events.

**Stakeholder Session**

The concluding session of the first day consisted of a presentation **Introduction to the ADX** by Richard Taylor. This provided a background to the use of DSTs, a consideration of the needs of decision-makers and the barriers to provision of decision support. Different types of decision-analysis methods available were discussed and their strengths and weaknesses. The rationale was then presented for the development of SEI's participatory tool and process - ADX. It was noted that decision-takers/practitioners are faced with different types of decision problems and there is no cure-all method to analyse everything: applying multiple, independent approaches to the same problem may help to cover against uncertainty. Several health examples were discussed.

This was followed by an introduction to the break-out groups and case studies work (done in day 2). In this session 3 appointed participants presented case studies on **RVF in Tanzania**, **Malaria in Uganda** and **Schistosomiasis in Kenya**. These were based on the climate adaptation 'user-lab' methodology developed by SEI (who provided templates). In this exercise, each presenter selected and discussed their own particular decision situation most relevant to them.

a) **Schistosomiasis in Kenya** was presented by Dr Mukoko, Head of VBD based in the Ministry of Health. Dr Mukoko outlined difficulties controlling for the disease which has been introduced in new areas due to the construction of dams and associated rice and horticulture systems, and due to environmental changes in higher altitude areas.

b) **Malaria in Uganda** was presented by Dr Myers of NMCP, Ministry of Health who discussed the social effects and economic costs of Malaria and the greatest challenges.

c) **RVF in Tanzania** was presented by Dr Swai, Epi Unit DVS, and focused on strategies for preventing animal from exposure to RVF virus under the context of environmental changes such as increased rainfall and changing patterns of pastoralism.

The presentations are appended to this report in an annex. This session concluded with a short session for questions/clarifications on the case study material/day 2 activities. Participants were able to select which group they would like to join with a show of hands.
3. Participatory sessions and groupwork

On the second day of the workshop, participants carried on working in groups focusing on one of the diseases. Below we describe in more detail the ‘user-lab’ methodology.

**Methodology**

Each case study group was formed by 4-6 people. The others had the opportunity to ask questions about cases and select which break-out group to join with equal sized groups wherever possible. Each group member had to choose a particular role, and choose a limited number of implementation options/ adaptation alternatives to keep up with time. Facilitator’s role (as outlined by the *Facilitation Guideline Notes* - shared by email a few days prior to the workshop and as mentioned in a face to face meeting held prior to the workshop) was to help the smooth running of this session and record/take notes of the discussion and decisions taken by the group members.

The idea of the case study groupwork session was to test two of the methods or ‘engines’ of the ADX tool with the participant groups: the **voting method** and the **AHP** with the case studies presented by three stakeholders.

A brief brainstorming session provided input regarding the stakeholders that are usually involved in the decision-making in the health sector. The roles were decided by the group members depending on the stakeholders or groups they interact with during the decision-making process (ie. the roles should be familiar to them). Each case study group could have participants adopting the following roles (but not limited to):

- Head of Vector-Borne Disease, Ministry of Health
- Malaria control room -Chief Medical advisor
- Village leader -from Local Government Authorities of an A village
- Local dispensary in town
- Climate advisor sitting in the Ministry of Health
- NGO representative
- etc..

**Step 1: Voting method (with PROS and CONS)**

Impersonating a role, participants were asked to provide PROS and CONS (from the perspective of their own role) for each option in turn (ie. starting with Pros for option 1). They had to articulate the reasons for each statement, if unclear. Other group members were invited to consider the statement and decide whether or not to accept it (if there was strong difference of opinion facilitators should have given the benefit of doubt - and recall that it is just a role-play!). *It was important to record the discussions this generated.*
After completing PROS and CONS analysis we moved on to Voting. Each participant had to vote and rank 2 of their preferred options among the pool of options used for the case study. One was to be ranked as their ‘favourite one’ and the other as ‘second-favourite one’. These were marked on the flipchart/whiteboard with participant names and ranks next to the options.

Step 2: Analytic Hierarchy Process (AHP)
The second method, AHP, was applied to the same case study problem (i.e. same options as for Voting). This step involved carrying out a pairwise comparison, comparing individual elements to one another, with respect to their impact or importance on an element above them in the hierarchy.

First, the hierarchy was formed by structuring the decision problem into the following elements: goal, criteria and options. Participants had to agree on which criteria were the most important for the implementation options and goal stated in the specification of the problem and they had to characterize/define what they mean by each criterion chosen.
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For example, one criterion chosen could be ‘economic’, which could be defined as being cost-effective (of the chosen measure). Firstly, participants were asked to compare the relative preference for each of the implementation options with every criterion. Participants then had to compare one implementation option against another in relation to the ability of each option to be designed, supported and implemented from an economic standpoint, in this case. Preferred values for one implementation option or another one were noted in the flipchart. However, as expected, it was noted that each participant had a different vision on assigning a particular weight to a particular option as each adopt a different role or character. Hence, the group had to reach a consensus on the weights (see Table 1: AHP scale for comparison).

If the value was written in the lower left side of the cell, it indicated that preference was given to the option in the row. If the value was written in the upper right, it indicates that preference was given to the option in the column. This exercise was then repeated with each of the three or four criteria chosen (one flipchart per criteria).

Secondly, participants were asked to assess the relative importance of each of the criteria with respect to the achievement of the goal. For example, if after assessing each implementation option for each criteria, it was perceived that the economic criterion should have more weight than the social in the achievement of the goal, then a specific weight was placed in the economic criterion cell. The weight values that each participant could give are characterized in the table below. In the flipchart, the value/weight noted was the one that was agreed among all participants. i.e. they compare the relative importance of each criteria for the adaptation of the health sector to climate change in East Africa with respect to the goal defined by the participants.

<table>
<thead>
<tr>
<th>Values</th>
<th>Relative importance</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Equal importance</td>
<td>Two elements contribute equally</td>
</tr>
<tr>
<td>3</td>
<td>Moderately more important/better</td>
<td>Experience and judgment moderately favours one element over another</td>
</tr>
<tr>
<td>5</td>
<td>Definitively more important/better</td>
<td>Experience and judgment strongly favours one element over another</td>
</tr>
<tr>
<td>7</td>
<td>Much more important/better</td>
<td>One element is highly favoured, its dominance is demonstrated in practice</td>
</tr>
<tr>
<td>9</td>
<td>Extremely more important</td>
<td>All evidence favours one element over another</td>
</tr>
</tbody>
</table>

Table 1 -AHP scale for comparison

Step 3
Step 3 concerns the calculation of the results from step 1 and step 2. They are presented in the group results sections (see tables below).

Finally, one person from each group was elected to present the findings (ideally this would be a different person to the one who presented the case study). However, by the end of the stakeholder session the computed results were not available to participants and so the plenary discussion was mainly limited to discussion of the decision-making process and feedback centred on this.
Case study groupwork outputs

Schistosomiasis Group
A case study for schistosomiasis based in Kenya was introduced by Dr Mukoko, from the Department of Disease Control from the Kenyan Government (see appendix for presentation slides). The goal of the decision was defined by the group, initially this was ‘reduce burden of schistosomiasis’.

Participants adopted the following roles;
- David Taylor / Mark Booth – Facilitator
- Dunstan Mukoko – Development Partner
- Susan Rumisha – Village leader from Local Government Authorities of an A village
- Ciara Egan (note taker) – Local dispensary in town
- Agaba Friday – Climate advisor sitting in the Ministry of Health
- Didas Namanya – NGO representative

Pros and cons analysis
GOAL: Reduce burden of schistosomiasis

<table>
<thead>
<tr>
<th>Option</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
</table>
| 1. Targeted Mass Drug Administration | - Attracts wider interest  
- Economies of scale (e.g. bulk procurement with MDA is cheaper than buying smaller doses)  
- Community buy-in/awareness  
- Immediate health/economic benefit | - Not sustainable  
- Side-effects (adverse)  
- Mobile communities are difficult to monitor  
- Drug resistance  
- Ethical issues associated with keeping people infected before treatment becomes available |
| 2. Snail control               | - Best approach - elimination  
- Ease of application | - Expensive - products  
- Expensive - apply (capacity limited)  
- Dynamic - suitable habitats change  
- Ineffective by itself |
| 3. Active water management     | - Long-term (if maintained)  
- Economically beneficial | - Expensive  
- Not immediate  
- Benefits not equally shared  
- Ecosystem disruption  
- Not stand alone |
| 4. Health education           | - Cheap  
- Sustainable  
- Community awareness | - Not effective by itself  
- Corrupted  
- Considerable fine-tuning |
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This exercise generated quite a lot of discussion and participants were able to share different points of view, (ie. from the perspective of the roles adopted). Particularly there were lots of inputs in terms of the Cons. Many were discussed but the group agreed on limiting the number to three or four main ones. Notably participants felt that many of the options are not standalone solutions and will require a combination of adaptation actions to be employed.

On the other hand, interestingly, the group found Pros for the options more difficult to identify. For example, some arguments had both positive and negative aspects (eg. the notion of ‘environmentally friendly’ and associated complexities / trade-offs). However, in relation to Pros the group began thinking more about long-term sustainability.

**Voting method**

<table>
<thead>
<tr>
<th>Option</th>
<th>Score</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short-term results</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Targeted Mass Drug Administration</td>
<td>5 (5)</td>
<td>1</td>
</tr>
<tr>
<td>2. Snail control</td>
<td>2 (1)</td>
<td>3</td>
</tr>
<tr>
<td>3. Active water management</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>4. Health education</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td><strong>Long-term results</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Snail control</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>1. Targeted Mass Drug Administration</td>
<td>3</td>
<td>= 2</td>
</tr>
<tr>
<td>4. Health education</td>
<td>3</td>
<td>= 2</td>
</tr>
<tr>
<td>3. Active water management</td>
<td>3</td>
<td>= 2</td>
</tr>
</tbody>
</table>

During the voting, the need for cost-effectiveness was added to the goal. Ranking was done by looking at the preferred options on both the short term and long term scales (roadmap of 20 years). This is because, when considering ‘best’ options it was perceived that the answers are quite dependent on the time frame of concern. In relation to the role-play it was noted that different types of actor may have different time frames of interest - for example a community leader may be more interested in the immediate benefits of an action. In each time frame, each person had two votes.

The top section shows short-term scores, and in this time-frame MDA is clearly the preferred option (receiving overall 5 ‘first preference’ votes). The lower section shows long term scores where the balance of opinion is equivocal. In this case MDA still received 3 votes but snail control was preferred by more participants receiving 4 votes. This illustrates that options that do
not seem effective in the short term (snail control or active water management) may have longer term payoffs. For the long term, participants found it more difficult to decide an order of preference and so the votes were given with equal weighting/preference.

A general observation is that ‘Pros and Cons’ may have been more useful exercise for discussion than ‘Voting’ method - although voting brought out the issue of short-term and long-term timeframes more explicitly to the discussion.

**AHP method**

In this exercise, both the goal and the criteria were all specified with the term ‘sustainable’. This marked another shift in the thinking of the group towards more long-term concerns. Some of the difficult concepts that the group discussed but had put aside (e.g. cost effectiveness, environmentally friendly) in the Pros and Cons and Voting seemed to be more readily introduced in this exercise as criteria. However, these indeed required - and received - significant discussion. Another of the criteria was a new one that had previously hardly been mentioned: political acceptance.

Four options (same as voting) and three criteria were used.

**Goal:** Sustainably reduce burden of schisto

**C1. Environment:** Ecosystem friendly and sustainable

**C2. Social:** Acceptable to all levels of society and sustainable

**C3. Economy:** Cost-effective and sustainable

**Result of AHP - the higher the ‘priority’ value the more support**

<table>
<thead>
<tr>
<th>Priority</th>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.136</td>
<td>Option 1:</td>
<td>MDA targeted</td>
</tr>
<tr>
<td>0.117</td>
<td>Option 2:</td>
<td>Snail control</td>
</tr>
<tr>
<td>0.433</td>
<td>Option 3:</td>
<td>Active water management</td>
</tr>
<tr>
<td>0.314</td>
<td>Option 4:</td>
<td>Health education</td>
</tr>
</tbody>
</table>

(MDA = Mass Drug Administration)

The result of the AHP exercise shows active water management to be the preferred option. Health education was also an approved option, whereas the other two options were not at all well-supported.

In terms of lessons learned applying the method, the group perceived difficulty to define criteria that were mutually independent, which is perhaps the most difficult part of a multi-criteria exercise, such as AHP. They observed that from a systems perspective, all are connected (eg.
A scientist observed that mistakes can be made when siloing criteria.

After some discussion the participants identified criteria within the three suggested domains. In this group the scientists facilitated, and both they and the decision makers assumed their different roles and were able to provide inputs. While carrying out the weighting of the AHP they occasionally referred back to the Pros and Cons discussions. It was sometimes difficult to reach agreement (especially about the issue of education) and the participants returned to voting (on the AHP weighting).

**Conclusions**

Different methods produced different outcomes. The conclusion of the AHP indicated a different result (AW management) than the voting exercise (snail control) where both methods employed long term horizons. This finding seems to point to the value of employing multiple frameworks for analysis of the decision, as an approach that may be worth further consideration and research.

**Malaria Group**

A case study for malaria based in Uganda was introduced by Dr Myers from the Ministry of Health (see appendix for presentation slides). Initially, the group selected the goal and defined it as ‘reducing the malaria burden by half by 2030’.

In this group, participants used a different approach from what was encouraged. They all adopted the same role, that is the point of view of the National Malaria Control Programme of the Ministry of Health, as suggested by one of the scientists. The argument for that was said to be ‘to keep it simple’.

This was, therefore, not done according to the suggested methodology which does use roleplay - each person should adopt a particular and different role so that different viewpoints and rich discussions in a multi-stakeholder setting could have been emerged. It also seems inconsistent with the above because typically a NMCP will have only short- or medium- term timeframe of up to 5 or 10 years.

**Pros and cons analysis**

**GOAL: To reduce malaria burden by ½ by 2030**

<table>
<thead>
<tr>
<th>Option</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Increasing clinics</td>
<td>- Wider health benefits</td>
<td>- Affordable to the client？</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Expensive to implement</td>
</tr>
<tr>
<td>Healthy Futures FP7: 266327</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Bednets &amp; IRS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Proven results</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Short-term (issue of sustainability?)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Health education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Open space (reaches all levels of society including schools, at community level)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Improves efficiency of other interventions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Cheap intervention (e.g. if used through radio - 1 person can create awareness to millions of people)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Can’t work in isolation/needs support from other interventions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Difficult to measure direct impact</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Capacity building</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Better access (village level (or mobile health teams), health facility)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Easy scalability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Expensive to implement?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Housing quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Long term programme to improve drainage, screening, etc.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Expensive (high initial cost), if shaped by bylaws.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Health insurance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Access improved</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Wider benefits (e.g. improved diagnosis &amp; treatment)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Difficult to implement/ issues of sustainability? (e.g. think of a village farmer)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Program cost (esp. if we think of community members)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Peri-urban environmental management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Focused geographically (e.g. drainage, clearing shrubs, etc. to have an impact on the vector, reducing breeding sites, etc.)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(IRS = Indoor Residual Spraying)

The decision regarding the timeframe of the goal was shaped by one of the scientists involved in the group. While a timeframe of 1-2 years or even a 5 year cycle were some of the salient choices expressed by stakeholders/decision-makers in the group, scientists preferred a long-term timeframe of about 20-30 years to take into consideration the environmental climate, as they stated.

Most of the discussion in this group was largely shaped by the scientists, who had a more dominant voice in the role-play exercise and were of the opinion that the methods were too complicated and was a waste of time. More input from decision-makers would have been
valuable to assess the tool (and process) because they primarily are the expected users and beneficiaries.

**Voting method**
The table below shows the result. Each participant ranked two options.

<table>
<thead>
<tr>
<th>Option</th>
<th>Score</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Health education</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>4. Capacity building</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>2. Bednets &amp; IRS</td>
<td>1</td>
<td>= 3</td>
</tr>
<tr>
<td>5. Housing quality</td>
<td>1</td>
<td>= 3</td>
</tr>
<tr>
<td>7. Peri-urban environmental management</td>
<td>1</td>
<td>= 3</td>
</tr>
</tbody>
</table>

As regards feedback that was collected, the scientists perceived certain difficulties in the voting method as it was said that one intervention cannot go without another and they need to complement with each other. While overall, scientists in this group did not find the method particularly useful, stakeholders said they found the exercise useful. In fact, this technique might lead to a single ‘best’ choice, or a smaller number of options that can be evaluated in more depth. The ‘voting’ ensures that only options that at least some stakeholders value highly are chosen. That is, at least someone is likely to champion the implementation of the option, which is then followed by a ranking exercise of the set of priority interventions to be implemented. A scientist mentioned a spatial element would be useful to consider as part of a DST as interventions need to be targeted towards a specific area/region and/or population target.

**AHP method**

Calculation of result of AHP - the higher the ‘priority’ value the more support

<table>
<thead>
<tr>
<th>Priority</th>
<th>Option 1:</th>
<th>Health clinics</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.097</td>
<td>Option 2:</td>
<td>Health education</td>
</tr>
<tr>
<td>0.271</td>
<td>Option 3:</td>
<td>Capacity building</td>
</tr>
<tr>
<td>0.345</td>
<td>Option 4:</td>
<td>Bednets &amp; IRS</td>
</tr>
</tbody>
</table>

Participants were expected to define the (social, environmental, etc) criteria as very often policy/decision-makers are driven by certain criteria and priorities when choosing
options/interventions. The specification of criteria is normally done at the beginning of the exercise, though in the malaria group this was not done until later on, when participants realized the importance of doing so.

Conclusions
Voting method concluded that ‘health education’ was the best option, receiving twice as many votes as ‘capacity building’ which was the second best option. However, the ordering was quite different in the application of AHP: ‘bednets and IRS’ was preferred to both ‘health education’ and ‘capacity building’.

RVF Group
A case study for RVF in Tanzania was introduced by Dr Swai, from the Directorate of Veterinary Services (see appendix for an overview of the presentation). The group selected the goal “to reduce the burden of RVF” and adopted the following roles:

Trader/butcher: Dr Swai
Farmer: Dr Matini
CVO/DMS/Epidemiologist: Dr Ithondeka
District vet/medic: Dr Matini
Entomologist: Joe Leedale
Researcher/Lab Technician: John Gachohi
Meteorology/forecasting: Dr Nyarilli
Development partner/NGO: Dr Nyarilli
Minister: Dr Swai
Vaccine manufacturer: Stacey Noel
Consumer: Stacey Noel/ Dr Matini

Pros and cons analysis
GOAL: To reduce the burden of RVF

<table>
<thead>
<tr>
<th>Option</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaccine banking</td>
<td>- Promote timely targeted vaccination</td>
<td>- Cost of stocking vaccine</td>
</tr>
<tr>
<td></td>
<td>- Good planning at district level</td>
<td>- Justifying expense to minister</td>
</tr>
<tr>
<td></td>
<td>- Immunity to prevent future outbreaks</td>
<td>- Lobbying &amp; ensuring that there are funds</td>
</tr>
<tr>
<td></td>
<td>- Vet infrastructure in remote areas</td>
<td>- Having a functioning vet infrastructure to vaccinate</td>
</tr>
<tr>
<td></td>
<td>- Reduces losses and increased productivity</td>
<td>- Long epidemic cycles versus short shelf-life</td>
</tr>
<tr>
<td></td>
<td>- Reduces trade bans</td>
<td>- Prevent human exposure</td>
</tr>
</tbody>
</table>
### Healthy Futures FP7: 266327

| Animal Spraying | - High demand for livestock products | - Control concurrent vector-borne diseases  
- Decrease RVF transmission  
- Reduce human exposure to RVF & other VBDs  
- Available | - Costly  
- Application logistics  
- Farmer compliance (low until they see results)  
- Environmental contamination (kills other beneficial insects) |
|-----------------|-------------------------------------|-----------------------------------------------|
| Communication   | - Low cost and wide outreach  
- Enhance coordinated approach | - If not used properly, counterproductive  
- Getting messages right is challenging & can affect trade  
- Cultural practice - difficult to reduce risky behaviour |
| Surveillance and diagnostics | - Sentinel surveillance - offer timely info, helps in prediction  
- Early detection contribute to good targeting/timely reporting  
- Develop preparedness plan  
- Build capacity to capture other diseases  
- Weather surveillance/prediction  
- Builds confidence among trade partners & transparency | - Costly - funding to sustain system  
- Some surveillance methods do not give good early warning signals  
- Inadequate capacity  
- Low coverage - not feasible to cover entire country |

### Voting Method
The table below shows the voting scores (assuming each role the participants ranked all four options and awarded points - 4 points awarded to the first ranked option etc) and the result.

<table>
<thead>
<tr>
<th>Role</th>
<th>Vaccine</th>
<th>Vector</th>
<th>Communication</th>
<th>Surveillance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trader/butcher</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Farmer</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Entomologist</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Researcher</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Meteorology</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Development/NGO</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
Thus the first ranked option using voting was the vector control option, ie. animal spraying and the second favourable option was communication.

**AHP method**
During the process of constructing the hierarchy for the AHP exercise, in the group discussion it was decided to drop one of the options - communication – because of the degree of interaction of communication across each of the other options presented.

The goal was also further specified to reducing the socio-economic burden.

Criteria 1: Epidemiological impact  
Criteria 2: Cost-effective  
Criteria 3: Logistical feasibility  
Criteria 4: Environmental impact  
Criteria 5: Socio-economic impact

The exercise was therefore done with 3 options and 5 criteria.

Calculation of result of AHP - the higher the ‘priority’ value the more support.

<table>
<thead>
<tr>
<th>Priority</th>
<th>Option 1:</th>
<th>Option 2:</th>
<th>Option 3:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.220</td>
<td>Targetted vaccination</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.392</td>
<td>Surveillance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.388</td>
<td>Animal spraying</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The result shows that Surveillance was the favoured option (0.392) only slightly ahead of Animal Spraying (0.388). The Animal Spraying (Vector) and Surveillance approaches were together much more highly preferred to the Vaccination approach. This contrasts somewhat with results of the voting method, which although it also ranked vector approaches highly, gave quite a low scoring of Surveillance.
4. Concluding Discussion

This Stakeholder Engagement workshop, which marks the first significant participation of health practitioners and decision-makers in the HEALTHY FUTURES project, has been a positive step forward in communication of the latest research, in feedback about what specific concerns decision-makers have, and in sharing insights into how that can be best supported. However it has also highlighted some tensions in the decision-making scope and scale for which future inputs are most needed. Particularly, there is often a divide between the long-term time horizon of climate change messages and the short-term time horizon of interest to decision-makers, and bridging the two remains a challenge.

The participatory session organisers, SEI and ILRI were very pleased with the quality of the input from all participants to the case study groups, particularly the lead presenters who introduced interesting material and were focal points for the discussions that followed. We were impressed by the hard work of all who participated to allow timely completion of the role-play break-out exercises, in a relatively short time, and also of the facilitators who enabled a good level of interaction in this session.

One shortcoming was the relatively short lengths of time available for feedback from participants, in plenary format, and the lack of the use of the feedback boards provided. At the end of the breakout groups work there was a short feedback session done in plenary.

Feedback Session

The RVF spokesperson commented that identifying the goal was not difficult but specifying clearly the interventions was a challenge. The reflection was that Pros and Cons was easier and people liked it. AHP brought about more discussion and created a deeper understanding, and the group overall found it to be a helpful process. However there was an unresolved question about the need to come to agreement on weightings and whether it was possible to arrive at a true consensus. The group thought that the decision techniques each had relative strengths and might be useful in different situations.

Schistosomiasis group similarly reflected that Pros and Cons was very easily explained and the group interacted well and stuck to their roles. With AHP it was a lot more difficult to come to consensus but the outcomes may be more useful from the AHP method. However, others thought that Pros and Cons was a good background for the later methods, as a brainstorming about what would be the issues that may be encountered; indeed this was the group which seemed to refer back more to the earlier methods.

The malaria group noted that there is no single one best option but they are all interdependent. They considered options in terms of the long-term costs and advantages: malaria burden in a 20
years time frame. The voting was found to be easy but the AHP required more input and was careful consideration of priorities. Discussions in the malaria group raised the important issue of relevance of the exercise for the climate and environmental change outputs of the project and to the discussion of climate more generally. The group found that the methods had made it easy for people to fall back into normal roles and experiences without sufficiently considering new information or the expectation of changes in future disease burdens. Another issue was with it being difficult to bring the consideration of such scenarios into evaluation of strategies – in, for example, decisions about the construction of clinics which would have long time-scale implications.

To some extent, these were also issues the other groups had been grappling with:

1. disconnect of time-frame interesting to the scientists and the time-frame of concern for the stakeholders and for which they are knowledgeable,
2. the extent to which climate and environmental change information could be incorporated and how the planning mechanisms may consequently change.

The participatory methods may be difficult to adapt. The schisto group addressed this to some extent by qualifying each of their criteria additionally with the word/attribute 'sustainability' to cover all dimensions of sustainability. They noted that some of the options were difficult to assess in dynamic situations. The RVF group discussed some options that were different/innovative to the standard ones. Unlike the other two groups, which included some aspects relating to the future, the RVF only looked as far as 'the next outbreak' at some unspecified point in time.

It was also observed that the value of the output depends on the variety or quality of the stakeholders and having the opportunity to discuss issues that are not normally considered. Including stakeholders with an in-depth understanding of environmental issues is required for such long time-frame considerations. It was also noted that it would be of benefit to have time to discuss more or different options than were originally included or considered – ones that result from taking a climate change perspective.

Regarding AHP, it was remarked that in practice, it would be very difficult to reach an agreement carrying out the exercise with many different types of stakeholders together. For the reasons that stakeholders have very different roles and responsibilities and because of unbalanced power relations ... one participant (from a community perspective) summed this up saying “I cannot argue with the minister”.

At the closing session, the following action points were agreed upon as the next steps for follow up.

1. Write up the case studies
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2. Circulate proceedings of the workshop  
3. Identify key messages and how best to present them to decision-makers  
4. Continue the group discussions via email

The following sections further detail how stakeholder participation has helped with the project’s decision support considerations

Observations
In more detail, our observations are:

Pros and Cons
Pros and cons analysis is a method that we trialed (for the first time with potential DST users) at the stakeholder workshop, and it seemed to promote interesting discussion among participants and we concluded that it was a valuable activity to learn from, especially in terms of enabling different perspectives through the role-play.

During the Pros and Cons it was found that, firstly, many of the options suggested by the participants could not, in fact, be used in isolation and therefore it is not easy to evaluate them separately outside of any context. This was less a challenge for the RVF group than for the other two groups, but in each case knowledge about the wider strategy was missing from the exercise. For example education and communication-based alternatives may not be effective without other antecedant conditions being met. Restating this, interdependence of options became quite apparent from the Pros and Cons exercise.

This point about isolation suggests a portfolio approach in which several options to varying degree are included in an alternative strategy or portfolio could be a good DST in this case. Portfolio theory is an area of finance theory that has been applied to decision making under (climate change scenario) uncertainty - Portfolio Analysis (PA). Yet, a problem with portfolio analysis is obtaining sufficient supporting (objective) data eg. efficacy of interventions. Alternatively a complex modelling approach could be used (exploring multiple strategies and scenarios).

Voting
During the Voting exercise (and later the AHP exercise) some participant felt that direct comparison was difficult because of the wide scope nature of health interventions. This was particularly acute in the malaria group. Comparability was confounded by some factors meaning that subsets of these options were used only in particular contexts .eg. it was difficult to compare preventative vs. treatment measures.

In practitioner literature, these options are described and assessed individually, but direct comparisons do not usually seem to be made. This provokes a deeper investigation into how do decisions get made, what is the role for comparison of options and what are decision factors
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(even if these are often not explicit)? Real decision factors were initially explored in the case study presentations. Also, some insights from surveys/interviews carried out prior to the workshop are that cost is the main factor - in which case using Cost Benefit Analysis (CBA) or Cost Effectiveness Analysis (CEA) could be an appropriate - or agreement and acceptability is the main factor - in which case Elimination By Aspects (EBA) or Multi Attribute Utility Theory (MAUT) (ruling out options based on aspects that are not acceptable) methods could be useful. These methods are of course, a step up in complexity from simple voting techniques and also have associated advantages and disadvantages. For example, (like other types of expert analysis) the disadvantage is with user engagement because such approaches lack accessibility to non-specialists and transparency.

On the other hand, voting was used to contrast the short-term and long-term aspects (this is what the schisto group did). It is not clear that other methods such as EBA or Multi-Criteria Analysis are well-equipped to consider future changes (that is, without supporting modelling work). CBA of course does look to the long term but not without making strong assumptions that some people may find inappropriate.

AHP
AHP required extra thought because of the need to additionally identify criteria, and the need to agree on weightings among group members. Some people felt that the method was too complicated to understand whereas others thought that aspects of it were too simple. Participants from the schisto group remarked that it was a good exercise and that the discussions were useful.

As this was intended only as a short introduction to a new decision analysis method - i.e unfamiliar to most of the stakeholders and scientists - there was a certain, perhaps inevitable, frustration at the lack of opportunity to go into sufficient detail and explanation and the frequent need to caveat the discussion.

In addition, some participants may have been uncomfortable with the lack of comprehensive scientific data underlying the methods, for example spatial data or economic data. This is also a reason for scientists scepticism towards the methods, because many of the project outputs involve complex data sets. Yet introduction of precise data - scientific data or community data - is not necessarily suitable for all types of problem, or for all types of decision process. Case study data were presented in the stakeholder session but only as a way to provide a background context and were not a focus of discussion.

Many other multi-criteria analysis methods, in contrast to AHP, are data intensive. AHP offers an alternative to full MCDA with low data and resource requirements, yet is appropriate for evaluation of options in situations of high complexity, considering different time horizons, uncertainty and multiple and interdependent variables requiring multi-dimensional trade-offs - as detailed in this Briefing Note by Bharwani and colleagues. It is being used to address climate
change adaptation and environmental change questions e.g. applied to the water sector where adaptation is already extensive. It should be noted that these are quite different contexts to the present one for HEALTHY FUTURES.

The user-lab methodology and the 3 methods detailed above are less aimed at identifying one single optimal options, than at looking at the issues inclusively from many different perspectives and screening the possibilities to help avoid what might be poor decisions, and to adopt robust strategies (which would involve selecting more than one option).

From the beginning, the DST development has been open to suggestions and refinement and here we have suggested a range of other decision methods (PA, CBA, EBA, MCDA etc.) that might also be suitable.

General observations are:

Firstly, there is a gap in understanding preventing effective take-up of research results and production of information that has maximum value. There is the need for accessible messages so that technical data may be able to drive decisions. When the priority is to look at longer time frames, this may require that the partners provide most of the data. This is because they are more familiar in working on such long-term time frames, which are not so much at the forefront of the stakeholders’ professional experience. In addition, other environmental experts may need to be included in the consultations.

From a technical standpoint, partners will provide data generated by the models that explore these futures under different scenarios. These model data will feed into decision support systems and processes (such as ADX or other MDCA tools, or spatial tools). For stakeholders to have input to and gain value from technical tools will need an improvement in communication among scientists and stakeholders to address the gap in understanding.

An observation is that it may be difficult for people on both sides to change their mind frame. It was clear from the scientific presentations that the partners are well aware of the time-frame disconnect. Yet it was still the case that discussions were oriented to long-term priorities and were dominated by scientific arguments rather than political rationale. This is likely to have negative consequences for engagement (and project impact) unless common reference points are found.

Stakeholders need understand the value of the work done by the scientists and how the information can support their decision-making. They should be able to use the tools or the output from them – i.e. the accessible messages – to help them understand potential future changes, new types of risks and their key dimensions (eg. spatial or financial aspects, differential impacts among social groups).
Whereas the partners may be able to contribute better on what decisions will need to be made over these long-term time horizons, the stakeholders have the most expertise on what strategies are plausible and practicable. Moreover, for the technical outputs to have value, the stakeholders will need to understand and value the information. The stakeholders must continue to frame the decisions and the modelers must become stakeholders in that framing process.

It is not clear whether participatory tools - that use a bottom up approach to develop stakeholder-driven example applications and elicit significant inputs from stakeholders themselves – have a role to facilitate this.

Second, as well as gaps in understanding there were evident gaps in perceptions. Decision support tools for some are somewhat automated systems with information and data inbuilt to the systems. Decision support tools for others were structured, participatory processes designed to guide the decision-making process and do not include specific data. The structure may include knowledge or a conceptual model of a specific issue under consideration. There were different perceptions of the task at hand - Are we making decision support tools or are we facilitating the actual making of decisions. Is the output a tool or actual decisions?

For some, experts build models and inform decisions (outside the problem). For others, experts and models are another stakeholder (part of the problem) in the decision making process. Some expressed frustration with the complexity of some discussions and the difficulty of achieving consensus with such a wide range of stakeholders. For others, the complexity was assumed and making progress in understanding (learning about) the complexity was central to having impact. In our view, although complete consensus is not obtainable, moving towards better consensus is essential to learning (on all sides) and having impact.

Third, in the HF context, not enough research has yet been done on exploring options and scenarios for decisions. Because of the gaps in understanding it may be premature to target development of decision support methods and tools towards comparing options. More work has first to be done on the earlier stage in the decision-making cycle. That is, problem shaping, understanding the dynamic context and identifying solutions that look feasible over longer timeframes.

It may be an oversight of the project that the first stakeholder engagement workshop was held in the final year of the project. There has been little engagement of the HF research teams with stakeholder perspectives in, for example, the political economy of the situation and its implications for interventions, identification of vulnerable people and regions, improving how risks are communicated (both to a general audience and to decision-makers), etc. that would help to shape the decision problems that need to be jointly addressed (ie. through a combined effort of stakeholders and scientists).
This observation is that problem shaping needs to be a goal of the engagement processes across all of the research teams, and that the development of decision support tools and mechanisms over the remainder of the project must focus on this. It should also be emphasized that stakeholder engagement is not only about tools. The consortium partners need to identify key messages and how best to present them to decision-makers. Currently, it is not clear what these outputs/messages are. This is the reason why participatory stakeholder-driven sessions might be a useful way to understand which needs are to be reconciled and the different priorities that need to be taken into account during the DST development process.

Looking back at the goals for the workshop, objectives (1), and (3) (4) were accomplished on Day One and Day Two of the workshop. Goal (2) was less well-accomplished because of a lack of time available for feedback but together with goal (5) these remain objectives of stakeholder engagement and continuing group discussions over the remaining months of the project.

**Follow up plan**

Recommendations are:

1. Organise a future workshop for each disease where Step 1 is a dialogue between one group that includes scientist and those whose job it is to take action to frame the issues. Step 2 is to present the messages of the research and the experience of those in action or decision roles. Step 3 is to revisit the framing of the issue and decide on what is the important information/experience and how to utilize the important material presented. The process can make use of structured, participatory tools for decision-making appropriate to the situation.

2. Production and circulation of a set of briefing documents to members of the Workshop Report email circulation group highlighting the clear, actionable messages. These will be available for review to collect stakeholders’ opinions on them, ie. piloting the project key messages. They will be produced in language that the general, educated public could understand.
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Schistosomiasis group:

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Didas Namanya, Ministry of Health, Uganda (CH)
Agaba Friday, Ministry of Health, Uganda (CH)
Mark Booth, Nicky McCreesh, University of Durham, United Kingdom (UDUR)
David Taylor, National University of Singapore, Singapore (NUS)
Susan Rumisha, National Institute for Medical Research
Dunstan Mukoko, Department of Disease Control (DCD)
HEALTHY FUTURES FP7: 266327

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Goreth Sinkenguburundi, NMCP, Burundi
HEALTHY FUTURES FP7: 266327

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Bernard Bett, ILRI, Kenya
John Gachohi, ILRI, Kenya
Peter M. Ithondeka,
Noelina Nantima, MAAIF, Uganda
Joe Leedale, University of Liverpool, UK
Stacey Noel, SEI Africa, Kenya
Bosco Lolem, Ministry of Health, Kenya
Group photograph
DRAFT *Schistosomiasis* Case Study

Dunstan Mukoko, Vector-Borne Diseases Unit, Ministry of Health, Kenya

Presented at the 1st HEALTHY FUTURES Stakeholder Engagement workshop, held at ILRI Nairobi, Kenya
February 24-25th 2014

http://www.healthyfutures.eu
Characterisation of case study area

The geographical distribution of (A) *Schistosoma haematobium* and (B) *S. mansoni* infection in East Africa
Kenya is among the 74 Schistosomiasis endemic countries.

Three high risk areas:
- Coastal, Western (Lake Victoria area) and Central/eastern area

Over 6 Million estimated infected

¾ of total population at risk

2 species prevalent: *Schistosoma haematobium* and *S. mansoni*

Mapping completed

Control by MDA with Praziquantel in school age children
Climate and environmental change

- Climate change is now very evident
- Global warming is a reality
  - Temperature is rising in areas that were cooler
  - Some areas becoming drier with longer draught periods
- Rains more erratic and unpredictable
  - Some areas get excessive rains during short rain season leading to floods
- Sea levels rising in many places:
  - Indian ocean level rising
Consequent to Global warming
• In mitigation to longer draught periods water dams are built
• Dams provide breeding habitats for snails – resulting in increased transmission of Schistosomiasis
• Schistosomiasis transmission may be introduced in new areas
Consequent to floods and rising sea level

- Long lasting swamps created
- Swamps attract small scale rice cultivation by local communities
  - Increasing human contact with water
  - Increasing risk of infection with Schistosomiasis
Specification of decision problem

**Background**: You are the DMS and the Cabinet secretary for Health has to address the health situation as it is in the Country.

**Goal**: Reduce the budget for health without increasing the burden of Schistosomiasis.

The CS has prioritized a focus on **evidence-based priorities**. However, new analyses (particularly, scientific modeling) suggest new risks associated with environmental change:

- It has become hotter and schistosomiasis transmission is happening in the formerly cooler higher altitude areas.
- Snails have adapted to the formerly cooler areas and newly constructed dams and water pans; increasing the risk of schistosomiasis transmission in the rice and horticulture farming schemes associated with the dams.
- Schistosomiasis is now prevalent and spreading towards the formerly cooler higher altitude areas.
Stakeholders involved in the decision-making

Stakeholders:-

- WHO – technical support and procurement of donated drugs (Praziquantel)
- KEMRI – Operational research to inform control
- Ministry of Education – School health policy
- SIFF – Funding for school deworming
- END FUND – Funding schistosomiasis mapping and MDA
Current interventions

Alternatives for Prevention

- MDA with praziquantel in school age children
- MDA in the vulnerable groups
  - Rice farmers
  - Fishermen
  - Car washers
- Snail control using molluscicides
- Re-engineering construction of dams and irrigation structures
- Health education in schools and community
Factors/criteria that matter most in the decision-making

- Existing health policy
- Availability of evidence and up-to-date data/information from research
- Availability of resources both human, physical and financial
- Coordinated partnership
- Physical infrastructure
Uncertainty & challenges complicating decision-making

- Unpredictable outcomes of climate change
- Unplanned response to impact of climate change in different sectors of government
- Limited resources
- Unresponsive attitude towards research outputs on specific communicable/vector-borne diseases
Malaria in Uganda: Overview

Paper presented at Healthy Futures Workshop, Nairobi

Dr. Lugemwa Myers
(International Health Specialist/Team leader, NMCP, MoH)

Monday, 24th February, 2014
Malaria is endemic in over 95% of Uganda

Epidemiological stratification based on TPR

Estimated Entomologic Infective Rate (EIR) 1994 - 2004

Malaria and Climate

*Uganda Climate Context*

Malaria transmission in Uganda, as in much of Sub-saharan Africa, is characterized by distinct seasonal trends, dependent on patterns of rainfall and temperature. Uganda’s climate is tropical, but is moderated by its high altitude. On average, national temperatures vary little throughout the year (25 °C – *February* to 22°C – *July*), but the average temperatures increase in the north of the country as the elevation decreases towards the Sudanese plain.[92] Average temperatures in the coolest regions of the south-west remain below 20°C (3.5 °C below the national average), and reach 25°C (1.5 °C below the national average) in the warmest, northernmost parts.[92]
Malaria and Rainfall

Figure 18: Apac District Under-Five Test Positivity Rate and Rainfall (mm)

R1: DDT
R2: Pyrethroid 2 (Alpha-cypermethrin)
R3: Carbamate (Bendiocarb)

Source: Uganda HMIS

Figure 19: Pader District Under-Five Test Positivity Rate and Rainfall (mm)

R1: Pyrethroid 1 (Lamda-cyhalothrin) R2-R4: Pyrethroid 2 (Alpha-cypermethrin) R5-R6: Carbamate (Bendiocarb)

Source: Uganda HMIS
Malaria burden: morbidity and mortality

- Malaria accounts for 26% of the burden of disease in Uganda (BOD Uganda 1995) and is responsible for
- Total cases estimated at up to 60 million per year (MIS 2009)
- 30-50% of Out patients visits, 20-30% of all admissions, 20.9% of Inpatient deaths (AHSPR 2010/11)
- 20 – 23% of deaths among the under fives
- Annual malaria specific mortality is estimated at 70,000 to 100,000 child deaths, far more than that for HIV/AIDS (Lynch et al., 2005)
- Long term mental disability

Malaria burden – affects and kills many people especially children & pregnant women
Top causes of morbidity/Mortality

- Malaria: 33%
- ARI: 18%
- Intestinal Infest: 9%
- Diarrheal Diseases: 6%
- Others: 34%
Malaria in children. (Note the Oxygen tubes and blood drips)
There are more deaths due to malaria than any other disease in Uganda (Current estimates at 140 per day)
Economic burden of malaria

• 15% of life years lost due to premature deaths

• HHs spend ~25% of their income on the malaria (direct and indirect costs)

• US$ 658 m lost (WHO, MoH)

• ~5-20 working days lost annually due to malaria
MALARIA AND MOTHERHOOD

• Pregnant women are four times more vulnerable to malaria due to low immune status

• High morbidity and mortality due to maternal anaemia

• High rate of pregnancy wastage: abortions, low birth weight retardation
MALARIA AND THE SCHOOL CHILD

• Commonest disease in schools; accounts for more than 43%

• 3-8% of all causes of school absenteeism & 13-50% of all school days missed, cause of poor class performance.

• Cerebral malaria affects the cognitive and learning ability of the child.

• High risk for girl child who gets pregnant
Goal and Overall Objective of Malaria Strategic plan 2005/6-9/10

• **Goal**: To control and prevent malaria morbidity and mortality, minimize social effects and economic losses attributable to malaria in the country.

• **Overall objective**: Go to national scale with effective interventions to prevent and treat malaria and sustain high coverage levels.
National Malaria Control Strategies/Interventions (based on the Abuja Declaration 2000)

- Case management: Accessing effective treatment within 24 hours of symptomatology (at HF Level & thru: HBMF)
  Intermittent preventive treatment in pregnancy (IPTp)

- Vector Control: Insecticide treated nets (ITN) & Indoor residual spraying (IRS) & Larviciding

- BCC/IEC

Support structures: M&E and Research
Partnerships

GoU through MoH Under the RBM Umbrella

- GFATM
- WHO
- MC
- UNICEF
- PMI
- JICA
- Malaria no More
- Stop Malaria
- +....Business community?,

Key stakeholders in decision making
New Initiatives Specific to malaria
(International)


- Accelerated malaria control programmes with a goal to eliminate malaria using all effective strategies. Emphasizing IRS, ACTs & ITNs by UN Millennium Malaria Project call for “Quick Impact Initiative” 2006

- RBM Yaoundé call for (Scale up for Impact -SUFI) 2005
Malaria Eradication Business Plan

Global Malaria Business Plan covers short, medium and long-term horizon

- **2010** (Short-term): Control phase with existing tools
- **2015** (Medium-term): Control stabilization phase
- **?** (Long-term): Development of new tools
- **?** (Long-term): Elimination / eradication phase

28-29 November 2007 13th RBM Partnership Board Meeting
Challenges

- Inadequate funding despite increasing global and national interest in malaria control & elimination

- Malaria vector resistance especially to Pyrethroids- the only current insecticide used in ITNs

- Emerging Parasite Resistance to ACTs

- Un attended to Salient Environmental Changes (Global warming)
Opportunities
(New Initiatives Specific to malaria)

- GFATM
- Clinton Foundation Fund
- Bill & Melinda Foundations Malaria forum meeting in Seattle call for Malaria eradication
- RBM 13th Board meeting calling for a Global Business plan to eradicate malaria
- All Calling for universal coverage of Malaria Interventions by 2010
- The US$ 3.2b announced last August at the UN for malaria
- Political commitment at Presidential & Parliament level
- Emulation of neighboring countries (Rwanda, Zanzibar) successes
- Increasing community awareness
Thank you for Listening
DRAFT RVF Case Study

E.S. Swai
Ministry of Livestock and Fisheries Development, Veterinary Services, Tanzania

Presented at the 1st HEALTHY FUTURES Stakeholder Engagement workshop, held at ILRI Nairobi, Kenya February 24-25th 2014

http://www.healthyfutures.eu
Characterisation of case study area

DISEASE HISTORY
Cycle of 10-20yrs

• 1st Outbreak 1930
• 2nd outbreak 1937
• 3rd outbreak 1947
• 4th outbreak 1977/8
• 5th outbreak 1997/8
• 6th outbreak 2006/7

Predicted potential suitable distributions area for C. pipiens complex in East Africa

Mweya et al, 2013
Characterisation of case study area II

Strategy / Intervention (animals/human)

- 956,000 animal vaccinated 2010-2013
- 800 litres of pyrethroids acaricide, worth Tsh 12 billion procured and distributed
- Use of impregnated bed nets in RVF prone region increasing from 40% in 2004/5 to >60% in 2009/10
- >10 research on virus ecology, genome characterisation, modelling, sentinel herd monitoring, risk mapping and geographical vulnerable studies, disease epidemiology in livestock/wildlife inter face on going
- Supporting agencies: SACIDS, Afrique one, SUA, MUHAS, NMIST

Prevalent RVF vector mosquito spp:
Aedes aegypti, Culex pipiens, Culex quinquefasciatus, Culex cinereus
# Current set of interventions

*(Inter–epizootic phase)*

<table>
<thead>
<tr>
<th>Category</th>
<th>Activity</th>
<th>Explanation</th>
<th>By whom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity building</td>
<td>Risk assessment</td>
<td>Development and regular update of risk maps</td>
<td>MLDF, MoHSW, MNRT</td>
</tr>
<tr>
<td></td>
<td>Training field and laboratory personnel</td>
<td>For rapid reporting, detection and response</td>
<td>MLDF, MoHSW, MNRT</td>
</tr>
<tr>
<td></td>
<td>Awareness creation</td>
<td>Carry out communication needs, audience and strategy</td>
<td>MLDF, MoHSW, MNRT, PMO-RALG, NGO</td>
</tr>
<tr>
<td>Early warning</td>
<td>International and local weather forecasting agencies</td>
<td>Keep a watching brief of international and local RVF early warning systems</td>
<td>MLDF, MoHSW, MNRT, TMA, FAO, GLEWS</td>
</tr>
<tr>
<td></td>
<td>Romour logs</td>
<td>Monitoring and investigate localized heavy rains, flooding, mosquito blooms</td>
<td>MLDF, MoHSW, MNRT, TMA,</td>
</tr>
<tr>
<td>Surveillance</td>
<td>Passive and active disease surveillance and sentinel monitoring</td>
<td>Strengthen capacity for vet/medical/wildlife personnel</td>
<td>MLDF, MoHSW, MNRT, FAO, OIE, AU-IBAR, SACIDS</td>
</tr>
<tr>
<td>Disease control</td>
<td>Vaccination animals</td>
<td>Plan vaccine availability, strategic mass vaccination</td>
<td>MLDF,</td>
</tr>
<tr>
<td></td>
<td>Vector control</td>
<td>Promote use of pyrethroids and insecticide in pregminated bed nets</td>
<td>MLDF, MoHSW</td>
</tr>
<tr>
<td>Funding</td>
<td>Advocacy, lobbying concept notes development</td>
<td>Ensure adequate local and external funds will be available when risk of RVF epizootic increases</td>
<td>MLDF, MoHSW, MNRT, MoFEA</td>
</tr>
<tr>
<td>Research</td>
<td>RVF prevention and control technologies approaches</td>
<td>Keep abreast of advances in RVF prevention and control technologies and approaches</td>
<td>NIMR, TAWIRI, TVLA, ZVCs, MUHAS, SUA/SACIDS, NELSON MANDELA, TANAPA, UDSM IFAKARA HEALTH INSITUTE</td>
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</tbody>
</table>
### Stakeholders involved in the decision-making

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 PMO-RALG</td>
<td>Coordination and monitoring preparedness and response at LGAs</td>
</tr>
<tr>
<td>2 MoLDF</td>
<td>Surveillance, diagnosis and response animals</td>
</tr>
<tr>
<td>3 MOHSW</td>
<td>Surveillance, diagnosis and response human</td>
</tr>
<tr>
<td>4 MNRT</td>
<td>Surveillance and monitoring wild life</td>
</tr>
<tr>
<td>5 MDNS</td>
<td>Mobilise military assets</td>
</tr>
<tr>
<td>6 MID</td>
<td>Forecast and climatic information</td>
</tr>
<tr>
<td>7 MISC</td>
<td>Training of media and communication</td>
</tr>
<tr>
<td>8 MHA &amp; MJCA</td>
<td>Interpretation and law enforcement</td>
</tr>
<tr>
<td>9 MoFEA</td>
<td>Mobilisation and provision of emergency fund</td>
</tr>
<tr>
<td>10 Professional association</td>
<td>Assist in arrangement &amp; secondment of staff</td>
</tr>
<tr>
<td>11 NGO, CBO, CSO, Private sector</td>
<td>Awareness creation, mobilization of resources-physical and finance</td>
</tr>
<tr>
<td>12 International agency and Development partners</td>
<td>Support government initiatives and resource mobilisation</td>
</tr>
</tbody>
</table>
Impact of climate, environmental change and RVF outbreak

• Extended, unpredicted and repetitive periods of droughts and flooding in Tanzania, both of which have significant impact for the country, may lead to:
  ✓ Over concentration of people and animals in specific locations due increasingly scarce water will result into hotspots for VBD transmission
• Altitude (elevation < 1000m asl high risk: Sindato et al 2013)

• The IPCC projection model suggests that by the end of 21st Century the global surface temperature is likely to exceed 1.5°C
  ✓ Combination of increasing temperature, erratic rainfall patterns, intensity and extreme weather events will increasingly have impact on disease vectors’ distribution as a result of altered habitat
  ✓ Deforestation and re-afforestation practices
  ✓ Land cover ownership and land use (farming and tourism)
  ✓ Soil degradation, volcanism
Satellite Estimated Rainfall Anomaly (mm)

More than average rainfall in western and central part of the country
Specification of decision problem

Goal: to prevent animal from exposure to RVF virus transmitting vectors in domestic animals

Consideration:

• coverage target is hampered by animals movement in search of pasture and water
• Most cattle dip tanks are not functioning due to encroachment and lack of water
• The effective use of spray pumps is uncertain given the larger herd size
• Presence of many vector hosts – in the wildlife/ livestock interface areas- where spraying is not done
• lack of information on the role of other vector spp on RVF transmission
• Migrating of vectors to other areas due to habitat, weather and climate change
Factors/criteria that matter most in the decision-making

1. Availability of credible information
2. Institutional structure in place and functional
3. Availability of resources
   - Finance
   - Competent and skilled staff
   - Appropriate tools
   - Veterinary infrastructure
4. Attitude, knowledge and perception of stakeholders
5. Level of compliance
   - Due to varied and large number of stakeholders
6. Presence of multiple disease challenges
7. Legal framework, regulation and enforcement mechanism in place
8. Local social-culture-political environment
Uncertainty & challenges complicating decision-making

Major challenges are hinged on the following:

1. **Coordination**: multi-sectoral and inter ministry is weak not functional
   - Due to resources constraint – fund and low awareness of the disease impact
2. **Early warning**: lack of inter departmental sharing of information/weather data
   - No existing institutional arrangement in place between TMA and key stakeholders
3. **Disease control (animals)**: vaccination is done but coverage is low
   - Due to low funding
4. **Vector control (animals)**: is done. Over the last 2 years 500,000 litres were procured through acaricide subsidy program
   - Challenge: not adequate due to low funding and length procurement system
5. **Surveillance**: passive commonly used. Active surveillance not done. Sentinel herd monitoring is currently being done by post-doctoral student
   - Lack of funds is the main constraint

**Most useful research outputs:**

Virus transmission dynamics during inter-epizootic period; vector competency studies, risk mapping and geographical vulnerability studies, socio-economic studies, safe candidate vaccine and rapid pen side test