



Roll Back Malaria Multi-Sectoral Working Group (RBM MSWG)
Inception Meeting, 2-3 October 2018
S&C Orangerie, Grellingerstrasse 75a, 4052 Basel

Chairs: Graham Alabaster & Robert Bos
Secretariat: Konstantina Boutsika
Rapporteur: Adriana Rüegger



Day 1: Tuesday 2 October 2018

Morning Session: Objectives and Expected outcomes of the Meeting

Chairperson: Robert Bos

Robert Bos opened the meeting and welcomed the newly formed multi-sectoral working group to its kick-off meeting, emphasising that the new working group (the Multi-Sectoral Working Group of RBM, MSWG) will provide an opportunity to consider vector-borne disease prevention and control through an intersectoral lens. After a tour de table, the intention was expressed for the MSWG to invite a broad selection of attendees from different sectoral backgrounds, as well as from the private sector and for efforts to continue along those lines when including new members.

With this, Graham Alabaster gave a short presentation on the challenges and opportunities of multi-sectoral action, stating that malaria remains one of the world's worst health problems with 1.5 to 2.7 million deaths annually, and that these deaths are primarily among children under 5 years of age and pregnant women in Africa South of the Sahara. It is of significance that in absolute numbers more people are dying from malaria today than 30 years ago. This is mostly due to lack of investment and lack of delivery mechanisms, which is why **the MSWG aims to design and promote new intervention mechanisms and malaria-sensitive projects and programmes that span across different sectors, the plans and activities of which affect the environmental and social determinants of malaria and other vector-borne diseases.**

The **objectives of the meeting** were:

- Explore the necessary gaps in the design and delivery of integrated multi-sectoral approaches, building on the RBM multi-sector framework;
- Encourage a wider participation in malaria control and eradication from other relevant sectors, prioritizing the most important actors;
- To promote successful models and design and implement new approaches to multi-sectoral projects and programmes;
- To identify additional resources to support activities, both within existing programmes and in establishing new partnerships; and
- Establish some priority regions/countries where political will is high and piggy-backing on existing initiatives is a viable option.

Mentioning the MSWG's connection to global mandates, such as the SDG, the GVCR, NUA and the Paris Agreement, Graham pointed out that we need to think about how to contextualize these mandates for our needs, especially in regard to different agendas in a local and sectoral context. Graham and Robert therefore suggested several themes that the working group could begin with:

- Enhanced engagement of community actors
- Improving weak institutional structures at national and local level

- Developing new tools to assess risk and to assist in monitoring and surveillance
- Identification of vulnerable populations in displaced communities due to natural disasters and conflict
- Influencing investment policy and practice
- New approaches to improved project design

A vital question therefore is: **How do we design new project interventions and how can we manage these ideas so they develop into new approaches by other sectors?** In his presentation, Graham suggested the following approach to the project design and its implementation:

- A more effective review of past successes.
- Better understanding of the impact of the new demographic changes brought about by urbanization and displaced populations. Malaria and other VBDs do not recognise international and national boundaries.
- In terms of application of existing health sector tools (such as IRS and ITNs), there is a need to consider how the efficiency of their use can be enhanced through additional environmental control methods, and how sustainability and resilience can be strengthened.
- Developing project methodologies which establish a 'learning by doing' approach. Community participation needs to go far beyond cosmetic approaches and be institutionalised in local authority systems.
- Promoting the inclusion of VBD control and eradication in school and tertiary education curricula.
- Use structures and approaches from other sectors, which can be re-purposed to support VB disease management.

After this presentation, the discussion on how to frame the MSWG was opened to the group. Early on, the plenum raised the question on how to **define the MSWG's framework regarding malaria or all vector-borne diseases, and where to draw the boundaries**. It was agreed that while malaria should remain the focus, it made sense to consider all vector-borne diseases as they often demand the similar interventions. Environmental interventions by other sectors all aim at transmission interruption. An important aspect should be how malaria affects other sectors, for example farmers' productivity in agricultural production areas. In many non-health sectors, environmental engineering, infrastructure and housing design and natural resource management can contribute interventions that do not only aim at tackling malaria, but also other vector-borne diseases, and indeed other infectious diseases such as cholera. Provision of water and sanitation services are an example of why a broader perspective might be added within a given context, anticipating that practical interventions and investments will address and benefit a range of public health challenges. The economic advantages of such an integrated multi-disease approach will be clear, especially to people outside of the health sector. However, with malaria being the most high-profile VBD and mosquitoes well-known vectors, the malaria/mosquito vector "model" should also stay at the forefront as a

“marketing tool” to promote intersectoral action.

Several ideas were raised where to start a focus of discussions and key areas of action: interventions within national structures, interventions within a geographical context, the tourism sector, the financial sector regarding water and sanitation, finance ministers. In order to decide, it makes sense to look at individual success stories on a country-level and already existing intersectoral committees, and explore what factors influence their levels of success and failure. **Identifying the current status and trends of intersectoral committees and projects at a national level was considered a good start.** Keziah Malm stressed that interventions should come from above, so that it pushes countries to do what they have to do, and the committees are functional irrespective of the initial availability of the necessary tools. She also suggested focusing on the comparative advantages of prospective partners so the MSWG can figure out where the gaps are, what to add and how to frame our issues in order to raise the interest of prospective partners. Furthermore, as Lucy Tusting emphasized, interventions are a very urgent matter, as the current population growth and urbanization in malaria-heavy areas have a lot of potential for example in housing interventions now while the houses are built. Intervention has to happen fast or else we will miss the boat. Others observed that a singular top-down approach would not be sufficient – clearly, policy guidance from the highest level (president or prime-minister level) will be essential to obtain the engagement of all relevant sectors. However, at the community level, where sectoral boundaries hardly exist, it will be essential to ensure good practice in agriculture, mining and other economic activities, and that good design and maintenance of infrastructure comes from the community itself, as a bottom-up approach. Furthermore, it was stressed that the MSWG can provide solutions in situations where the achievements of traditional approaches (case detection and treatment, indoor residual spraying, long-lasting nets) are coming under pressure because of drug and insecticide resistance. **Intersectoral approaches operating through the management of environment, social and economic determinants of malaria and other vector-borne diseases aim to add resilience and sustainability.** This is in line with the SDG 2030 agenda and aims to preserve our drug and insecticide resources for future generations.

[A Brief Introduction to the RBM Partnership to End Malaria](#)

Konstantina Boutsika then introduced the RBM Partnership within the context of the MSWG. The MSWG has been a long-standing interest of RBM. **A MSWG distribution list is currently populated to bring in as many people as possible from different sectors and the group was kindly asked to bring in new names as well.** In consultation with the co-Chairs, Konstantina suggested five public sectors on which the group should focus first: **1. Settlement planning & infrastructure, 2. Food, agriculture & forestry, 3. Tourism, 4. Extractive industries, and 5. Health,** but mentioned that these sectors might change according to the discussion of the meeting. For this meeting, the co-Chairs of the other WGs were also invited, promoting further collaboration between the working groups. The co-Chairs of the other WGs will also be present at the annual meeting, and Konstantina suggested organising a phone conference beforehand with those boards. The plenum mentioned that there is a lot of overlap with the VCWG in terms of content, and Steve Lindsay suggested that the MSWG can pick up the ends

where the VCWG meets its boundaries, for instance when reaching out to mayors, communities and stakeholders. The political leverage of decision-makers in the different sectors should be considered when reaching out to possible collaborators.



RBM Strategic Objective 2018-2020

Josh Levens then presented the RBM Strategic Objectives 2018-2020, outlining how these aim to keep malaria high on the political and development agenda to ensure continued commitment and investment to achieve the GTS and AIM milestones and targets. There is quite a bit of overlap in the focus from different initiatives in different countries, and we need to figure out which are the most sustainable approaches to improve them. Josh stressed that malaria is a victim of its own success while fall-backs have become less of a challenge. Despite the still high mortality in some regions, malaria is not a national priority anymore in some countries (e.g. Nigeria). The perception prevails that malaria is not a problem because people are used to the disease. Additionally, there is a political challenge: India as an example has the 3rd largest morbidity in the world but there is a lack of understanding how big of a problem malaria is. Benevolence and humanitarian issues are a strong political pull that political stakeholders support for their own gain, and talks are underway how RBM may take advantage of this. At the moment RBM works with the Global Fund on Malaria, Tuberculosis and HIV/AIDS on having a joint parliamentary strategy. The idea is to build inclusive and **multi-sectoral coalitions where the emphasis is not only on parliamentarians with a focus on public health, but for instance parliamentarians that have a constituency in high disease regions.** Parliaments should consider malaria when debating development issues, including transport infrastructure, housing, energy and natural resources management. A further objective is to promote and support regional approaches to the fight against malaria anchored in existing political and economic platforms such as regional economic communities, including in complex humanitarian settings, also with funding for sub-regional meetings, for example from the regional development banks.

Furthermore, RBM has set the goal to expand the financing envelope for malaria. The gap between countries on the road to elimination and high-burden countries is increasing, and more data on what drives resurgence is required so that WHO and RBM can prioritize. The key source for funding should come from domestic resources, and mobilising this funding will be a priority. The best approach for this is seen in the multi-sectoral agenda. As a result, a **malaria-funding task force** has been created where the idea is to work with countries to create investment cases for malaria. At the moment, RBM is looking for countries where a number of factors prevail: one of these is the presence of a minister of health who is active promoting relevant issues but who faces challenges in getting through with his agenda. All countries that RBM wants to reach out to are cases where the minister of health has reached out to us first. The idea is to set up a high-level political mission where all ministerial sectors are engaged from the beginning. The process of this has been relatively slow due to the general difficulty of planning and coordinating with high-ranked national officers.

The first successful meeting to make a multi-sectoral pitch took place with the country of Mozambique in the beginning of June 2018, where a delegation of RBM board members, Elimination 8, ALMA, WHO and the local NGO Goodbye Malaria met with the ministers of health, economy, finance, environment and agriculture. It was particularly gratifying that, in preparation for the meeting, the Minister of Agriculture already brought his own suggestions to the table on how to engage more in malaria prevention and control. As Mozambique has a very low density of community health workers in the field, the Minister of Agriculture suggested to add malaria to the field of work of the agriculture extension workers, and to train them to close this knowledge gap. There has been a high-level commitment from all ministries that they each appoint a member for a new steering committee. The next country to approach will be Sudan, and RBM currently realizes new connections with the new ministry of health. Furthermore, RBM tries to set up meetings with Uganda, Republic of Congo, Nigeria and Zambia.

Following this presentation, **Robert recapitulated that an approach to a multi-sectoral agenda seems most logical from top-down, targeting parliamentary groups.** He asked the plenum on how we can work on the SDG targets around the theme of malaria, and suggested to produce a document or tool that we can provide to governments for sectors other than the health sector on how to interact with MSWG. Murray Burt pointed out that a top-down approach does not reach conflict-afflicted areas or trans-border issues and stressed that the work with regional authorities is also vital. However, Josh reassured that RBM and the strategy will not forget the bottom-up view on this. In regard to collaborating with the African Union, the RBM already has an RBM-AU joint initiative with malaria-specific funding allocation divided by country.

Apart from the top-down approach, there were several inputs from the participants on where to put the initial focus. Jo Lines stressed that **malaria is a man-made problem in a man-made environment.** This means that we can help people to stop creating that problem. Breeding sites are often made through industrial or infrastructure activities that are necessary, for instance rice fields or bridges. This means although the industry will move on there can be

way to influence it in its impact on the environment to avoid facilitating malaria. **Community and behavioural change are another issue to be looked at from a multi-sectoral angle**, whereas Robert pointed out that problems on a community level often stem from boundaries on a higher level, meaning the focus should be to get rid of those boundaries (the siloes and intersectoral obstacles) first. Maisoon Elbukhari instead suggested to map the existing structures and opportunities, and also to pinpoint which already succeeded and which did not, relating this to the example of Sudan where malaria decrease failed as a result of various problems from all sectors. Josh agreed with this, especially due to the fact that RSSG applications do not have coordinated concepts. This leads to underperforming and underspent funding that is often wrongly targeted.

Promoting Malaria Prevention: a historical perspective

Together with the sheet distributed in advance, on the short history on the WHO/FAO/UNEP UNCHS Panel of Experts on Environmental Management for Vector Control (PEEM), Robert gave the group a **historical perspective on inter-sectoral approaches to the prevention and control of malaria between 1980 and 1996**. With this, Robert wanted to convey the lessons learnt back then and how this might help the MSWG. It is important to understand what the concept 'sector' actually stands for. Sectors are the result of achieving a critical mass of vested interest in society on a topic. In other words, specific vested interests, often linked to disciplinary groups (engineers, medical doctors) become accepted as societal needs. They become a niche in the government making sure that the interest has a power base and is assigned part of the public finances. There are boundaries around the sector to secure its power and assets. Within the multi-sectoral approach we are trying to break those boundaries by pointing out issues that are of interest to them that go beyond their sectoral confinements. PEEM was established by WHO, FAO and UNEP in the timeframe of the late 1970s, with the objective to promote the widespread use of environmental management for vector control in the context of agricultural and water resources development projects. An expert panel composed of different disciplines and representing different sectoral policies was considered a timely tool to address the several challenges faced in malaria control and the control of other VBD. Environmental management was never proposed as a stand-alone approach, but rather an intervention supporting the other, more typically health sector driven interventions. It was difficult to see a role for environmental approaches to controlling malaria in regions where it was ecologically well-entrenched (Africa South of the Sahara), but in areas where the delineation of ecosystem-bound vector species was more defined and where transmission patterns were meso-endemic and/or seasonal (i.e. where there is a linear relationship between vector densities and transmission levels) it had been shown to be effective. However, as agency funding was limited (basically: enough for an annual panel meeting) the panel resulted in important and high-level discussions on a range of relevant topics, but the outcomes never evolved into real intersectoral action. There also was resistance against intersectoral action from within the health sector, and decades of reliance on universal (blanket) operations (IRS and drugs) did not favour a more contextual approach based on vectors' local ecological requirements. There had been several efforts to work with

institutes members of the Consultative Group on International Agricultural Research (CGIAR), with greater or lesser success. Successful endeavours (for example: research on the relationship between irrigated rice production systems and malaria and schistosomiasis in the different ecozones of West Africa) produced a range of publications in medical journals, but these were never translated into policy papers for the agriculture sector. Another example of unsuccessful tackling intersectoral hurdles was idea of the promoting agricultural practices favouring malaria transmission reduction through agriculture-extension workers or farmer field schools; agricultural extension workers would be credible sources of information for farmers on how to include vector-reducing measures in their practice, but these workers were reluctant to engage with messages from the health sector that could jeopardize the credibility they had with farmer communities. This approach was later re-visited under the Stockholm Convention on POPs with a combined IPM and IVM approach in agricultural production zones.

The group then discussed **WHO's role in the past and today within vector control and how to get the Organisation's support**. Rajpal Yadav stated that vector control capacity in the WHO headquarters and in the Regional Offices is very limited. WHO Regional Offices try to allocate the control responsibilities on their own, with normative guidance from Geneva. At this stage, it is in a primitive way of implementation. Rajpal hopes that the process to streamline this issue will start in 2019. Murray added that the majority of funding in this area is allocated to where disease outbreak has already happened instead of a proactive infrastructure preventing outbreaks. Egon Weinmueller reminded the participants that we should not forget community involvement and local funding, reminding that with small but specific input we could already achieve a lot, for instance with regular community clean-up campaigns.

Afternoon Session: Setting the Framework, Scope and Focus for the RBM Multi-sectoral Working Group

Initial plenary discussion led by the co-Chairs

In the afternoon, the participants split up into three groups; each group was presented a different issue that was deemed necessary to discuss in the early stage of the MSWG. **The groups' foci were 1. tool development, 2. demographics, communities & humanitarian, and 3. project design & finance**. Each group tried to work out which aspects to consider within their issue, thinking of specific short and long term activities, and an attainable commitment that can be executed until the annual meeting in February. The leading question for the activity was: **How can we advocate for the MSWG as an approach?** At the end of the afternoon, the individual groups presented their findings to the plenum.



Group 1: Tool Development

The first group saw their key issue as **knowledge generation and management, and imparting knowledge** in various ways. To develop tools, the group argued, it is necessary to look at case studies from individual countries to build an information base. They imagined having a tool that every country can use, for instance an online-learning module, or a virtual city for teaching and learning, with specific topics. A good example for a topic would be vector control in an urban environment specified for individual sectors. The most ideal solution would be to get vector control into the school curricula and public health into engineering schools. As for the short term activities, the group suggested to create a **one page guidance note for urban planning and management and reducing critical habitats**. Ideally, one could create individual guidance notes for South Asia, Africa, Southeast Asia and Latin-America, as a step towards fitting specific contexts. A long term goal would be to **tap into subnational coordination mechanisms for sustainable development and environmental facilities**, for instance by creating an SDG localization task force on a subnational level in critical areas. This could be initiated by reaching out to municipalities. The group proposed the following commitments for February:

1. IVM manuals approved and available on the RBM website, including training curricula.
2. IRM available MOOC.
3. One page recommendation guidance with summaries of the issues we want the sectors to think about.
4. A plan for outreach, figuring out who to contact. Suggestions were: existing key players in municipalities and cities, China's aid in Africa, regional development banks

(ADB, AfDB, IADB, EBRD, EIB).

5. Identifying WHO's manuals and necessary updates

The plenum agreed that a practical one-page guidance would be the most ideal form to reach out to people. A direct-country engagement is preferred to make sure that the funding allocation is right for our needs, and our malaria components are included.

Group 2: Demographics, communities & humanitarian

The group pointed out that the *Zeromalaria Campaign* by RBM and the African Union already presents a toolkit to different population types. The **key idea would be to create a rapid assessment tool where other databases or tools can be combined with the Zeromalaria tool** to proactively find out more. Databases that are indirectly linked to malaria outbreaks, for instance databases on housing or road construction would be very useful. This would help to find out where new energy resources are going to be placed, which then would help to assess where RBM needs to focus first. This would be a long term assessment together with doing research in this field. The short term activity would be identifying databases, while the long term activity would be the modelling of the assessment tool. Someone in the plenum also suggested that this data gathering can be used for future modelling, and a long term goal could be to figure more models to use the overlaying mapping of data. The rapid assessment tool can also have an impact on other diseases and SDGs, and we therefore can look for support with other VBDs as well. Once we have the data in place vis-à-vis malaria, we need to identify key players to approach. Another short term goal is to build up an area of research and collect information on multi-sectoral research (publications) and present them on the RBM website. A good starting point would be the malaria & economics research data tool on



the RBM website that we could imitate in the form for the multi-sectoral issue. Since the members of the MSWG are from different sectors, everybody can add to the research collection according to their expertise.

The group on demographics also suggested to look into **environmental impact assessments** of the individual countries, and to see if we can influence them with the agenda on malaria. However, as someone commented in the plenum, there might be misconceptions on environmental impact assessments in the private sector and on how much they can achieve, as each host country and region treats them differently. The ability to influence at the environmental impact assessment stage might be too little. In this case it would be more useful to influence at the policy level.

Group 3: Project design

The third group on multi-sectoral project design stated that its **key focus should be to engage with collaborators, especially the private sector, and embed them in projects in a stage as early as possible**. Furthermore, it is necessary to bring more engineers on board as this expertise is still lacking in the group. Within the interest of the private sector, we should also focus on corporate responsibilities and opportunities in which the private sector can see their own advantages. According to Gary, the issue of protecting their employees from malaria is very small because it is already taken care of. We also need to ask ourselves how the private sector can participate. The group suggested logistics, transport and local issues that can be more costly for outsiders. The group proposed to tap into existing big projects that we could guide within our agenda. In this scenario, we would need to find out what projects come in the next years. For this we would need contact private sector foundations, project organisers and development banks.

The goals for February therefore need to be to **identify upcoming projects (for instance, from Mozambique LNG) and contact foundations for data-mining and help us find better contacts within the private sector, companies and financial institutions**. A longer term goal would be to get a team of VC and general experts to attend the design phase of new projects in the industry or agriculture sector. The project design group also suggested that we could set up a meeting with CropLife International to talk about agriculture in the near future.

Input: Planning For Collaboration across Working Groups (Anna McCartney-Melstadt)

Anna McCartney-Melstadt, co-Chair of the SBCCWG, presented her working group and briefly discussed the opportunities of collaboration across working groups. The SBCCWG had its annual meeting a week before and Anna updated the group on their most recent events and results.

In particular, Anna presented several **multi-sectoral opportunities to collaborate between SBCC and CM**, emphasising that SBCC is critical to ensure universal access to effective case management, prompt treatment seeking and compliance with interventions provided, and acceptance and adherence to malaria chemoprevention interventions, as well as successful conduct of parasite control and elimination using MDA. Anna also suggested that SBCC's potential deliverables to the MSWG were the community health workers (CHW) package of integrated SBCC interventions in MiP, CM and VC, and the SBCC module for MIS including

guidance on tabulation plan and data use. Furthermore, she added the following deliverables that could be easily achieved:

1. Develop key contact lists
 - Consultant directory of SBCC experts guided by feedback from WGs to be shared on Springboard
 - Listing NMCP SBCC focal point by country
2. Roadmap for strengthening malaria behaviour change for health professionals
3. Strategic dissemination plan for the Second Editions of the Strategic Framework and Indicator Reference Guide, including webinars to discuss documents and how to use them, infographics for each document, and method for tracking use.
4. Case studies/2-pager products linking malaria SBCC evidence to program decision making so that planners know how to synthesize formative research and monitoring data to inform malaria control strategies and programs and share experiences.
5. Adapt SBCC QA checklist to malaria and brand as RBM.
6. Case studies/2-pager products of successful engagement with private sector/non-traditional donors and how to increase interaction/engagement with malaria SBC sector

Anna expects further feedback going back and forth between SBCC and MS that will outline more overlap between the working groups. To support collaboration, the SBCCWG also works towards having their annual meeting in February, together with CMWG, VSWG and MSWG.

Day 2: Wednesday 3 October 2018

Session 3: Operationalization of the RBM Multisectoral Working Group

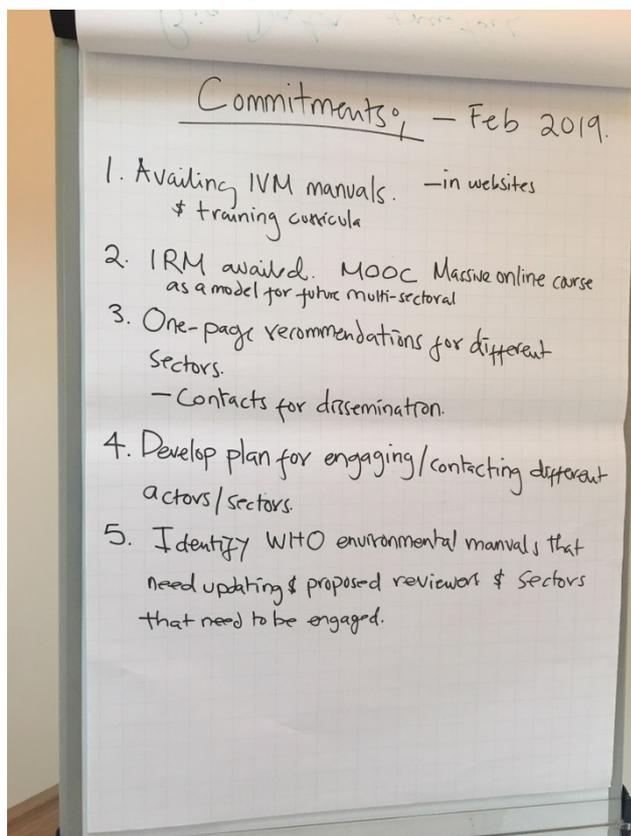
Plenary discussion led by the co-Chairs

Recapitulation and Outlook for Day 2

The second day started with a recapitulation of first day that lay out the agenda for the rest of the meeting. The group had agreed on boundaries for the multi-sectoral group, deciding that the sole focus will not lie on malaria but also other not-vector related health issues. For the second day, the co-Chairs then suggested to break into three groups to work out **prototype proposals**. The prototype proposals should allow us to find a place where to start with some clear examples without specific donors yet. The idea of the rapid assessment tool and creating a roadmap and a timeline for it was also going to be a focus of the day.

Rapid Assessment Tool & Advocacy Brief

It has been a general interest of the group to create a **guide for other sectors on how they can assess a malaria agenda**. The best approach would be to expand the idea on the basis of an



existing database, manual or project. The Handbook for Integrated Vector Management (IVM) was suggested as a potential basis to build on and initially design a tool focused on a national level. There has been some discordance if this was the right approach and would not put vector control too much into an authoritarian position, and the proposition was made that **all sectors should take on leading responsibilities**. Instead, the working group could now focus on finding opportunities for other sectors to contribute. It has also been pointed out that many countries have needs assessments in regional capacities, which would help on local level assessment as well. However, before a manual like this can be created, it needs to be assessed

who we want to reach out to and how to create a context that makes the issue interesting for other sectors. Josh expressed the wish to have an expert meeting in February on the Rapid Assessment Tool including a follow-up later where we can think about the actual implementation.

Furthermore, the idea of an **advocacy brief**, or one-pager, was discussed. An advocacy brief would be addressed to each sector, **containing no regret-measures that do not need a lot of**

extra work or resources but have great impact on reducing malaria. The one-page document should contain practical assessments and are given to the ministries where they can discuss how those changes can fit into their budgetary process and resources. It is necessary to pitch these one-pagers on a high level so the addressees know the problem affects everybody, and so that we reach those with the power to influence the budget and resources. For these briefs we **need additional help in technical innovations, water engineering, sanitation and agricultural assessments** that are necessary for the practical approach of the documents. The one-page can also give us feedback for the future where additional resources are still needed. Moreover, we need to design a way to make an impact assessment after distributing the briefs.

The group also discussed on **how to bring in new members from sectors other than health.** Suggestions were to reach out to the UN World Tourism Organisation and to create a consultant representing a steering committee within each affected country. Practically speaking, this means that the group will go ahead with who is available now and find a broad variety of experts as we go along. **It has been stressed that the working group should actively aim to not become isolated within vector control.**

Outputs

Following up on the previous discussion, it was decided that the **advocacy briefs will be the first output of the working group.** The briefs sent out to each sector are focusing on the following:

- The impact of VBD on the specific sector
- What the sector can do against it
- Why this benefits this sector in particular

It is therefore most important to point out **how each sector specifically can profit with the decision to contribute to our agenda.** In the document on potential topics for the MSWG from August 2018, all working groups have weighed in on what they would like to expand in a multi-sectoral approach, which can also be useful in regard to defining the foci in the advocacy briefs.

A similar strategy should also be implemented in the **private sector where we can reach out to already existing projects and opportunities.** In order to develop a similar strategy, Gary Krieger will share his contacts. In addition, **the group wants to reach out to other organisations (e.g. Rockefeller Foundation) to compile an extensive list of potential partners and collaborations.** It was also suggested that we can participate in other organisations' meetings and events to present our case. The co-Chairs will reach out to everyone in the working group to help collect a list for outreach.

It was also discussed that, at a later point, we can think about realizing longer manuals written like training courses on public health that can be distributed in an academic environment, for instance in engineering schools.

Input: Dams & Health (Eline Boelee)

Eline Boelee gave a short presentation on **an example on multi-sectoral cooperation in disease control, an approach which started within the non-health sector**. The project on Dams & Health collected data on planned and existing dams, and used Google Earth remote sensing to detect additional water bodies through which they also found dams and water bodies that have not been previously referenced in geographical databases. With this they made a participatory health impact assessment to look how the dams and water bodies affected their environment. Among the mentioned health issues influenced by water bodies regarding the OneHealth concept were: improved food security, better livelihood, water supply, bathing & hygiene, reduced water quality, breeding of vectors (mosquitoes, snails) and other infectious diseases. A consortium has now been created to approach these issues in a proposal.

Prototype Proposals: Operational Approaches to Different Sectors

The discussion then moved on to the major activity of the day: designing multi-sectoral prototype proposals. For this the co-Chairs suggested three groups on issues that have come out as important from the discussion so far: **1. Agriculture, 2. Urban management and 3. Private sector**. Each group had the task to **outline what they expect from a multi-sectoral proposal in their issue**, and answer the following questions:

1. How do we define outcomes that are of interest for the other sectors that are also in the interest of reducing malaria?
2. How can we make the prototype proposal an example to further elaborate the idea in later specific proposals?

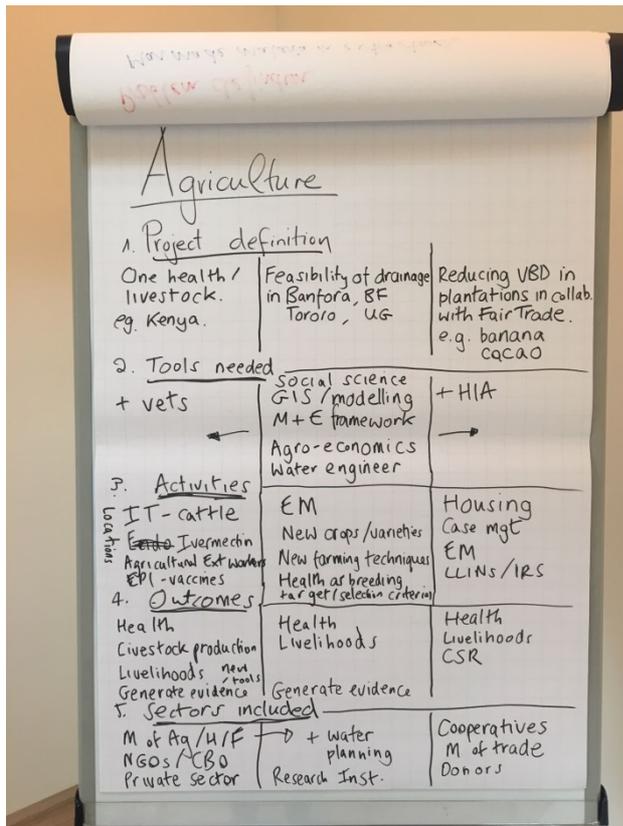
The co-Chairs pointed out that case studies would be a useful way to start and gave the following structural guidelines to consider when presenting the issues:

1. Problem definition
2. Tools needed
3. Activities
4. Outcome
5. Sectors Included

Group 1: Agriculture

The group on agriculture worked out three case studies for their issue. The first proposal on **OneHealth & Livestock** discussed the livestock intervention and how **improving livestock health can simultaneously improve human health**. Multi-sectoral engagement is important in this area, for instance in improving insecticides and vaccinations. As a major outcome, the group sees generating evidence in that field, in order to find out what works. Someone in the plenum suggests that there could be stage management on where diseases affect livestock and where only humans. If animals are kept at home, or if they live in a separate space than humans, should also be considered. Research has already been done in this area, which can

be used for a multi-sectoral approach.



The second project looked at **the feasibility of drainage in Banfora, BF and Tororo, UG**. The two picked districts are both high-burden areas in malaria, and the project proposal aims to **reduce breeding areas by water drainage**. By planting new crops/varieties and implementing new farming techniques, health and livelihoods in regard to VBD would improve in these areas. Just as for the first proposal, the group sees its first aim in this proposal to generate evidence from which future research can learn. Both the first and second project would involve the Ministry of Agriculture, the Ministry of Health and the Ministry of Finance, NGOs and the private sector. On the project on water drainage, the group would also involve local water planning institutions.

The last prototype proposal in agriculture dealt with **reducing VBDs in plantation agriculture in collaboration with FairTrade**, e.g. in banana or cacao plantations. For this the group sees different types of collaboration with case management, LLINS/IRS and housing and an involvement of the Ministry of Trade and donors. All three project proposals require similar tools: GIS modelling, an M & E framework, and an agro-economics water engineer as a specialist in this field.

Group 2: Urban management

The group on urban management picked the issue of mosquito control, targeting various mosquito-borne diseases in Accra, Ghana. Accra is one of the 100RC member cities (100 Resilient Cities supported by the Rockefeller Foundation) and has a transmission of malaria, and to some extent dengue and filariasis. The 100 Resilient Cities receive financial and logistical guidance for establishing a Chief Resilience Officer to support a city's resilience efforts in a proactive and integrated plan to address shocks and stresses from natural disasters and to adverse socio-economic trends. The group suggested that we connect with 100RC since all sectors are represented and involved in the organisation. There are other urban projects in Accra, showing that there is a political will in the city to change, and with which we could collaborate, for instance the Clean Accra Project (stemming from the Ministry of Sanitation and Water Resources) and the BreatheLife campaign (from WHO) to improve air quality by removing waste and enhancing green spaces.

The tools needed for this would be a mapping of the stakeholders involved in these projects and which sectors are most important to target, as well as a forecasting tool to expect

different outcomes and risk stratification (e.g. Where are the most vulnerable people? Can we imagine a scenario where the water becomes cleaner but VBD prevails? Or, are there environmental issues not involved in the projects that contribute to the problem?). The outcome for this case study could be an evidence-based tool to bring vector control into city planning.



Group 3: Private Sector

The third group focused on the private sector and chose **the issue of man-made malaria in extractive industries**. There are already some tools in place useful when considering this issue: the IFC Performance Standards present standards for the extraction industry to which the private sector closely adheres. Furthermore, the working group could get in contact with mining mineral commissions, oil & gas health committees to access leverage standards and guidelines. This is however not a short term activity – it would be much better to build up a long term relationship with single key players to produce an impact on minimising man-made malaria. Another good project to tap in would be the NGO Goodbye Malaria that is in partnership with the Global Fund and raises money from the private sector (from the aluminium, oil and gas industries) that is then matched by the Global Fund and uses it for malaria countermeasures. Through that, they have access to oil and gas industries. Several potential activities resulted from these issues, including: training awareness in e.g. **civil engineering, interacting with industry specialists on the intertwined issues on health, social and environment, and showing the private sector what is in for them when they support the agenda to reduce malaria**. The group took away from their discussion that the dialogue with **the private sector most likely will catch on to environmental and social issues** and we therefore must think about the bigger picture.

Preparation for the February Meeting and the Future

To conclude the meeting, the group briefly revisited items on the agenda and discussed what was still necessary for the annual meeting in February. As a general task for everybody, it was

decided that **each member should try to bring in new additional resources through other organisations and projects, invite colleagues from different sectors and go to meetings and present our goal to get the message out there.** A particular goal should be to bring in more members that are not from the health sector. **Especially the tourism sector is still very underrepresented and undeveloped.** As mentioned in the discussion earlier, it would therefore make sense to contact the UN World Tourism Organisation.

The co-Chairs will draft a program for the February meeting and send it out to the members for feedback. Concerns were raised in the group that the VCWG meeting is not back-to-back with the MSWG, and Konstantina assured that this issue will be taken care of for 2020. The idea would be to have one day in between for joint meetings, for instance: Monday to Tuesday VCWG meetings, Wednesday joint meetings, Thursday to Friday MSWG meetings. Someone expressed the wish to have a session on the MSWG during VCWG meeting this year. The February meeting should also give an opportunity to define what the timeline for after the meeting should be.

The following tasks were distributed with the commitment to fulfil them in preparation for the February meeting:

Topic	Responsible
Advocacy briefs ¹	Steve, Anne, Graham, Robert
Generic template for the sectors for the advocacy briefs	Konstantina
Requests from Steering Committee (Mozambique)	Josh forward to Graham, Robert et al
Develop templates for the rapid assessments	Josh, Konstantina
Attend different meetings from different sectors, what's the message, clarity	Priyane shares calendar Josh shares calendar
Invite colleagues from different sectors to our meeting (commitment of interest), i.e. ICMM (Konstantina), Associations of Mayors (Graham), A4NH (Jo Lines), UN agencies (Konstantina), Tourism Organization (Konstantina),	Everybody

¹ The advocacy briefs, or one-pagers, will include one focal point of each sector to consider. Until February we will prepare the advocacy briefs for the five focus sectors: settlement, food & agriculture, tourism, extractive industries and health.

Development Banks (European okay but African needs special invitation) (Graham), Donors (Welcome Trust, DFID ...), Professional Associations	
UNDP shares tools and experiences from country level	Maisoon
Draft program of work for the annual meeting	Graham, Robert and share early
<p>Agenda (ideas):</p> <ul style="list-style-type: none"> • high profile keynote speaker (Suggestions: Jeffrey Sachs, Princess Anne, Queen Máxima, Awa Seck) • thematic focus on particular area followed by panel discussions • give time to the selected topics 	Graham, Robert, Konstantina
Housing workstream keep at VCWG in 2019	Steve, Lucy
The WGs will present an update of their activities during the VCWG-14	WGs Co-Chairs
Proposals will be formatted and shared during the annual meeting	Graham, Robert
How all fits with SDGs targets and found out which Sectors are involved (check GBCR/IVM, VC needs assessment)	
Malaria Policy Advisory Committee (MPAC, April 2019) and STAG (April 2019) (NTD) slot for multi sectoral action	Alistair Robb is now at WHO GMP

Distribution list ²	Konstantina
Website Updates ³	Konstantina
Present in CropLife (strategic committee board, 15 or 20 minutes presentation), zero by 2040	
ASTMH meeting in New Orleans USA, celebrates 20 years RBM. There is a room for side meetings, if needed. ⁴	Josh, Konstantina, may be WGs collaboration gathering

Agenda

Tuesday 2nd October 2018 Day 1		
8:30 – 9:00	Arrival and registration	
9:00 – 9:20	Opening of the meeting Tour de table, round of introductions Approval proposed agenda and programme of work	Robert Bos Graham Alabaster MSWG co-Chairs
9:20 – 9:40	Objectives and expected outcomes of the meeting Documents: inception note Q&A	Graham Alabaster
9:40 – 10:05	The RBM Partnership to End Malaria: a brief introduction to the Partnership and the role of RBM working groups Documents: RBM reports/strategy/plan/WG ToR Q&A	Joshua Levens Konstantina Boutsika
10:05 – 10:30	Promoting malaria prevention and control through actions by non-health sectors: a historical perspective Documents: A brief history of intersectoral action for	Robert Bos

² This list is the basis on who will be invited to the February meeting. Everyone in the group is encouraged to add new people to the list through Konstantina.

³ Everyone in the group is encouraged to send Konstantina materials and documents useful for the MSWG that can be uploaded to the RBM website.

⁴ It was suggested to use this side-meeting to organise the cataloguing of MS-research.

	malaria prevention and control Q&A	
10:30 – 11:00	Break for refreshments and to exercise the human right to sanitation	
11:00 – 11:30	Setting the framework, scope and focus for the RBM Multisectoral Working Group	Initial plenary discussion led by the co-Chairs
11:30 – 12:30	Small group discussions on the five proposed Working Group focus sectors	All
12:30 – 13:30	Group photo Buffet lunch	
13:30 – 14:00	Interim feedback from the small groups	All
14:00 – 15:00	Small group discussions continued	All
15:00 – 15:30	Break for refreshments and to exercise the human right to sanitation	
15:30 – 16:00	Small groups report back on the outcome of their discussions	Rapporteur & All
16:00 – 17:00	Concluding plenary discussion on setting the framework, scope and focus for the RBM Multisectoral Working Group; determinants of malaria and other VBD in different settings	Robert Bos Graham Alabaster

Wednesday 2nd October 2018
Day 2

9:00 – 9:20	Recapitulation of the day one, update for day two	Robert Bos Graham Alabaster
9:20 – 10:30	Operationalization of the RBM Multisectoral Working Group 1. Institutional set-up: basis for engagement with other sectors	Plenary discussion led by the co-Chairs

	<ol style="list-style-type: none"> 2. Promoting public and private sector participation 3. The role of the research communities covering various disciplines 4. Links with other RBM Working Groups 5. From practice to policy and back: advocacy and evidence-based policy formulation 6. Cross-cutting methods that can support multisectoral initiatives (such as health impact assessment of development projects) 7. Integrated vector management across sectoral boundaries (e.g. IPM and IVM in agricultural production systems) 8. Opening new channels for health promotion, focused on VBD prevention 9. Capacity gaps and capacity development 10. Stratification: where are the hot spots, where are the best opportunities? 11. Resource mobilization for intersectoral action 12. Economic analysis in support of intersectoral action 13. Development and updating of normative and guidance documents 14. Any other issues? 	
10:30 – 11:00	Break for refreshments and to exercise the human right to sanitation	
11:00 – 12:30	Small group discussions on designing multi-sectoral prototype proposals	
12:30 – 13:30	Buffet lunch	
13:30 – 15:00	Small groups report back on the outcome of their discussions	
15:00 – 15:30	Break for refreshments and to exercise the human right to sanitation	
15:30 – 17:00	Conclusions and further action	Robert Bos Graham Alabaster All

List of Participants

Last name	First name	Email	Affiliation	Country
Alabaster	Graham	graham.alabaster@un.org	United Nations Human Settlements Programme	Switzerland
Amerasinghe	Priyanie	P.Amerasinghe@cgiar.org	Consultative Group on International Agricultural Research	Sri Lanka
Boelee	Eline	eline.boelee@deltares.nl	Deltares	The Netherlands
Bos	Robert	robert.bos53@gmail.com	International Water Association	Switzerland
Boutsika	Konstantina	konstantina.boutsika@swisstph.ch	Swiss Tropical and Public Health Institute	Switzerland
Burt	Murray	burt@unhcr.org	United Nations High Commissioner for Refugees	Switzerland
Elbukhari Ibrahim	Maisoon	maisoon.elbukhari@undp.org	United Nations Development Programme	Switzerland
Fink	Günther	guenther.fink@swisstph.ch	Swiss Tropical and Public Health Institute	Switzerland
Hoppé	Mark	mark.hoppe@syngenta.com	Syngenta	Switzerland
Krieger	Gary	gkrieger@newfields.com	Consultant	USA
Levens	Joshua P.	Joshua.Levens@endmalaria.org	RBM Partnership to End Malaria	Switzerland
Lindsay	Steve	s.w.lindsay@durham.ac.uk	Durham University	UK
Lines	Jo	jo.lines@lshtm.ac.uk	London School of Hygiene and Tropical Medicine	UK
Malm	Keziah	kezmalm@yahoo.com	National Malaria Control Programme	Ghana
McCartney-Melstad	Anna	amccartney@jhu.edu	Johns Hopkins University Center for Communication Programs	USA
Okal	Michael	mnyanganga@icipe.org	International Centre of Insect Physiology and Ecology	Kenya
Prytherch	Helen	helen.prytherch@swisstph.ch	Swiss Tropical and Public Health Institute	Switzerland
Rüegger	Adriana	adriana.rueegger@swisstph.ch	Swiss Tropical and Public Health Institute	Switzerland
Tusting	Lucy	lucy.tusting@well.ox.ac.uk	University of Oxford	UK
Unternährer	Sabine	sabine.unternaehrer@eda.admin.ch	Swiss Agency for Development and Cooperation	Switzerland
Weinmueller	Egon	eweinmueller@vodafone.de	Consultant	Germany
Wilson	Anne	anne.wilson@durham.ac.uk	Durham University	UK
Yadav	Rajpal Singh	yadavraj@who.int	World Health Organization	Switzerland

List of Abbreviations

A4NH	Agriculture for Nutrition and Health
ADB	Asian Development Bank
AfDB	African Development Bank
AIM	RBM's guide for collective Action and Investment to defeat malaria 2016-2030
CGIAR	Consultative Group on International Agricultural Research
CHW	Community Health Workers
CM	Case Management
DFID	Department for International Development
EBDR	European Bank for Reconstruction and Development
EIB	European Investment Bank
FAO	Food and Agriculture Organization of the United Nations
GTS	WHO's Global Technical Strategy for Malaria 2016-2030
GVCR	Global Vector Control Response
IADB	Inter-American Development Bank
ICMM	International Council on Mining and Metals
IFC	International Finance Corporation
IPM	Integrated Pest Management
IRS	Indoor Residual Spraying
ITNs	Insecticide Treated Netting Materials
IVM	Integrated Vector Management
LLINs	Long-lasting Insecticidal Nets
MDA	Mass Drug Administration
MiP	Malaria in Pregnancy
MIS	Malaria Indicators Survey
MOOC	Massive Open Online Course
MPAC	Malaria Policy Advisory Committee
MSWG	Multi-sectoral Working Group
NMCP	National Malaria Control Programme
NUA	New Urban Agenda
PEEM	WHO/FAO/UNEP/UNCHS Panel of Experts on Environmental Management for VC
POPs	Persistent Organic Pollutants
RBM	Rollback Malaria Partnership
SBCCWG	Social and Behaviour Change Communication Working Group
SDG	Sustainable Development Goals
STAG	Strategic Technical Advisory Group (Neglected Tropical Diseases)
UNCHS	United Nations Human Settlements Programme
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
VCWG	Vector Control Working Group
WHO	World Health Organization

[Annex 1: Discussion Paper: Challenges and Opportunities for Multi- Sectoral Action to control and eradicate Malaria and other vector-borne diseases, by Graham Alabaster](#)

Discussion Paper

Challenges and Opportunities for Multi-Sectoral Action to control and eradicate Malaria and other vector-borne diseases

Dr Graham Alabaster

Chief of Waste Management and Sanitation, UN-Habitat

Introduction

Malaria remains one of the world's worst health problems with 1.5 to 2.7 million deaths annually; these deaths are primarily among children under 5 years of age and pregnant women in sub-Saharan Africa. Of significance, more people are dying from malaria today than 30 years ago.

"2016 marked the first time in over two decades that malaria cases did not fall year-on-year despite huge efforts and resources, suggesting we need more tools in the fight."

[Nature Biotechnology](#), (reported BBC news 24 sept 2018)

It can be argued that we need more and better tools, but perhaps most importantly we also need more ways to deliver what we have more effectively, hence the need to broaden the approaches beyond health interventions.

We have also long been presented by the "experts" that a miracle cure is "just around the corner" and that efforts to invest in environmental management methods present a limited opportunity. Clearly this is not the case. History teaches us that eradication was achieved in many parts of the world through ensuring poverty was addressed through improved living conditions, and the local environment, especially housing and the peri-domestic environment.

Although blanket approaches to mosquito control built around use of insecticides and bed-nets, have varying levels of success, these approaches are beyond the resources of many endemic communities. There is clearly a need to save costs and time, while improving effectiveness through tailor-made, context specific solutions. In order to achieve this, we not

only need better diagnostic facilities, better mapping of cases and better feedback from communities, but also an involvement of the other critical stakeholders, who have much to give, although they may not realise the impact Malaria and other vector-borne diseases are having on their sectors.

The main objective of this working group is to:

- explore the necessary gaps in the design and delivery of integrated multi-sectoral approaches, building on the RBM multi-sector framework;
- encourage a wider participation in malaria control and eradication from other relevant sectors, prioritizing the most important actors;
- to promote successful models and design and implement new approaches to multi-sectoral projects and programmes;
- To identify additional resources to support activities, both within existing programmes and in establishing new partnerships; and
- Establish some priority regions/countries where political will is high and piggy-backing on existing initiatives is useful

Global Mandates for our work

These are principally driven by: The Sustainable Development Goals; Global Vector Control Response of WHO; and also some key sectoral mandates such as the New Urban Agenda. These higher-level mandates are key as a unifying approach for us to align with.

Efforts to prevent, control and eliminate malaria both contribute to and benefit from sustainable development. The objectives of reducing the disease burden and eliminating malaria are intrinsically linked to most of the Sustainable Development Goals (SDGs), and are central to SDG 3: *Ensure healthy lives and promote well-being for all at all ages* and its Target 3.3: "By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases." We note here the linkages to other communicable diseases

The *Global vector control response 2017–2030 (GVCR)* provides a new strategy to strengthen vector control worldwide through increased capacity, improved surveillance, better coordination and integrated action across sectors and diseases.

In May 2017, the World Health Assembly adopted resolution WHA 70.16, which calls on Member States to develop or adapt national vector control strategies and operational plans to align with this strategy. Priority activities set out in the GVCR fall within 4 pillars that are underpinned by 2 foundational elements:

Pillars of action

- Strengthen inter- and intra-sectoral action and collaboration
- Engage and mobilize communities

- Enhance vector surveillance, and monitoring and evaluation of interventions
- Scale up and integrate tools and approaches

Foundation

- Enhance vector control capacity and capability
- Increase basic and applied research, and innovation

Successful implementation of the GVCR will require strong country leadership, advocacy, resource mobilization and partner coordination, along with regulatory, policy and normative support. The GVCR was developed through a fast-tracked and broadly consultative process co-led by the WHO Global Malaria Programme (GMP), WHO Department of Control of Neglected Tropical Diseases (NTD), and the Special Programme for Research and Training in Tropical Diseases (TDR).

The New Urban Agenda does mention some of critical health issues faced by cities: it specifically calls out the epidemics of AIDS, tuberculosis, and malaria and other vector-borne diseases, in addition to the need for better nutrition and food security. It is however clear the other challenges highlighted (like the reduction of social inequalities and the promotion of social inclusion, and the need to promote the environmental quality of cities and ensure access to basic services and affordable housing) have health impacts. The density of urban agglomerations makes it possible for policies to impact the environments and the health of many people at once. Because they are home to enormous social and spatial inequalities, cities also have the obligation and the opportunity to act decisively to reduce health inequalities. There is clearly here a good opportunity for RBM

A second critical point is that population health and environmental sustainability are inextricably linked. Policies that promote health, like active transportation and consuming less processed foods will also have beneficial environmental impacts. And vice versa, policies to enhance the environmental quality and sustainability of cities will improve population health.

Key Issues for discussion

Enhanced engagement of community actors

The complex social structures in society are often not fully understood. Most community sensitization, is frequently a required inclusion, but seldom goes deep enough to contribute to more efficient and effective project design, let alone implementation. The complex working habits and leisure practices, play a huge role in understanding transmission routes and designing effective interventions. Poor engagements with communities often result in false conclusions about how or why interventions fail to achieve positive outcomes.

“on a recent visit to the Kagera region in Tanzania, the sporadic use of ITNs was questioned. Although the majority of households had been supplied with nets, in-depth discussions with the communities revealed that most parents did not allow their children to sleep under nets, as recently a house fire had injured some children. Many adults had thus rejected their use as hazardous “

Realising the untapped capacity that exists in communities, has not only been affected by “master plans” for malaria control and eradication, but has discouraged new, innovative community-based approaches to monitoring, surveillance and destruction of vector-breeding

Box 1 Community Engagement & Control of Vector-borne Diseases in Malindi, Kenya

The study was undertaken in Malindi town on the Kenyan Coast. The area was divided into grid cells measuring 1 km by 1 km. Each grid cell was assigned to a mosquito scout. The mosquito scouts were laypersons who are trained on aspects of mosquito biology, larval and adult sampling techniques and communication skills and data collection. Information on mosquito breeding areas, mosquito larvae and adult and promoting ITN use was collected and used to make decisions on mosquito control actions in the area. Participation in vector control was sought by local level involvement through community and/or inter-sectoral participation.

The resulting project triggered a further series of initiatives to share the knowledge. Using the community to identify malaria risk areas (positive larval habitats, presence of mosquitoes, children fevers), make decisions, and manage finances for malaria control, meant costs savings and a reduction in Malaria. Women provided ~ 60% of labour in the identification of ground pools of water and were well represented in the overall management (51%). Working in partnership with the Ministry of Health and local health

sites. Good examples do however exist (see Box 1)

Improving weak institutional structures at national and local level

Weak institutional structures at national level have resulted in Malaria control and eradication relying exclusively on ministries of Health, where other sectoral ministries are better placed to support interventions. Ministries of public works and housing, construction, urban development and planning, education, agriculture etc all have a role to play. But inter-ministerial co-ordination is easier said than done, with many turf-wars coming into play, particularly when resources are available. What is perhaps more important is the ability for line ministries to provide an enabling environment for other actors. For example, for local government bodies, communities and private sector to work together in innovative partnerships.

At the local authority level, a new dynamic, needs to be created to encourage multi-sectoral approaches in practice, building on existing capacity, complimented with community engagement. Multi-sectoral planning, housing design and construction, provision of drainage, water supplies and sanitation can be reviewed through a “vector-borne disease” lens with new or revisions to local by-laws, paving the way for strengthened capacity. The ultimate aim is to build malaria-wise communities, cities and towns, villages and agglomerations of all sizes.

Developing new tools to assess risk and assist in monitoring and surveillance

Predicting the risk rather than waiting for outbreaks has always been sought by health officials. However, although many risk assessment tools have been developed, their practical application in local settings is often impractical. Many aspects of both the natural and built environments have, in the past, been difficult to monitor. With great opportunities now available using remote sensing, drones and other forms of data acquisition, not only can environmental conditions such as surface temperature, air temperature, precipitation, soil moisture, vegetation, and evapotranspiration. This information can be mapped with the known behaviour of disease vectors and movements and behaviours of affected populations. Even aerial photography, until-recently requiring the purchase of satellite imagery, is now available freely. The opportunities are obviously not limited to Malaria but include others such as, Dengue Fever, Zika, Schistosomiasis, West Nile fever, Chikungunya. [NASA](#) data sets can be used to identify environmental conditions that may result in the onset of vector-borne diseases. At the present time, some researchers are using these datasets but most operational users have not begun to take advantage of the availability of these data. Such assessment methods are an integral part of assessment and appraisal tools.

Identification of vulnerable populations in displaced communities due to natural disasters and conflict

In a world where there are increasing numbers of displaced persons, due to disaster or civil strife, there are significant risks for transmission on Malaria and other VB diseases. Tracking VB diseases in such populations is difficult as they are often not registered in any formal system. With the increasing trends of the assimilation of refugees in existing host communities, new challenges are faced in the frequently low-income areas where they are hosted. In existing camps and settlements (where the average life span is, in excess of 27 years) a new approach to the provision of basic services such as housing, water, sanitation, drainage and access to medical care is required.

New approaches to Improved project design

Over the past several decades, a huge amount has been learned about vector habitats, behaviour and opportunities for control. This has not been well-captured in integrated projects. Many of the tools for effective interventions have been extensively researched, but like many other effective but isolated good practices, they never move to scale or are institutionalised in governance structures. Some suggested areas for innovation could be considered including:

- A more effective review of past successes, such as the pioneering work of the Tennessee Valley Authority and some of the military projects and interventions in South Pacific during WWII

- Better understanding the impact of new demographic changes brought about by urbanization and displaced populations. Malaria and other vector-borne diseases are often wrongly categorized as “rural diseases” In many parts of the world, urbanization patterns have seen explosive growth in smaller settlements. These settlements, although classed as “rural” by statisticians have predominantly urban characteristics. Housing and infrastructure provision must be designed with due consideration of the impact of vector-borne diseases.
- Malaria and other VB diseases do not recognise international and national boundaries. It is clear the further investigation of the transboundary issues, in relation of VB disease control, are needed. A good example is the designing of cross-border water resources projects.
- In terms of application of existing tools (such as IRS and ITNs), there is a need to consider how the efficiency of their use can be enhanced through additional environmental control methods, based on context could yield far greater impacts, often at reduced cost. Assessment and appraisal tools are therefore high on the list of priorities to contribute to such integrated projects.
- Developing project methodologies which establish a learning by doing approach, which is more participatory and less top-down may offer improved impacts. For example, establishing a multi-sectoral project design and implementation facility/team, sourced from local sector experts, to support municipal staff. Community participation needs to go far beyond cosmetic approaches and be institutionalised in local authority systems.
- Promoting the inclusion of multi-sectoral approaches to VB disease control and eradication in school and tertiary education curricula is most certainly missing in most malaria-endemic areas.
- There is much opportunity to use structures and approaches from other sectors which can be re-purposed to support VB disease management. Associations of agricultural workers, village water committees, HIV-AIDs advocacy workers all have lessons we can learn from.

Influencing increased investments

Influencing new and major investments in preventative approaches to Malaria and other VB disease still lags other sectors. There are opportunities to influence the investments of the financial institutions and external support agencies, providing interventions are considered in a timely manner.

Engaging in the initial phases of project development to include malaria and other VB disease components can be achieved in several ways. As a first priority, understanding the type of lending/grant so-called blended financing available is critical. Some organisations are geared solely to bilateral lending, whereas others offer flexibility for a regional funding approach.

Recognizing that investments can include components both at local level and in larger scale national/regional interventions such as investments in roads, railways dams housing, urban development, settlements planning for displaced persons.

The use of catalytic funding to leverage large investments is also well received. For example, including a demonstration of VB disease control in the inception phase of a major infrastructure investment project can be replicated and expanded in later phases. The inclusion of vector-borne disease experts in pre-appraisal and appraisal missions is also important as this is where recipient governments can be persuaded to include VB disease management components.

[Annex 2: A Brief History of PEEM, by Robert Bos](#)

A BRIEF HISTORY OF PEEM

Robert Bos, independent consultant, Public Health, Environment and Water & Sanitation⁵

This is a brief history of the joint WHO/FAO/UNEP/UNCHS Panel of Experts on Environmental Management for Vector Control (PEEM), which as a Panel functioned from 1980 to 1996, and whose programmatic activities in environmental management for vector control and health impact assessment of development projects continued until 2009.

This brief history intends to inform the newly established RBM Multi-sectoral Working Group of past efforts, achievements and failures in the pursuit of intersectoral action for the prevention and control of malaria and other vector-borne diseases.

Summary: lessons learned

Intersectoral approaches to the prevention and control of malaria and other vector-borne diseases have a huge potential, both at the policy and operational level. This potential remains largely untapped. The PEEM experience teaches us that creating a strong evidence base for such approaches through multidisciplinary research is feasible, provided a number of conditions is met. The bottleneck lies in translating the results of such research into policies, programmes and operations. This bottleneck is defined by the narrow focus of professional training and education, compartmentalized governance practice and rigid institutional structures.

“We must all become silo busters” (David Naborro, at the IFPRI Conference Agriculture for Health and Nutrition in Delhi 2011) or “It is only at this stage of my life that I realize the crux of all solutions is multidisciplinary and intersectorality” (Wendell Wallach at the Graduate Institute in Geneva, in his talk “How to keep Artificial Intelligence from slipping beyond our control”, May 2018) are all wonderful, to-the-point statements. The reality on the ground, however, is a host of sectoral boundaries, vested interests and professional prejudices that need to be overcome first before multisectoral action can deliver. Experience shows that for sustained results of multisectoral action, economic benefits for all parties concerned remains the critical motivation.

Intersectoral collaboration: Loved by all, funded by no-one. While the onus of poor intersectoral communications and coordination is usually put on the shoulders of governments, it must be clear that funding agencies are just as compartmentalized as the rest of the world. Each department will focus on its core business, and the cross-cutting issues are considered marginal. As a result, the optimal use of limited resources is hampered because the synergies that can be achieved are never considered.

It is important to be clear about the nature of sectors, as clarified by an Australian group of sociologists led by Degeling in the early 1990s. Government sectors are the result of achieving a critical mass of vested interests around a theme, that lead to a stand-alone institutional structure with its own budget to pursue the theme’s objective. This means that

⁵ Robert Bos joined the Secretariat of the joint WHO/FAO/UNEP/UNCHS Panel of Experts on Environmental Management for Vector Control, at WHO Geneva, in August 1983 and became its Executive Secretary in December 1985 – the Panel remained functional until 1996, and his post description was adapted in 1998, eliminating his role as Executive Secretary of the Panel.

decisionmakers in different sectors will only engage in collaborating if there are clear advantages for the vested interests in each sector from an approach of power-sharing. There have been many pleas for intersectoral action for health in international bodies such as the World Health Assembly, but in the end often the health sector has been its own worst enemy.

A long breath is needed to promote intersectoral approaches to all health issues, including malaria. The TDR initiative to do research on environmental determinants of malaria of the early 1990s soon petered out because the projects went beyond the conventional TDR business model both in terms of financing and in terms of time horizon.

Environmental management does not aim to replace other interventions (indoor residual spraying, mosquito nets (with or without insecticide impregnation, LLINs)), it complements them in an effort to increase impact and efficiency, and to add sustainability and resilience to the results achieved by the health sector. However, the false argument that environmental management interventions (or, in the 1930s, pre-World War II terminology: “naturalistic methods”, or even before that in the 1910s and 1920s: “species sanitation”) cannot achieve what post-World War II chemical and pharmaceutical interventions achieved, keeps coming back. It is false because multisectoral environmental management approaches do not have the intention to replace health sector-confined disease and vector control actions. It is also false because it does not consider the limitation of blanket interventions putting pressures on biological systems: the development of resistance to drugs and pesticides. In the search for a silver bullet solution (instigated by antibiotics and DDT) and in the reality of commercial interests linked to presumed silver bullets, the concepts of integration and synergy are systematically overlooked.

Another David Nabarro quote, in response to a question how the newly established Roll Back Malaria programme would address the intersectoral dimensions of malaria (inaugural session Roll Back Malaria, 1998 in the WHO Executive Board Room): “The core of the health sector is well-defined, but its boundaries are nebulous”

The spirit of the time

As Pepe Nájera, Director of the WHO Malaria Action Programme (MAP) from 1982 to 1992 documents ⁶:

“ Encouraged by the early success of using dichloro-diphenyl-trichloroethane (DDT) against malaria, the World Health Organization (WHO) embarked on the Global Malaria Eradication Program (GMEP) in 1955. Fourteen years later, the campaign was discontinued when it was recognised that eradication was not achievable with the available means in many areas, although the long-term goal remained unchanged. During the GMEP, malaria was permanently eliminated from many regions. In other areas, however, substantial gains were lost in resurgences, sometimes of epidemic proportions. During the 1970s and 1980s, because of economic and financial crises, international support for malaria control declined rapidly.” The failed global malaria eradication of the 1950s and 1960 – failed because of many technical challenges and for lack of sustained political support, and not global as its

⁶ Nájera, J.A., González-Silva, M. and Alonso, P.L. (2011) Some Lessons for the Future from the Global Malaria Eradication Programme (1955–1969). [PLoS Med.](https://doi.org/10.1371/journal.pmed.1000412) 2011 Jan; 8(1): e1000412. Published online 2011 Jan 25. doi: [10.1371/journal.pmed.1000412](https://doi.org/10.1371/journal.pmed.1000412) PMID: [21311585](https://pubmed.ncbi.nlm.nih.gov/21311585/)

name suggests (Africa south of the Sahara was largely excluded from the efforts) – left WHO licking its wounds during the decade of the 1970s.

At the beginning of that decade, the awakening to human-generated environmental problems took on concrete shapes with the United Nations Conference on the Human Environment (Stockholm, June 1972) and the subsequent creation of the United Nations Environment Programme (UNEP) – ironically, in a sense, the interest in environmental pollution had in part been stimulated by Rachel Carson’s book on the damage caused by DDT “*Silent Spring*”, the early focus of UNEP’s activities was on environmental risks incurred by industrialization: pollution by chemicals including the excessive use of pesticides.

In the cold war context of the time, the Soviet block and the non-aligned countries found themselves in strategies to promote social justice: the Basic Needs approach, and, in the health sector, the 1978 Declaration of Alma Ata, which was the product of the International Conference on Primary Health Care (PHC), organized by WHO and UNICEF, and hosted by the Government of the Soviet Union.

In keeping with the “New International Economic Order”, the Declaration re-affirmed the definition of health (“a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”), it recognized health as a socio-economic issue and a human right, and it proposed eight pillars in support of PHC: public education including on health issues, proper nutrition, clean water & sanitation, maternal & child health care, immunization, local disease control, accessible treatment and provision of essential drugs.

Local disease control underlined the need to tackle the prevention and control of diseases in the local context, instead of aiming for blanket silver bullet solutions. Community engagement, involvement and participation were key means of implementation for PHC.

It did not take long for a response from the other side of the iron curtain to materialise: after a Rockefeller-organized meeting in Bellagio, Ken Warren and Julia Walsh published their alternative to Alma Ata’s PHC: selective primary health care⁷ which reined health systems back into sectoral boundaries and focused on medical rather than public health approaches.

In the early 1990s IUCN briefly promoted an environmental variant on PHC: Primary Environmental Care. Potentially, it offered several points of interface with PHC, but the concept never really took off.

In the late 1970s, early 1980s, there was a sombre outlook on agricultural development in Africa – In Asia and in Latin America, the Green Revolution had refuted fears over major famines, but food production in Africa was not taking off, and the lack of water resources development, investment in irrigation infrastructure and poor capacities in managing water resources were seen as root problems. These ideas were reflected in the 1986 FAO report on Irrigation in Africa.⁸ The public health concerns related to irrigation in Africa were considered a serious impediment to agricultural development in that continent.

⁷ Walsh, J. and Warren, K. (1979). Selective PHC – an interim strategy for disease control in developing countries. *The New England Journal of Medicine* 30 (18): 967-974

⁸ Food and Agriculture Organization of the United Nations (1986). *Consultation on Irrigation in Africa*. FAO Irrigation & Drainage Paper 42, Rome.

The broad canvas of concepts and political streams in the 1970s helps to clarify the different motives that brought the three agencies, WHO, FAO and UNEP, together around one theme: promoting environmental management for disease vector control in the context of water resources development.

WHO was phasing out the vector control programme that had defined it for two decades, and was engaging in community-based, contextual approaches to public health. Environmental management for vector control was a good fit for its new paradigms. FAO was concerned over negative health impacts of accelerated irrigation and other water resources development, which could undermine its strategy to increase agricultural production. It needed evidence and tools to build safeguards into irrigation schemes. UNEP's concern was with the use of pesticides, both in agriculture and for public health purposes. Environmental management was an alternative, even though the understanding that it would never control disease vectors as a stand-alone approach had not yet penetrated. The reduction and elimination of first generation pesticides would eventually be regulated internationally by the 2001 Stockholm Convention on Persistent Organic Pollutants.

The original objectives, structure and evolution of the panel

The joint WHO/FAO/UNEP Panel of Experts on Environmental Management for Vector Control (PEEM) was the brainchild of an Iranian Sanitary Engineer working in WHO's Division of Vector Biology and Control in Geneva, Mr Rafatjah. WHO and FAO signed three MoUs in 1980, and in the context of one of these (collaboration in the field of water resources development-related diseases) Arrangements were agreed for the establishment of PEEM – last minute, the United Nations Environment Programme joined and thus the Panel was created as a tri-partite initiative in 1980, with its first meeting, in Geneva in September 1981.

Rafatjah's original intention was to create an expert panel that would advise the agencies on policy issues in direct reporting to the executive bodies of the three organizations: the WHO Executive Board, the FAO Council and the UNEP Governing Council. In reality, this idea never materialized.

At the start challenges for sectoral UN agencies to collaborate were already apparent: it was hard to agree on a name for the group of experts. In WHO, and Expert Committee had a special connotation (expert committees were convened on a regular basis by the Director-General and submitted their report to the Executive Board for approval – this was probably Rafatjah's vision, but there already was an Expert Committee on Vector Biology and Control which had just delivered an Expert Committee report on environmental Management, in 1979); in FAO, the term "Task Force" already had a specific meaning and WHO/FAO/UNEP Task Force on Environmental Management was therefore discarded .. the final agreement was on the name "Joint Panel of Experts".

In its initial years the Panel discussions and reports reflected a general policy focus, often with "motherhood" recommendations, and without a clearly defined audience. The membership of the Panel included several former WHO Executive Board members, not necessarily with a technical background in tropical diseases or disease vector control. The Panel was chaired by the Dutch Senator Dr R.J.H. Kruisinga, who had been vice-Chair of the EB. The FAO designated members did have strong technical backgrounds, drawn from either academia or irrigation practice. UNEP relied on WHO for the designation of Panel members.

There was a clear need to move the Panel from an annual talk-shop to a more operations-oriented entity and the shift to a focus on technical issues started with the 3rd Panel meeting at FAO in Rome, in 1983. The agenda of the five-day meeting included a half-day (!) technical discussion session on forecasting the vector-borne disease implications of water resources development. This technical discussion was the starting point of the Panel's and later WHO's work on Health Impact Assessment of Development Project.

As the technical discussions took on a more important place on the agenda of annual Panel meetings (in the late 1980s 2.5 of the five meeting days), the composition of the Panel gradually changed to more technical levels. This led to the emergence of normative documents, health impact assessment, agricultural research for health, river basin assessment, education and training activities, and development of policy and institutional strengthening programmes.

The financial basis for the Panel was narrow from the beginning: under the Arrangements each agency contributed in cash USD20,000 annually – the budget of USD60,000 served to organize the annual Panel meeting, the preparation and distribution of meetings report and, starting in 1985, a mid-term meeting of a small Steering Committee. However, as soon as the Panel's focus shifted from policy to practice, ad-hoc funding was provided for recommended activities. In 1983, WHO supported projects in Nigeria and Sri Lanka with USD30,000 each. The development of guidelines was covered under technical service agreements, and by the early 1990s the Panel had an annual budget of almost 1M USD. A major input was provided by IDRC Canada with the governments of Denmark and Norway: a total of nearly 2M USD for the IDRC/WARDA/PEEM Consortium Research Project on the association between irrigated rice production systems and malaria and schistosomiasis in different ecozones of West Africa.

In addition, WHO provided a full-time P4 staff and a G5 secretary, as well as part of the time of a P5 staff; FAO provided a practically full-time P4 staff and part of the time of a P5 staff, and UNEP part of the time of a P4 staff.

In 1990 the UN Centre for Human Settlements UNCHS, also known as UN-Habitat, based in Nairobi, joined the other three agencies, adding the dimension of disease vector control in urbanizing areas and in peri-urban often informal settlements. The frequency of Panel meetings was reduced to once every two years, staggered with a meeting of WHO-designated Collaborating Centres the other year.

In 1995 an independent review of the Panel and its programme was commissioned. This happened at the time when the UN agencies went through series financial constraints. Each agency nominated a consultant and this team investigated the Panel's objectives and outputs, interviewed people at the four agencies, a number of selected panel members and representatives of collaborating centres.

The outcome was highly positive. Relevance of the Panel's objectives scored high against the backdrop of the 1987 Brundtland report (*Our Common Future*), the 1992 UN Conference on Environment and Development, and the trend towards dealing with Persistent Organic Pollutants in a definitive manner. The consultants also observed, however, that the excellent work of the Panel could be significantly enhanced if the four agencies would raise their annual support from what they considered the absolute bare minimum of USD20,000 a year. For FAO, where new leadership of the Water Resources, Development and Management

Service had already questioned the use of a health programme in an agricultural organization, this was reason to end its engagement. From the WHO side, where the Division of Vector Biology and Control had been disestablished at the end of 1989 (with the PEEM Secretariat moving to the Community Water Supply and Sanitation unit in the Environmental Health Division) there was no pushback, as priorities in Tropical Disease Control had shifted – in the Declaration of the 1992 Malaria Conference in Amsterdam, vector control had been inserted only last minute.

While the Panel was never formally disestablished by the agencies, the interagency activities gradually wound down and the remnants of its programme continued to be carried out by the WHO.

Main issues addressed by the Panel

Following is a list of technical discussions held at the annual (later biennial) PEEM meetings:

- 1981 Environmental management for vector control in rice fields
- 1982 Environmental management measures for disease vector control
- 1983 Methods of Forecasting the vector-borne disease implications in the development of different types of water resources projects
- 1984 Institutional arrangements to ensure the incorporation of health and environmental safeguards in water resources development projects
- 1985 The environmental impact of population resettlement and its effect on vector-borne diseases
- 1986 Financial and economic aspects of environmental management, and its cost-effectiveness
as a vector control measure
- 1987 Effects of agricultural development and changes in agricultural practices on the Transmission of vector-borne diseases
- 1988 Education and training for the planning, design and implementation of environmental Management for vector control
- 1989 Policies and programmes of governments, bilateral and multilateral agencies and development banks in support of environmental management
- 1990 Livestock management and vector-borne disease control
- 1991 Vector-borne disease problems associated with rural and urban water management

Other activities and events

In 1984, the International Irrigation Management Institute (now the International Water Management Institute) was established in Sri Lanka, and the first workshop ever was on Irrigation and Malaria (IIMI, 1985), at its initial premises, Digana Village near Kandy. Policy seminars on public health in water resources development were held in Kenya (1987),

Zambia (1995) and Malawi (1996). River-basin studies were performed on the Lower Mekong Basin, the Zambezi River and the Senegal River in the mid-1990s to assess the conditions of vector-borne disease control in basin-wide approaches. In a series of regional workshops (Alexandria, 1991; Bangkok 1991; Tegucigalpa 1992) the options of promoting environmental management for vector control through agricultural extension workers and farmer field schools were explored.

Major and minor research efforts

In March 1987 the International Rice Research Institute (IRRI, part of the CGIAR), PEEM and the USDA Riceland Mosquito Management Program (RMMP) jointly organized a workshop at the IRRI premises in Los Baños, the Philippines. This resulted in a seminal publication and the development of a multi-country research proposal. Donor interest was weak, and the proposal was never funded. Underlying reasons were a change in administration at IRRI and internal resistance in WHO to mobilize funds for health research outside of the health sector research infrastructure.

Work with another CGIAR centre, the West Africa Rice Development Association (WARDA, based in Bouaké, Côte d'Ivoire) was more successful: a multidisciplinary team studied over four years the associations between valley bottom and irrigated rice production systems, and the transmission of malaria and schistosomiasis in three West African ecozones: humid, intermediate and Sahelian zones in Côte d'Ivoire and Mali. It resulted in some ten research papers published in the biomedical literature, but the results were never transformed into policy papers for the agricultural sector.

The initial contact with IWMI resulted in the creation of a Water and Health programme, covering mainly malaria and Japanese encephalitis, later expanded into issues around pesticide use and the safe use of wastewater in agriculture – the latter subject continues to be part of IWMI's research programme. The malaria component at IWMI was revived for some years in 1999 when it hosted the CIAR System-wide Initiative on Malaria (SIMA).

Ad-hoc, less institutionalized research activities took place under the auspices of PEEM in Sri Lanka (malaria impacts of the accelerated Mahaweli Development project), Nigeria (an inventory of small-scale water resources projects and their links to schistosomiasis), South India (environmental management for the control of Japanese encephalitis vector breeding in rice fields) and Indonesia (environmental determinants of malaria in the Menoreh Hills area of central Java).

Capacity development

Out of the eighth Panel meeting with its technical discussion on education and training, a course was developed for health impact assessment of water resources development projects. In a collaborative effort of PEEM with the Danish Bilharziasis Laboratory, the Liverpool School of Tropical Medicine and the Institute of Higher Education Studies of University College London, a three-week problem-based learning course was developed and tested in five countries: Zimbabwe (1992), Ghana (1994), Tanzania (1995), Honduras (1996) and India (1997). Course development and testing was generously supported by the Danish Government.

Post PEEM

Many of the work streams initiated under PEEM continued well after the moment the Panel stopped functioning. The subject of HIA was covered extensively in WHO capacity development efforts in the Mekong countries between 2003 and 2009, and it is now continued by the Asian Development Bank. Work on alternatives to insecticides fed into the negotiations on the Convention for the reduction and elimination of Persistent Organic Pollutants – the agreed Stockholm Convention (2001) included many first-generation residual insecticides used for vector control in the 1950s, with DDT being the most prominent and controversial. In follow up, GEF supported projects on substitution of DDT with alternatives for vector control were carried out in WHO's Eastern Mediterranean and African regions. It spurred discussions over the links between IVM and IPM, and how to promote a combined approach for vector and pest management in agroecosystems.

Environmental management has also become increasingly of interest for urban vector control, with dengue, Chikungunya and Zika viruses surfacing at regular intervals. As the health sector interventions for malaria control (case detecting, drug treatment, LLINs) are faced with stagnancy, because of drug and insecticide resistance, and with regress in areas of civil strife and war, the role of multisectoral approaches applying more durable solutions is again catching the attention. In the period of the SDGs, such an interlinked approach makes sense as part of efforts to achieve sustainable development. Environmental engineering and manipulation can add the resilience needed to ensure that the achievements (and investments) in malaria control over the past 15 years are not lost.

Publications

WHO (1982). Environmental management for Mosquito Control with special reference to malaria. WHO Offset Publication 66. Geneva: World Health Organization

FAO 1984

Reports of the annual PEEM meetings – 1st (1980) to the 11th (1991)

Guidelines

Tiffen, M. (1991) Guidelines for the Incorporation of Health Safeguards into Irrigation Projects through Intersectoral Cooperation. PEEM Guidelines series 1. Document WHO/CWS/91.2. Geneva: World Health Organization

Birley, M.H. (1991) Guidelines for forecasting the vector-borne disease implications of water resources development. PEEM Guidelines series 2, Document WHO/CWS/91.3. Geneva: World Health Organization

Phillips, M, Mills, A and Dye, C (1993). Guidelines for Cost-effectiveness Analysis of Vector Control. PEEM Guidelines series 3. Document HO/CWS/93.4. Geneva: World Health Organization

Other reports

IRRI/PEEM (1988). Vector-borne disease control in humans through rice agroecosystem management. Proceedings of a workshop on research and training needs in the field of integrated vector-borne disease control in riceland agroecosystems of developing countries (9-14 March 1987). Los Baños, International Rice Research Institute in collaboration with the joint WHO/FAO/UNEP Panel of Experts on Environmental Management for Vector Control.

Oomen, JMV, de Wolf, J and Jobin WR (1994). Health and Irrigation – incorporation of disease control measures in irrigation, a multi-faceted task in design, construction, operation. Vols 1 and 2. ILRI

publication 45. Wageningen, the Netherlands: International Institute for Land Reclamation and Improvement.

WHO/FAO/UNEP/UNCHS (1995). Promotion of environmental management for disease vector control through agricultural extension programmes – reports of inter-regional workshops in Alexandria (23-26 September 1991); Bangkok (28-31 October 1991); Tegucigalpa (23-26 May 1993). Documents WHO/EOS/95.12/13/14. Geneva: World Health Organization

WHO/FAO/UNEP/UNCHS (1994). Incorporating a human health component into the integrated development and management of the Lower Mekong Basin. A report prepared by TH Mather, Santasiri Sornmani and Keobang A. Keola. PEEM River Basin Series 1, document WHO/EOS/94.52. Geneva: World Health Organization

WHO/FAO/UNEP/UNCHS (1994). Incorporating a human health component into the integrated development and management of the Zambesi Basin. A report prepared SK Chandiwana and WB Snellen, PEEM River Basin Series No 3, Document WHO/EOS/94.53. Geneva: World Health Organization

WARDA project

Briët OJ, Dossou-Yovo J, Akodo E, van de Giesen N, Teuscher TM (2003). The relationship between *Anopheles gambiae* density and rice cultivation in the savannah zone and forest zone of Côte d'Ivoire. Trop Med Int Health 8(5):439-48.

Henry MC, Rogier C, Nzeyimana I, Assi SB, Dossou-Yovo J, Audibert M, Mathonnat J, Keundjian A, Akodo E, Teuscher T, Carnevale P. (2003). Inland valley rice production systems and malaria infection and disease in the savannah of Côte d'Ivoire. Trop Med Int Health 8(5):449-58.

Dolo G, Briët OJ, Dao A, Traoré SF, Bouaré M, Sogoba N, Niaré O, Bagayogo M, Sangaré D, Teuscher T, Touré YT (2004). Malaria transmission in relation to rice cultivation in the irrigated Sahel of Mali. Acta Tropica 89(2): 147-159 DOI: [10.1016/j.actatropica.2003.10.014](https://doi.org/10.1016/j.actatropica.2003.10.014)

Assi, Serge-Brice Assi, Henry, Marie-Claire, Rogier, Christophe, Dossou-Yovo, Joël, Audibert, Martine, Mathonnat, Jacky, Teuscher, Thomas and Carnevale, Pierre (2013). Inland valley rice production systems and malaria infection and disease in the forest region of western Côte d'Ivoire. Malaria Journal 12:233 <https://doi.org/10.1186/1475-2875-12-233>

Other related documents

Takken W, Snellen WB, Verhave JP, Knols BGJ and Atmosoedjono S (1991). Environmental measures for malaria control in Indonesia: a historical review on species sanitation. Wageningen, the Netherlands: Agricultural University

ADB (1992). Guidelines for the Health Impact Assessment of Development Projects. ADB Environment Paper no. 11, prepared by MH Birley and GL Peralta. Manila: Asian Development Bank.

Jobin W (1999). Dams and Disease – ecological design and health impacts of large dams, canals and irrigation systems. London: E & FN Spon / Routledge

Konradsen F, Amerasinghe FP, van der Hoek W and Amerasinghe PH (2000). Malaria in Sri Lanka – Current Knowledge on Transmission and Control. Colombo: International Water Management Institute

Sustriayu Nalim, Hartono, Sugeng, Bogh C and Bos R (2002). Rapid assessment of correlations between remotely sensed data and malaria prevalence in the Menoreh Hills area of Central Java, Indonesia. WHO/SDE/WSH/02.06. Geneva: World Health Organization

Casman EA and Dowlatabadi H (2002). The Contextual Determinants of Malaria. Washington DC: Resources for the Future

Lindsay S, Kirby M, Baris E and Bos R (2004) Environmental Management for Malaria Control in the East Asia and Pacific Region. Health, Nutrition and Population Discussion Paper. Washington DC: the World Bank