Concept Note

Leveraging the Sustainable Development Goals to intensify transdisciplinary & multisectoral collaboration in the global malaria response

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1. The 2030 Sustainable Development Agenda – a call for greater transdisciplinary and multisectoral collaboration

The Sustainable Development Goals (SDGs) build on the Millennium Development Goals, but are distinct in their content, ambition and attitude. The SDG agenda strives to balance development thinking around the preservation of the human environment and natural resources, with discourses on social development and equity, and today’s concern with global economic development and growth (France 2015).

Like the interconnected realms and issues it is designed to tackle, sustainable development is a complex system. Problems associated with complex systems are typically difficult to solve and often hard to understand because the causes and effects are not obviously related (World Bank 2015). The broad-based, global consultation that informed the development of the SDGs raised questions of how people can establish sustainable livelihoods while also protecting the environment; of how to provide everyone with the water, food, shelter, energy and healthcare they need; and how to strengthen community resilience in the face of natural disasters.

Making progress through any complex system requires an understanding of indirect effects, and the recognition that all parts of a system give rise to its collective behaviours (NECSI 2015). The sustainable development approach seeks to bring previously separate and divergent work areas together as an integrated whole, so they can be collectively understood and jointly contribute to the generation of innovative ideas and ‘emergent’ solutions. This is sustainable development’s greatest promise – and its greatest challenge (Waage & Yap 2015).

“While it appears a modest goal in principle, actually achieving widespread integration across diverse disciplines will be arduous. Barriers include institutionalized ‘silo-ization’, personal identification with individual fields, and the deep-rooted fragmentation and operational design of existing information- and experiencing-sharing platforms” (France 2015 p.2). To rapidly realize the potential and deliver on the SDG agenda there is an urgent need for sectors to work together more closely. This concept note explores the implications of intensified interdisciplin ary and multisectoral collaboration for the global malaria response. It seeks to clarify definitions, provides a conceptual framework and highlights possible entry points for facilitating change.

2. How transdisciplinary and multisectoral collaboration could strengthen the fight against malaria

From a global policy perspective the stage has been set for a development dimension to be added to existing strategies for fighting malaria. The 69th session of the UN General Assembly of Resolution /RES/69/325, “Consolidating Gains and Accelerating Efforts to Control and Eliminate Malaria in Developing Countries, Particularly in Africa, by 2015 and beyond” highlighted the Multisectoral Action Framework for Malaria, developed by UNDP, RBM and other partners.

Moreover, the new RBM flagship document Action and Investment to defeat Malaria 2016-2030 (AIM) – for a malaria-free world – illustrates not only the contribution that meeting the 2030 malaria goals will make to the achievement of SDG3 (good health for all), but the additional, knock-on benefits this will bring for progress towards many of the other SDGs.

A growing body of scientific research confirms that malaria is both a result and a cause of a lack of sustainable development. Its burden is greatest in the least developed areas and among the poorest members of society – particularly children, pregnant women and other vulnerable population groups. Poverty forces people to live and work in sub-standard conditions, with a high level of exposure to malaria vectors, while lacking access to malaria prevention, health care and other basic services (UNDP/RBM 2013). Moreover, many of the key challenges to sustainable development – including environmental
change, human habitats, weather and climate, food security and population mobility – interact with malaria transmission and are impacted by the actions of stakeholders in a wide variety of sectors.

The Multisectoral Action Framework for Malaria (MSAF) consolidates the evidence on the many interfaces between the operations of the non-health sectors and how these operations might inadvertently contribute to increasing the risk of malaria transmission or serve as a potential vehicle for scaling up access to malaria prevention, diagnosis and treatment. It reminds us that while preventive tools like long-lasting insecticide treated nets and indoor residual spraying, improved diagnosis and treatment and responsive surveillance systems are critical to reduce the burden of malaria (Bhatt, S et al 2015), elimination in northern Europe, North America, and more recently in countries like Iran and Sri Lanka was further facilitated by broader social and economic development, including better and less crowded housing, improved land drainage and stronger health systems (Najera 1994; Feachem et al 2010).

The MSAF calls for the defeat of malaria through holistic inter-organizational and inter-agency efforts that promote participation of affected communities, as well as action across inter- and intra-national boundaries, and at all levels in multiple sectors. It underscores the importance of finding common ground for diverse stakeholders on the joint benefits of accelerating socio-economic development and reducing malaria, as captured in Figure 1 below.

Action and Investment to defeat Malaria 2016-2030 outlines how high level action is needed to demonstrate to Heads of State, Ministers of non-health sectors, business partners and other key stakeholders that less malaria translates into healthier and more productive workforces; creates the conditions that attract investment and trade; and results in economic growth and development. This is a recognized prerequisite for the integration of malaria into regional and national development strategies and its inclusion on the agenda of meetings of regional economic blocs. In addition, organizations or individuals with the power to convene a wide variety of stakeholders have a critical role to play so that potentially receptive “champions” in the non-health sectors can be familiarized with the evidence on the benefits of investing in malaria.
Figure 1: Positive synergies between advances in malaria and progress towards the SDGs
Source: RBM/Action and Investment to defeat Malaria 2016-2030
3. Clarifying definitions

This concept note has so far referred to transdisciplinary and multisectoral collaboration. **Transdisciplinary collaboration** refers to the integration of information, data, techniques, tools, perspectives, concepts, and/or theories from two or more disciplines or bodies of specialized knowledge to advance fundamental understanding or to solve problems whose solutions are beyond the scope of a single discipline or area of research practice (Gray 2008). The term interdisciplinary collaboration is also coined, but the concept of transdisciplinarity goes further and embraces not only the co-production of knowledge across disciplines but also between policy makers, practitioners and other concerned collective and individual actors. This is shown in Figure 2 below.

![Concept of transdisciplinary collaboration](http://www.transdisciplinarity.ch/td-net/Transdisziplinaritaet/Forschungszwecke.html)

**Figure 2:** Concept of transdisciplinary collaboration

**Source:** Swiss Academies of Science, td-net. [http://www.transdisciplinarity.ch/td-net/Transdisziplinaritaet/Forschungszwecke.html](http://www.transdisciplinarity.ch/td-net/Transdisziplinaritaet/Forschungszwecke.html)

**Multisectoral collaboration,** sometimes referred to as intersectoral collaboration refers to the approaches taken by multiple sectors, either working explicitly together or in a synchronized way. Multisectoral action for health, or malaria would therefore refer to activities implemented by sectors outside the health sector, possibly, but not necessarily, in collaboration with the health sector, on health or health equity outcomes or on the determinants of health or health equity (PHAC & WHO 2008).

**A sector refers to a part or subdivision, especially of a society or an economy.** Within each sector, there are a plethora of stakeholders and actors: government, public; private-for-profit; private-not-for-profit; nongovernment organizations; civil society, including consumers groups.

**Mainstreaming refers to the process of integrating a focus on malaria into country development frameworks, sectoral policies, decisions and actions at national, sectoral and local levels.** Mainstreaming addresses both the causes and effects of malaria in an effective and sustained manner – that is, within the context of the normal functions of a sector, organization or community. The MSAF invites receptive stakeholders from the non-health sectors and actors with expertise in malaria to jointly examine the determinants of the disease from a societal, environmental, population and household perspective, and to explore how their sector may be affected by, or could influence, these determinants. These stakeholders are well placed to address the malaria needs of their own staff and their families, as well as of their clients (e.g. students or farmers) or business partners. More fundamentally, they can be supported to examine whether their operations, practices, procedures or production systems may be contributing to, sustaining, or increasing vector abundance, parasite transmission, insecticide or drug resistance. In such cases, mitigation strategies that can be readily integrated in the routine activities and budgets of the sector concerned at all levels of operation become essential.
4. Towards a conceptual framework: Entry points for change

In Figure 3 a possible conceptual framework is presented. It lays out the socio-economic and environmental determinants that exacerbate risk and exposure to malaria, while also influencing access to malaria prevention, diagnosis and treatment.

The framework builds on the transdisciplinary discourse that calls for us to break down the walls that separate researchers, policy-makers, practitioners and those on the receiving end of malaria services, while also adding the component of multisectoral collaboration. Timely transdisciplinary and multisectoral exchange can combine information, techniques, tools, theories and practical experience from a variety of different perspectives and widen the collective knowledge base for problem-solving. This significantly increases the likelihood that ‘emergent’ solutions and innovative ideas will materialize.

The process of translating such solutions into policy-change and multisectoral action is complex, and will require stronger multisectoral modalities (eg. for programming and financing). The process of translation can take place at global, regional, national and local levels, and through the actions of a variety of stakeholders: government; businesses; non-governmental or faith-based organizations; civil society, including consumer or community-based groups.

The framework indicates that there are many windows of opportunity or entry points for change. Possible entry points via the policy level, through private sector involvement and stronger public engagement are further elaborated below.
Figure 3: Conceptual framework for greater transdisciplinary and multisectoral collaboration taking malaria as an example
4.1. Making policies “malaria-smart”

As more sectors engage, the need to ensure the coherence of policies across different work areas and line ministries increases. Vector-control activities, such as land drainage regulations, may fall under the remit of Environmental Health Agencies. Ministries of Agriculture issue the permits that allow insecticides to be used for Indoor Residual Spraying, wider pest control bodies are often responsible for the registration, regulation and use of pesticides. The involvement of Animal Health Authorities also becomes necessary when developing policies to manage human health risks; for example, those related to *P. knowlesi* and possibly other zoonotic malaria infections (CDC 2013). Policies that provide or exclude access to health services for the poor, or for foreign nationals have important ramifications, especially along porous borders in regions that are striving to eliminate the disease. Even within the health system of a single country there is often scope to improve collaboration between public and non-state providers for greater overall efficiency, assured availability of quality antimalarials, and the timely delivery of preventive and curative malaria services to everyone in need. To strengthen regional and national policy environments, rapid policy analyses¹ are important for identifying gaps and inconsistencies as a basis for amending, rephrasing, withdrawing or creating policies in support of the fight against malaria.

4.2. Private sector involvement

The private sector interacts with the malaria response in a multitude of different ways. While it can contribute to the ongoing transmission of malaria, it also helps to drive malaria research and innovation; shares its strategic, technical and logistical expertise; delivers malaria services; and facilitates access to corporate networks and clients (Bloom et al 2006). The private sector provides funding or materials in kind, and invests through corporate social responsibility programmes and sustainable business practices. As part of the global movement to make international and national tax systems more transparent, private sector actors are increasingly demonstrating corporate citizenship, and publishing the amounts they pay to governments in the countries where they operate (e.g. Publish What You Pay, Extractive Industries Transparency Initiative etc.). Some of the companies that produce malaria commodities as part of their core business have relocated their production processes to endemic countries, as a way of creating local jobs and fostering sustainability (DFID 2007).

In endemic areas, malaria can be responsible for high levels of workers sickness and absenteeism, at considerable cost. Many companies work in partnership with national malaria programmes, and civil society organizations to bring malaria and health services to their workers, their families and surrounding communities. Including academia in these partnerships, allows such endeavours to be accompanied by a research component to monitor and evaluate the impact. As they have grown in experience and expertise, some of the companies involved in malaria have extended their role even further, for example, by becoming an implementing partner for the Global Fund or a principal recipient of its funding.

4.3. Civil Society/Public engagement

In keeping with the td-framework and research into Citizenship, Participation and Accountability, there is a push to bring together the debates about “public engagement” in the North and “community engagement” in the South (Leach et al 2007, www.drc-citizenship.org).

Public engagement is crucial for an effective response to malaria where innovations meet local needs, ways to overcome access barriers are found, and interventions are rapidly scaled up. Yet understanding people and their behaviour is a complex undertaking. People often make fast and automatic decisions, while they are social animals too, influenced by social preferences, networks and identities. Previous experience also shapes the way people respond and act.

The *World Development Report 2015: Mind, Society, and Behaviour* shows how far our knowledge of human behaviour has expanded in recent years. It provides useful insights into how taking the right decisions for health and malaria can be facilitated; provides a deeper diagnosis of the barriers to, and drivers of, change; and summarizes the latest evidence on the role of public engagement in supporting change. In particular, it emphasizes the importance of involving civil society in governance of the health sector, through seats on political advisory groups, country-coordinating mechanisms, private sector boards, coalitions and health facility governing committees, and of ensuring that the representation is balanced (e.g. in terms of gender and ethnicity).

Collaboration with Ministries of Women and Youth and their networks can help create platforms for generating new ideas and initiatives. Civil society groups and watch dogs are increasingly demanding data on progress in health and malaria (e.g. in monitoring outbreaks, interruptions of services or supply-chain failures) as they seek to hold governments and services providers to account. See for example: [http://sikika.or.tz/](http://sikika.or.tz/). Such groups are quick to take advantage of the opportunities for public engagement offered by new technologies. Participatory qualitative research methods can be used to more effectively involve the affected public in the co-diagnosis and design of malaria interventions and innovations.

### 5. Illustrative thematic areas

#### 5.1. Environmental manipulation – land-use and infrastructure

Environmental change has a tremendous impact on malaria transmission, making the disease a potential threat wherever there is a receptive environment. Deforestation, large-scale irrigation, urbanization, the establishment of rubber plantations, soil salinification, and extractive activities can all affect the mix of vector species, their abundance, host choice, longevity and behavior and ultimately malaria transmission (Tatem et al 2013; Bhumiratana et al 2013; Hay et al 2005). Decisions on major development projects such as dam construction, road building and associated resettlement schemes are taken by Ministries of Finance, Infrastructure, Transport, Planning, Energy and Water, as well as international financing institutions, Regional Banks and companies - and there are often many complex and competing interests at stake.

International and national legislation is needed to oblige donors and businesses to conduct quality health, social and environmental assessments of the potential impacts of such projects at the construction, operation and closure phases (IAIA 2006). It is important that baseline studies and surveillance activities
are carried out jointly with local health authorities and that the results are made publically available. This can allow ongoing monitoring of the project’s impact and any mitigating measures, and foster accountability to local communities. By ensuring that major construction and development projects do not introduce or increase malaria transmission, the benefits of progress can be reaped, while also protecting human health and ecosystems. The companies involved can also be guided to provide malaria services to their workforce and surrounding communities. Civic by-laws are a further entry point, for example to require companies and individuals involved in construction and demolition to take precautions to prevent conditions for vector breeding.

5.2. Sustainable agriculture and food security

Sustainable agricultural practices are pivotal to improvements in farming productivity and the achievement of food security. Intense farming, irrigation and land drainage need to be well managed if they are to avoid increasing vector breeding sites. Production systems for certain crops have been associated with increased incidence of malaria; e.g. irrigated rice, mature rubber plantations, sweet potato and other "ridge crops" where rainwater accumulates and provides larval habitats; and salad vegetables grown using micro-dams for irrigation (Kebede et al 2005; Basurko et al 2013). In addition, the use of agricultural pollutants requires regulation so as not to exacerbate the problem of resistance (Nkya et al 2014).

The agricultural sector has become an important actor in malaria in the light of evidence that the disease impacts negatively on the sector's productivity, undermining national food security and exacerbating rural poverty (Wielgosz et al 2014). In sub-Saharan Africa, where women make up 60-80% of food crop producers for household consumption and sale, malaria reduces their labour output, interrupts the production cycle, and causes resources to be diverted from farm inputs to, for example, the costs of seeking health care (Asenso-Okyere et al 2009).

To engage with this situation strategies have been introduced to improve: agricultural practices and production systems; environmental manipulation (water management, intermittent irrigation, vegetation management); environmental modification (draining, filling of swamps, adjustment of river boundaries and other engineering approaches); as well as mitigating measures for example to increase the distance between residential areas and crops/methods that increase malaria. Collaborations with farmer's field schools to see malaria integrated into pest-management schemes are also generating positive results.

Well-managed agricultural practices reduce water use and increase crop yields, with knock-on benefits for food security at household level. Well-nourished people, especially young children, are better able to mount an immune response and withstand malaria infection (Caulfield et al 2004). In endemic countries, malaria remains a significant cause of stunted growth in children, and the combination of malaria and malnutrition (including deficiencies of iron, zinc or vitamin A) is a significant cause of child mortality (Kang et al 2013). The benefits work both ways with interventions to integrate nutrition and malaria programmes, provide vitamin A and zinc supplements in high-transmission areas/to high-risk populations also having a positive, complementary effect on the resilience of malaria affected communities.
5.3. Climate change

Weather and climate are major determinants of the geographical distribution, seasonality, year-to-year variability and longer term trends of malaria. Periods of long-term drought can reduce transmission while periods of high rainfall or warmer temperatures can result in increased malaria transmission, even in areas where control is strong. Natural climate variability – including the El Niño phenomena and other long-term cycles – are important not only in explaining trends in disease burden but also upsurges in cases, including epidemics (Van Lieshout et al 2004).

The Intergovernmental Panel on Climate Change has concluded that changes in temperature and rainfall will affect the natural habitats of mosquitoes, changing the prevalence of the vector or prolonging transmission seasons (or both) in some areas, and potentially exposing new regions and populations to malaria and other vector-borne diseases. It has been projected that climate change could increase the population at risk of malaria in Africa by over 80 million by the middle of the next decade (IRICS 2014).

Climate change is likely to result in increased flooding, which not only affects the effectiveness of sanitation systems and leads to contamination of water sources, but also increases mosquito breeding sites and malaria transmission.

The World Bank has further highlighted how the effects of climate change are negatively impacting on the lives of the poorest. As the poorest people in society are also those at highest risk of contracting malaria, pre-existing vulnerabilities are being further compounded, locking millions of families in an ever deeper cycle of poverty and disease.

In response, countries are investing in early warning systems that integrate seasonal rainfall forecast with population and health surveillance information to increase the warning time for malaria epidemics (WMO 2009). Multisectoral partnerships between malaria programmes, Ministries of Health and National meteorological agencies are being established to access adaptation funds so that climate-related risks can be managed to the benefit of the fight against malaria.

Experience also shows that it is critical to strengthen community resilience. Capacity at subnational and facility level is needed to prepare for emergencies, and clarify contingencies for assuring the delivery of medical supplies in disaster situations. Furthermore, cooperation with local and international non-governmental organizations is essential as they are often the main source of malaria services in crisis situations.

5.4. Sustainable habitats and urbanization

UN-Habitat projects that by 2050 more than two thirds of the global population will live in urban centres. Urbanization can contribute to the reduction of malaria in endemic countries, because cities may bring benefits such as better housing, greater access to basic services and fewer breeding sites (Tatem et al 2013). However, these benefits often remain elusive for the world’s more than 800 million slum dwellers. In slum areas flimsy shelters and standing water can increase malaria transmission, and poor security can undermine efforts to rapidly diagnose and treat people.
Malaria programmes have learnt to remain continually vigilant to the risk of malaria resurgences in urban and peri-urban areas, where urban agriculture and micro-irrigation dams can be conducive to Anopheles vector populations. Poor drainage; activities such as brick-making, road building and construction; and the proliferation of gardens and small-scale farming in urban areas can all inadvertently create mosquito breeding sites and need close oversight (WHO 2012). Community stakeholder participation is a central tenant of efforts to create malaria-safe habitats. The integrated vector management approach encourages communities to engage in source reduction for example through larviciding, de-weeding, weekly dry days, cleaning of ditches, waste removal etc.

In specific relation to housing, a systematic review has shown that in endemic areas, people living in traditional houses were twice as likely to suffer from malaria as those living in modern houses, after adjusting for socioeconomic status. Importantly, improved housing may even be protective in places with exceptionally high levels of malaria transmission (Tusting et al 2015). In Africa, where consumer spending is expected to double over the next decade, more than 144 million rural houses are set to be built by 2050 (Economist 2013). A recent joint UNDP, UN-Habitat and RBM position paper reinforces how closing the eaves, installing a ceiling, or screening doors and windows can all have a protective effect against malaria (Wanzira et al 2015, Kirby et al 2009). Many of these features also have additional functional and aesthetic benefits that residents’ value.

Integrating these features into national building codes, corporation and public housing programmes, microfinance initiatives for home improvements, and education on improved house designs presents the malaria community with a tremendous opportunity, while also bringing wider benefits to the housing sector.

5.5. Population Mobility

Population mobility is a rising phenomenon of globalization, and it is likely to increase exponentially. People move between countries and regions, and from rural to urban areas, in search of better opportunities, to escape disasters, conflict and persecution, or because they are displaced (e.g. by land redevelopments).

When people move, they often have to trade familiar habitats for ones that are largely unknown, and are often inherently unhealthy and precarious. This may be due to general poverty, sleeping outdoors, working at night, proximity to vector-breeding areas, poor-quality housing, and limited use of prevention measures. Refugees, internally displaced people and mobile migrant populations often face obstacles of stigma, language and legal status when they try to access health care. These obstacles affect all stages in the migration process – at origin, in transit, at the destination or on eventual return to their home country (IOM 2014).

Movement from areas of high malaria transmission can result in imported malaria cases and potential re-introduction of malaria into low-transmission or malaria-free areas, depending on whether or not competent malaria vectors are present. Malaria-infected mosquitoes can also be inadvertently transported from malaria-endemic areas to malaria-free areas, causing unexpected outbreaks (Whitman 2000).

The economies of many countries depend upon the availability of migrant labour, making the safe movement of people across region and country borders an important component of regional development. Mobile and migrant populations who frequently move in and out of endemic areas may have lost or not possess naturally acquired immunity, leaving them more vulnerable to clinical disease and severe illness. Malaria epidemics and resurgence with high fatality rates in all age groups can be the result – undermining growth, making countries less attractive for investment and tourism and impeding efforts to eliminate the disease. Mobility also makes it harder for people to access diagnosis and
treatment at the onset of fever, and to adhere to the full course of malaria drugs, especially in the case of \textit{P.vivax}, which in turn may accelerate the development of resistance to antimalarial drugs (WHO 2011).

To engage with issues of mobility and malaria policies stronger inter-country partnerships are required to enforce the World Health Assembly resolution on monotherapies. By building the capacity of national regulatory systems the quality of antimalarials and other drugs can be better regulated. This has been accompanied by campaigns to raise awareness about the damage that fake drugs can cause among health workers, traders and communities. Furthermore, policies are required to make universal health coverage arrangements genuinely inclusive. Countries are working together to implement the 2008 World Health Assembly (WHA61.17) Resolution on the Health of Migrants, identify specific health risks for migrants, promote inter-country agreements of reciprocal health care for migrants, and monitor migrants’ health and access to health services. Companies also have an important role to play through occupational health regulations, as promoted by the International Labour Organization’s ‘decent work’ agenda to protect workers from injury and sickness, including malaria, during employment.

The lessons learnt include that to successfully engage with malaria and mobility non-health actors such as immigration authorities, employment and social services, companies recruiting migrant workers, transporters, traders, brokers, humanitarian workers and armies must be actively involved. For example, to reach Mobile, Migrant Populations, information is needed on where they are and what their patterns of movement are. Useful data may already exist, or could be gathered from social networks, mobile phone technology or respondent-driven sampling, for interdisciplinary and multisectoral analysis. Once obtained, these insights can be used to develop implementations at possible points of interaction. For example, in Cambodia taxi drivers were trained to deliver health promotion messages to those crossing borders (WHO 2013). In Malaysian operators of palm oil, rubber and acacia plantations work with the national programme to distribute Long-Lasting Insecticide Treated Nets to migrant workers, and to ensure that febrile workers report to health facilities (Sanders et al 2014).

More fundamentally, concerted action to resolve situations of political upheaval and humanitarian crises will be crucial for reducing population mobility, as well as for progress in the fight against malaria and towards the SDGs. UNICEF has highlighted how 17 of the 20 countries with the world’s highest under-5 mortality rates are those that are affected by violence or are in fragile situations; in all 17 of these countries, malaria is a leading cause of mortality.

There are many more links between malaria and other domains of development than those presented in the section above. Reducing the disease enables people to escape poverty, thus contributing to the creation of more equal and cohesive societies. There are also positive two-way interactions with education, and gender equity and the empowerment of girls and women: as a mother or caregiver’s level of education increases, so do the chances that their children will access malaria prevention and treatment services, and survive childhood (Fernando et al 2013). This makes quality schooling an important component of the global effort to defeat the disease. If there is less malaria, then children can attend school regularly and learn more effectively. This significantly improves their school performance and subsequent wage-earning capacity. In addition to falling sick themselves, older girls often have to stay at home to help care for their younger siblings when they get malaria (Ayi et al 2010). Less malaria frees these girls - and women in general - from the burden of caring for sick family members, enabling them to generate income, and participate more fully in public decision-making.
6. Conclusion

This concept paper describes some of the areas where transdisciplinary or multisectoral collaboration is enhancing the malaria response. Hopefully in so doing it has provided some inspiration and will encourage further efforts.
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