

Addressing the Links among Agriculture, Malaria, and Development in Africa

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The global impact of malaria on human health, productivity, and general well-being is profound, and Africa has been particularly hard hit. In 2006, more than 90 percent of deaths from malaria occurred in Africa, where 45 of the 53 countries are endemic for the disease (WHO 2008). Malaria costs Africa more than US\$12 billion annually, and it slows economic growth in African countries by as much as 1.3 percent per year (WHO 2010).

Children and women (particularly pregnant women) in Africa are most vulnerable to malaria attacks. The potential impact of malaria for women engaged in agriculture, especially food production, can be substantial. Women perform nearly all the tasks associated with subsistence food production in Africa. They account for about 70 percent of agricultural workers and 60 to 80 percent of those producing foodcrops for household consumption and sale, and they also raise and market livestock (Todaro 2000; FAO 2010). Since the majority of the continent's population is rural, the effects of the disease on agriculture, health, and development are widespread.

Poor, rural farmers can pay quite a high cost for preventive measures and treatment. In Kenya and Nigeria, for example, estimates show annual treatment costs for small-scale farmers as high as 5 percent and 13 percent, respectively, of total household expenditure (WHO 1996). The burden is similar in other countries. To emphasize: *this is the cost borne by a household of poor smallholder farmers for treatment of a single disease*. Removing malaria as a constraint could free resources for household productivity and local development.

While most people can readily grasp the disease's impact on smallholder productivity and development, the impact of agriculture development on the disease is

This brief is based on the authors' IFPRI Discussion Paper (861) *The Linkages between Agriculture and Malaria: Issues for Policy, Research, and Capacity Strengthening* (Washington, DC: International Food Policy Research Institute, 2009).

less understood. Many agricultural practices increase the spread of malaria; in order to truly combat the disease, the risks involved in these practices must be managed and effective policy initiatives must take into account the two-way linkages between malaria and agricultural development.

The Impact of Malaria on Agricultural Development

Malaria's effects on smallholders can spiral. Taken ill at planting season, a farmer may not be able to cultivate as much land and engage in intensive farming practices. She may then plant less labor-intensive crops and change cropping patterns, perhaps raising crops with a lower return, and fewer of them. New techniques may be ignored because they require time and energy to learn, and the farmer may reduce inputs that require more energy or more money than the household has. The same may result if the farmer must take time off to care for her ill family members or if illness strikes at harvest time. Less land under cultivation, less effective methods, and a smaller harvest generate less income to pay for prevention and treatment (see Figure 1). Farm households may also withdraw savings, sell productive assets, or borrow money to pay for treatments. Fewer improvements may be made to farms, further decreasing their productivity even when illness is not an issue.

A recent United Nations report observed that “a brief period of illness that delays planting or coincides with the harvest may result in catastrophic economic effects” (UN Millennium Project 2005). Malaria transmission generally coincides with the planting and harvesting seasons, making the illness's impact particularly damaging.

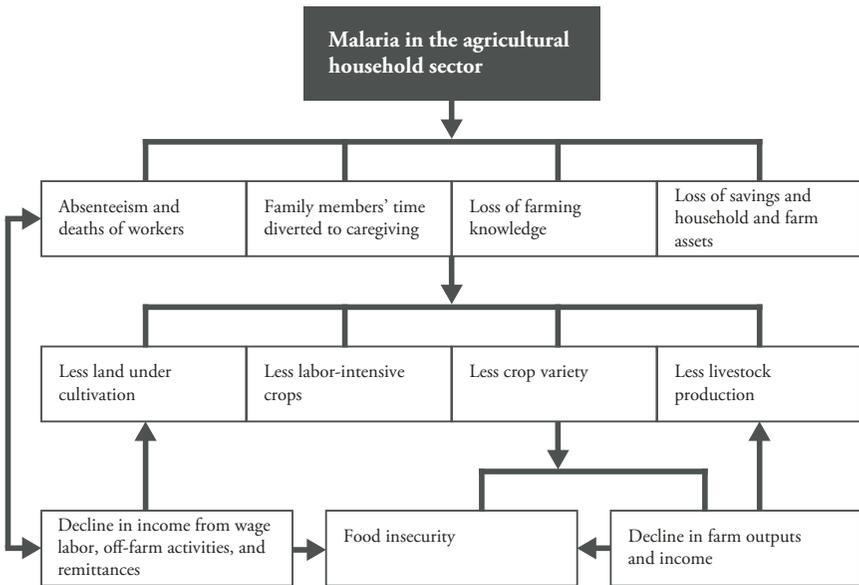
Effects of Agricultural Development on Malaria

Farmers, communities, and programs may inadvertently be sowing seeds of their own ill health. Water resource development, deforestation, wetland cultivation, crop cover, land-use changes for agricultural purposes in the highlands, and an increase in urban agriculture all expand habitats for malaria-carrying mosquitoes. These practices, however, can also boost the income of producers, expanding access to preventive and treatment services and therefore improving health and productivity. The risks must be acknowledged and managed.

- **Water use and irrigation:** In Africa, irrigation exposes non-immune populations in areas of unstable malaria transmission to a high risk of acquiring the disease. This effect of irrigation—creating conditions for the transmission of malaria—may be one of the most severe negative consequences of water projects.

- Deforestation:** While deforestation can reduce the breeding habitats of mosquitoes that breed in shaded water, changes in environmental and climatic conditions in the deforested region can also promote the survival of other species, leading to prolonged seasons of malaria transmission.
- Wetlands:** The cultivation of valley bottoms across East Africa as a result of population growth and demand for food has changed the local ecology. These wetlands were covered with natural papyrus, which limits the breeding of the *Anopheles gambiae* mosquito because of the denseness of the vegetation and the natural oil layer. The elimination of the papyrus and the reclamation of the swamps have led to an increase in temperatures, which promotes the breeding and survival of mosquitoes and increases malaria transmission (WHO 2008).
- Crop cover:** Thickets formed by crop cover could be favorable environments for mosquito breeding, although to date there is little documented evidence. It may be possible for mosquitoes to breed in leaf axils (for example, of pineapples, bananas, cocoyams, and maize), tree holes, and bamboo stumps. It is known that maize pollen provides nutrition for larval carrier mosquitoes.

FIGURE 1 Conceptual framework for the impact of malaria on agriculture



Source: Negin 2004, with authors' modifications.

- **Highlands:** The increasing incidence of malaria in the highlands, especially in Eastern Africa, has been attributed largely to agricultural practices that have changed rainfall patterns, temperature, and vegetation. The reemergence of malaria in the highlands of western Kenya has been blamed on forest clearing for the development of tea estates and the migration of labor to the farms. The construction of access roads through the forests to the farms, the building of milldams on rivers, and the massive deforestation, among other factors, have caused a drastic change in the ecology, making it suitable for the breeding of malaria-carrying mosquitoes. Similar observations have been made in the Amani hills of Tanzania, the Rukungiri and Kabale districts of southwest Uganda, and the Rwanda highlands.
- **Urban agriculture:** It is generally held that malaria in Africa is predominantly a rural disease and that mosquito breeding decreases with urbanization. However, in some African cities, poor environmental management and peri-urban agriculture provide favorable habitats for mosquitoes.

Blending Effective Agricultural, Health, and Development Policies

Since the majority of the world's and Africa's poor, work in agriculture and the poor suffer disproportionately from related illness and disease, an integrated view of agriculture, development, and health is necessary to promote agricultural growth, reduce pervasive rural poverty, and improve well-being.

- *Tackle the threat of malaria at the start of agricultural water development projects.* Water projects often support the breeding of mosquitoes, and the density of the malarial mosquito population often indicates transmission rates. This is not true in all cases, however. With sufficient preventive care and mosquito control, not only can downward spirals of health and productivity be avoided but the people can also be productive enough to purchase adequate treatment on their own and begin an upward surge of development. Water projects should therefore include provisions for effective vector control, effective water management, and prevention interventions.
- *Coordinate health and agriculture policy efforts.* Even though the linkage between agriculture and health was first recognized long ago, health considerations still play little part in governments' agricultural policy decisions. The health sector also has not reached out to agriculture as a key partner in addressing global ill health.

Because malaria and agricultural development have a well-integrated relationship, integrated policies are best suited to address them.

- *Aggressively disseminate information about the two-way interaction between malaria and agriculture.* While most rural populations are aware of malaria as a serious illness and recognize the link between mosquitoes and the disease, fewer people understand the linkage between malaria and agriculture in terms of causation and impact. Information about the linkages, prevention practices, and treatments aimed at farmers and extension workers could lead to capacity-building activities. It should be an essential part of all rural agriculture and health projects. Similar information should accompany farm inputs (seeds, tools, fertilizers, and so forth) at purchase. Information should be geared particularly toward women, as they are often the primary agricultural producers.
- *Intensify public health interventions just before and during the growing season.* Researchers have noted that bouts of malaria particularly threaten livelihoods when they occur in the planting, growing, and harvesting seasons and that this is when they are most likely to occur. Effective timing of interventions (inoculations, clinic openings, information campaigns, and so forth) is thus crucial and likely to pay the greatest dividends.
- *Conduct research to target interventions even further.* Although information on malaria's effects on agricultural productivity exists, it is inadequate due to the nature of the disease and the coping mechanisms that families adopt. Research can shed light on malaria's direct negative effects on farm households' food security, nutrition, and livelihood and could lead to more focused policy.

Concluding Remarks

There is widespread recognition among African leaders, international organizations, and the donor community that improving agriculture's productivity and income-generating capacity is essential to poverty reduction and economic growth. This means that malaria must be addressed. The disease's impact on the agricultural sector is widely felt in Africa since about 70 percent of Africa's population engages in agriculture. Ill health from malaria causes a decline in crop output, a reduction in the use of inputs, a decrease in area planted, changes in cropping patterns, and loss of agricultural knowledge. Unfortunately, agricultural practices and projects can increase the spread of malaria. Efforts to address the disease and improve agricultural development must take this two-way relationship into account.

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