Evidences

Study #4065

**Contributing Projects:**
- P354 - Evidence base on farming and environment practices that reduce health risks

**Part I: Public communications**

**Type:** OICR: Outcome Impact Case Report  
**Status:** Completed  
**Year:** 2020

**Title:** Funder Requests A4NH Inputs into the Direction of a Major Development Investment Strategy to Mitigate any Unintended Negative Consequences on Human Health in West Africa

**Short outcome/impact statement:**
In Africa, a child dies of malaria every two minutes. Ricefields are an important breeding place for mosquitoes. Recent work by A4NH has confirmed that the introduction of rice brings more malaria to local residents; hence rice intensification may be an obstacle to malaria elimination. In 2020, a meeting was convened to bring together Japanese agronomists and health experts to discuss the implications of A4NH research for their plans to support a major expansion of irrigated rice in Africa.
Outcome story for communications use:
Rice is linked with malaria in Africa because of two features of the African malaria mosquito. One, this species breeds abundantly in ricefields; two, is its efficiency at transmitting the parasite, compared to others in Asia and Latin America. For this reason, Africa suffers 85% of the world’s mortality due to malaria: an African child dies of malaria every two minutes. Against this biological background, agricultural development plans for a massive expansion of rice cultivation in Africa and public health plans to eliminate malaria in Africa. Will the former interfere with the latter? What adjustments could be made, so that agricultural development can become part of the public health solution, not part of the problem? One key question is whether the introduction of rice brings extra malaria. Past studies comparing malaria in villages with and without rice fields found that the former did have more mosquitoes, but did not have more malaria than the latter. This was because, as well as the additional mosquitoes, the advent of rice cultivation also brought more money and better infrastructure, so the residents of rice-growing villages have better access to commercially-sold mosquito nets and antimalarial drugs. Since then, coverage with effective anti-malaria interventions is both much higher and more equitable than it was then, and general levels of transmission are greatly reduced: the average prevalence of infection has halved since 2000. A4NH researchers carried out a systematic review and found that the relationship between rice and malaria in Africa has indeed changed. Living next to a rice field means not only increased exposure, but also suffering more from malaria. The need for more rice in Africa is not going to go away, but we need to find ways of growing rice in Africa without growing mosquitoes at the same time. International efforts to reduce the amount of greenhouse gases produced by ricefields has developed a somewhat similar approach, called alternative wet and dry (AWD) irrigation. AWD is similar to, but not the same as, the intermittent irrigation used to control mosquitoes. With funding from the Wellcome Trust, A4NH researchers are investigating whether these two approaches can be modified and combined in a method that would effectively minimize emissions of both methane and mosquitoes. Our findings suggest that such a win-win solution is possible, but it will require detailed research on a range of rice growing options in a range of settings.

Links to any communications materials relating to this outcome:
- https://youtu.be/q9WjdQQU8tU

Part II: CGIAR system level reporting

Link to Common Results Reporting Indicator of Policies: No

Stage of maturity of change reported: Stage 1

Links to the Strategic Results Framework:
Sub-IDOs:
- Enhanced institutional capacity of partner research organizations

Is this OICR linked to some SRF 2022/2030 target?: No

Description of activity / study: The CGIAR SRF does not have any targets related to human health impacts.

Geographic scope:
- Regional

Region(s):
- Sub-Saharan Africa
Comments: <Not Defined>

Key Contributors:
Contributing CRPs/Platforms:
  ● A4NH - Agriculture for Nutrition and Health
Contributing Flagships: <Not Defined>
Contributing Regional programs: <Not Defined>
Contributing external partners:
  ● AfricaRice - Africa Rice Center

CGIAR innovation(s) or findings that have resulted in this outcome or impact:
This OICR describes an outcome related to two innovations reported by A4NH to CGIAR - modification of alternate wetting and drying (AWD) and minimal tillage and intermittent flooding. Neither innovation were developed by A4NH, but A4NH researchers are adapting both rice irrigation strategies to test to what extent they can reduce the production of mosquitoes that transmit malaria.

Innovations: <Not Defined>
Elaboration of Outcome/Impact Statement:
In many African countries, Ministries of Agriculture are planning for a major expansion of rice cultivation; meanwhile Ministries of Health are making plans to eliminate malaria. The development community recognizes both as desirable development goals. A4NH research led by the London School of Hygiene & Tropical Medicine (LSHTM) with AfricaRice, has suggested, unfortunately, the former may interfere with the latter. In 2020, a major funder convened a meeting to collect expert opinion on their plans to support expansion of irrigated rice in Africa. A4NH researchers provided advice based on evidence generated in West Africa.

The fact that African malaria vector mosquitoes breed abundantly in rice fields has been recognised since the last century. However, in the 1990s, a series of studies comparing villages with and without irrigated rice concluded that as a general rule, the introduction of rice does bring a substantial increase in the local abundance of vector mosquitoes, but seemingly not an increase in malaria in the local human population. It was concluded that rice productivity led to improvements in household economics and in local infrastructure, so residents had better access to anti-malaria drugs and bednets for protection against mosquitoes. This conclusion reassured agricultural development agencies that irrigated rice schemes did not have the harmful side effect of causing an increase in malaria. As a result, changes in malaria vector mosquito behaviour or prevalence of malaria are rarely monitored.

Simultaneously, donor expenditures on malaria control have increased massively. Intervention coverage is now substantially higher and more equitable than before. As a result, Africa has enjoyed a reduction of more than 50% in malaria mortality and in the prevalence of malaria infection. One of A4NH’s key research questions asks if this overall decrease in malaria, and the more equitable access to interventions, might have changed the relationship between rice and malaria. Recently completed analysis confirms that those additional malaria mosquitoes coming from the rice do indeed cause an increase in the intensity of malaria transmission in irrigated rice communities.

One funder was keen to understand this trend [1]. They convened two groups of experts - agronomists with expertise in growing rice in Africa and entomologists with expertise in the ecology of mosquitoes in African rice fields – and gave A4NH researchers an opportunity to inform the direction of a major development investment strategy to mitigate any unintended negative consequences on human health [2].

References cited:
[2] Content delivered in additional sessions convened by the funder, such as webinars and reports, can be provided upon request.

Quantification: <Not Defined>
Gender, Youth, Capacity Development and Climate Change:

Gender relevance: 0 - Not Targeted
Youth relevance: 0 - Not Targeted
CapDev relevance: 0 - Not Targeted
Climate Change relevance: 0 - Not Targeted

Other cross-cutting dimensions: NA

Other cross-cutting dimensions description: <Not Defined>

Outcome Impact Case Report link: Study #4065

Contact person:
Jo Lines LSHTM, jo.lines@lshtm.ac.uk