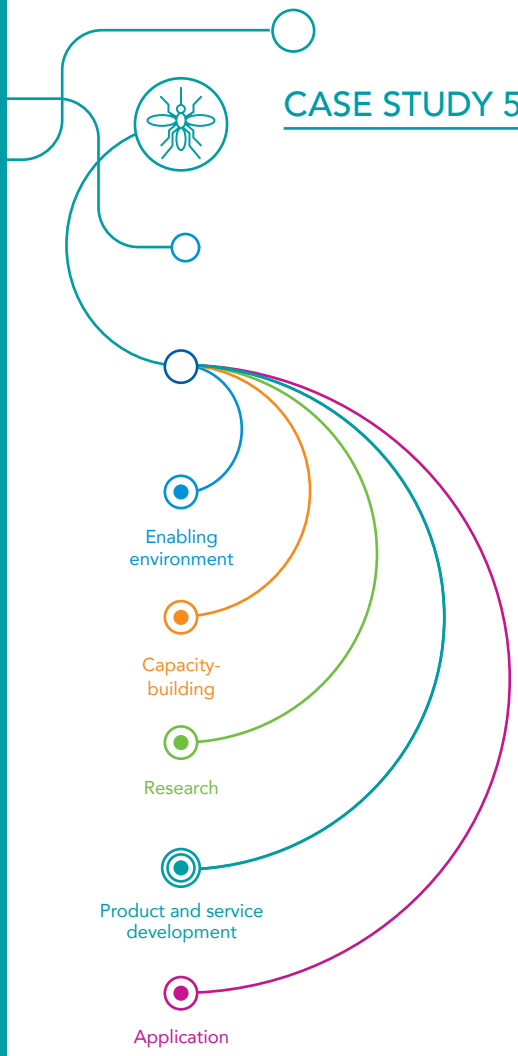

CASE STUDY 5F

CORE ANALYTICS

MALACLIM: CLIMATE-BASED SUITABILITY MAPPING TO INFORM VECTOR CONTROL PROGRAMMES IN THE SOLOMON ISLANDS

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CONTEXT

More than 90% of people in three southwestern Pacific countries still live in malaria high-incidence areas *(32)*, despite an improvement of malaria programmes and a huge decrease in the overall number of malaria cases. Solomon Islands and Vanuatu are on the way to eliminating malaria in some of their less populated provinces, but malaria reductions in some high-incidence areas have stalled. One of the major challenges to reaching the next step is the lack of timely access to quality health care *(33)*.

NEW APPROACHES

A climate-based malaria monitoring and early warning system (MalaClim) is being developed in the Solomon Islands. In September 2014, a pilot season was launched with the release of malaria suitability maps accounting for environmental factors and a rainfall-based malaria outlook for the next malaria season.

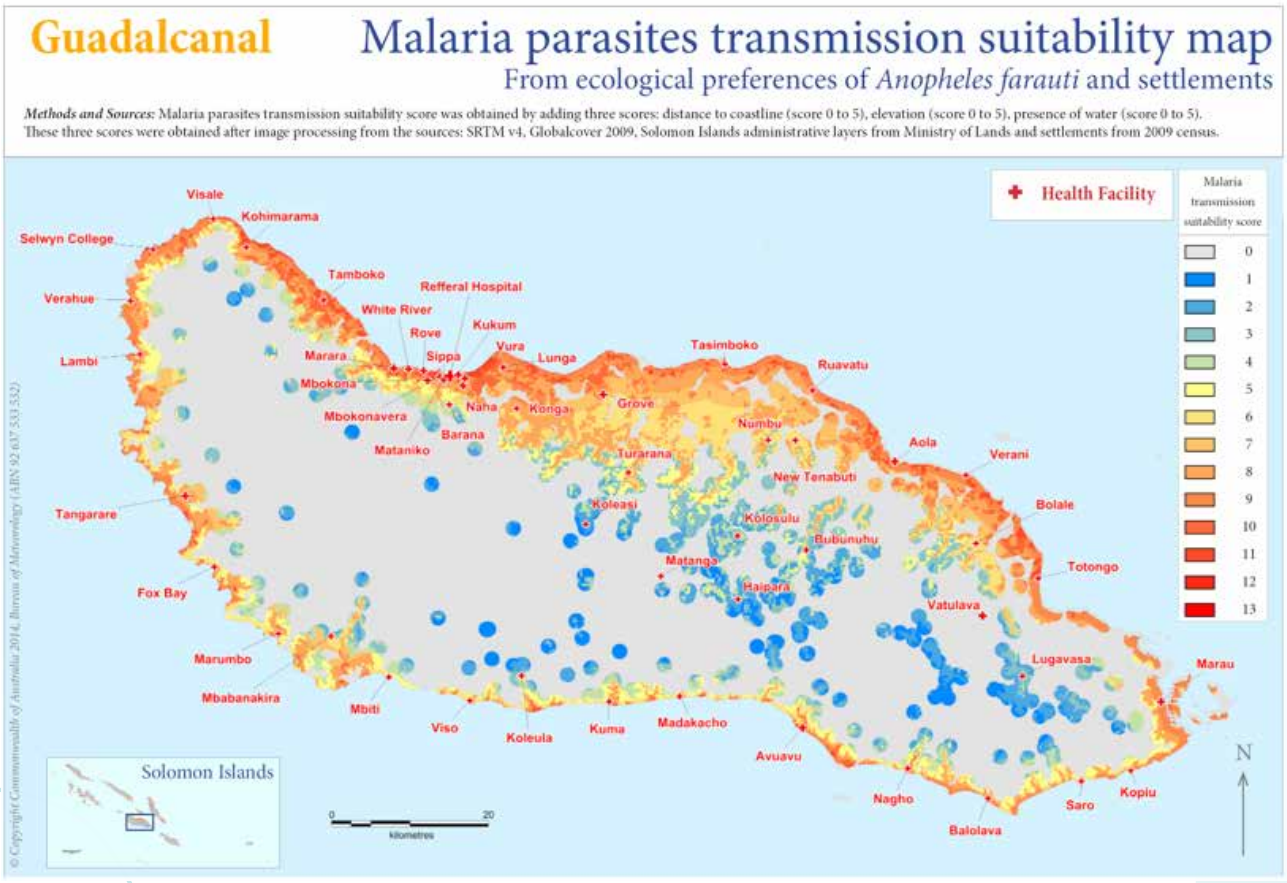
The MalaClim project is part of the Climate and Oceans Support Program in the Pacific (COSPPac), a programme funded by Australian Aid and run by the Australian Bureau of Meteorology in partnership with several Solomon Islands government ministries.

The malaria suitability maps help to refine vector control strategies by identifying target areas such as dense clusters and patchy areas that need to be managed differently. These maps are developed through analysis of the location of human settlements and the ecological preferences of the main remaining mosquito vector (*Anopheles farauti*). Found in creeks or swamps, this very adaptive mosquito *(34)* tends to stay in coastal regions and at low elevations. From previous entomological studies *(35)* of these characteristics and thanks to GIS, remote sensing, image processing and spatial analysis, an environment risk score has been established and mapped for all nine provinces where malaria parasites may be transmitted.

The year-to-year and seasonal variability of rainfall significantly influences the availability of mosquito breeding habitats. Each year, a peak in the number of cases of malaria occurs 1–2 months after the beginning of the rainy season. However, during El Niño years, which are typically drier than normal *(36)*, the average number of detected malaria cases is higher. During this project a strong relationship was confirmed between low rainfall in October, November and December (OND) and a high malaria incidence for the following period January to June for some parts of the country. This has allowed the Solomon Islands Meteorological Services (SIMS) to provide monthly a customized OND rainfall outlook for the malaria control service, the National Vector Borne Disease Control Programme.

Knowing whether the OND rainfall will reach a key threshold allows for early preparedness up to four months before the beginning of the malaria season. Updated monthly rainfall outlooks, supplemented by observations, allow for adjustments to be made to these actions as the malaria outlook becomes clearer. These actions can include: community awareness, diagnostics tools and treatments allocations and expanding vector control measures.

Figure 5.14 Malaria parasite transmission suitability map based on the ecological preferences of the main mosquito vector and the location of human settlements.



CASE STUDY 5F

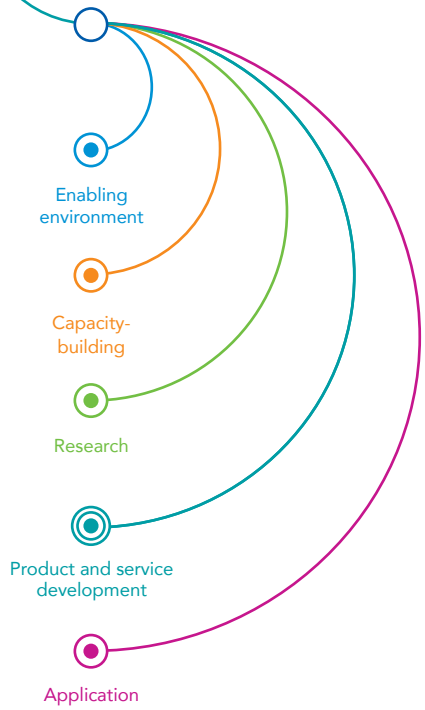


Figure 5.15 Health clinic in Guadalcanal: pregnant women and children under the age of five are still the population most affected by malaria.

Figure 5.16 Typical breeding site in northern Guadalcanal where the links between rainfall and malaria are strong enough to have allowed the creation of a malaria early warning system based on rainfall outlooks.

ACKNOWLEDGEMENTS

Vector Borne Disease Control Programme

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BENEFITS AND LESSONS

This project could not have been implemented so quickly without the strong partnership with the NVBDCP and the SIMS. In addition to the challenges presented by the lack of human and material resources in health centres, the lack of weather stations also poses a constraint. However, since the start of the project, meteorological and malaria services have worked together to begin installation of 16 new rain gauges located next to health centres in the project areas.

Following the pilot phase, the MalaClim Early Warning System was officially launched in November 2015. The SIMS provides a customized monthly rainfall outlook for the national malaria control authority, and regular meetings are conducted between SIMS and NVBDCP. The parasite transmission suitability maps and GIS for all nine provinces was very successful and monthly rainfall outlooks for Guadalcanal and Central province was issued. The next step should be to analyse the malaria seasonal variability for the other parts of the Solomon Islands, where climate and environment impacts on malaria transmission are more complex and require a better understanding of other parameters, in addition to rainfall.