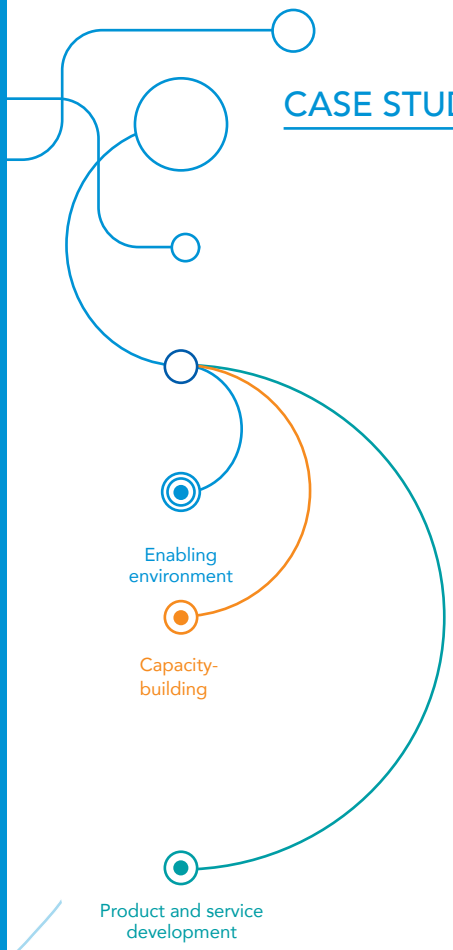


CASE STUDY 2D

MADAGASCAR CLIMATE AND HEALTH WORKING GROUP

Authors: Climate and Health Working Group, H. Kootval and J.Guillemot (World Meteorological Organization).

CONTEXT

Madagascar has a tropical climate with two distinct seasons: the winter dry season from May to October and the summer rainy season from November to April. During the tropical cyclone season from November to April, tropical disturbances can cause severe damage. Rainfall and temperatures vary widely across the island due to variations in altitude.

Climate-sensitive diseases, such as zoonoses and waterborne and vector-borne diseases, are responsible for almost 40% of illness registered at health centres in Madagascar and contribute to 57% of the alerts received by the Directorate of Public Health and Epidemiological Surveillance (Direction de la Veille Sanitaire et de la Surveillance Epidemiologique). This does not include alerts that go directly to individual health programmes fighting diseases such as malaria and plague, which present high mortality rates in the island.

NEW APPROACHES

In 2003, the ministry of health took the initiative to meet Meteo Madagascar (the national meteorological and hydrological service) following a malaria outbreak. The aim was to establish a close collaboration between the unit and the applied research service of the National Meteorological and Hydrological Service for malaria monitoring, prevention and response. This collaboration was strengthened by participation of malaria unit staff in the International Research Institute for Climate and Society summer institute and of applied research service staff in the Southern African Development Community Climate Expert Meeting and the Southern African Regional Outlook Forum in 2005. The Directorate of Public Health and Epidemiological Surveillance, the Pasteur Institute of Madagascar and international organizations working in the health sector – such as the United Nations Children's Fund (UNICEF) and the President's Malaria Initiative (led by the United States Agency for International Development) – also became involved.

In 2008, as a result of these initial steps, WMO selected Madagascar as the first country for the implementation of a pilot project focusing on the use of climate information to support the health sector. A launch workshop in 2008 resulted in the signing of an interministerial memorandum of understanding for partnership in climate and health, establishing the Madagascar Climate and Health Working Group and defining terms of reference and initial priorities. The 15 original members of the group were formally appointed, including eight health experts (one each for malaria, plague, Rift Valley fever and health and environmental issues, and five for epidemiological surveillance, including animal health), five climate experts (climatology, weather forecasting, climate forecasting, research and hydrology), and a researcher from the Pasteur Institute of Madagascar.

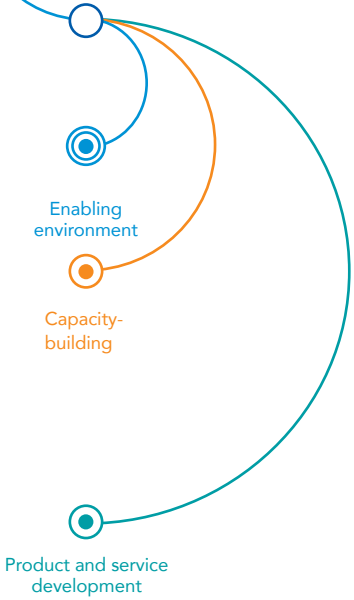
The working group aimed to identify the climate and weather information and service needs of the health sector, including gaps in current data, information and service delivery, and to help the Madagascar Meteorological Service meet the specific needs of the health sector. It also aimed to help the health sector use climate data and information efficiently for the prevention of epidemics and for guiding response activities for malaria, plague and Rift Valley fever, three priority climate-sensitive diseases in the country. The working group was also a catalyst for resource mobilization to ensure the sustainability of the project. The strategies adopted included institutional data sharing, access to climate and weather tools, and targeting of research, education and training needs across the sectors.

The group organized two workshop training sessions with local and international facilitators. The training improved knowledge of climate data and information at national and international levels, as well as methods for accessing and manipulating existing databases to analyse and interpret epidemiological and climate data.

One of the main outcomes of these joint training workshops was the identification of the health sector needs in climate data and information. WMO provided individual manual climate stations for six health sentinel sites, accompanied by the establishment of a memorandum of understanding between the ministry of health and the national meteorological and hydrological service, defining the roles of each sector in the management of the climate observation sites. This included the training of local health workers and climate experts on measurement of climate variables, data transmission and interpretation, the use of climate information for local epidemiological monitoring and surveillance, and the transformation of data into information for decision-makers.

Figure 2.7 Climate monitoring station at the health sentinel site in Ambositra.

CASE STUDY 2D



These efforts have resulted in the development of a seasonal and intraseasonal climate outlook, which provides information to the health sector on climatic conditions in forthcoming rainy seasons and is used by the ministry of health to produce its climate and health monthly bulletin, and to provide free-of-charge data for research or post-disease outbreak analysis by the national meteorological and hydrological service.

Under the financial support of the World Meterological Organization Public Weather Service Programme (WMO/PWS), since 2008 the group regularly organizes follow-up on field missions on the climate and health sentinel site and national climate and health workshops, gathering all climate and health stakeholders from the 22 regions of Madagascar. These workshops share the use and benefits of climate stations on the health sentinel sites in order to assess the gaps and needs and define future workplans in climate and health.

Figure 2.8 Participants at climate and health workshop, September 2015, Antananarivo.

CLIMATE AND HEALTH WORKING GROUP MEMBERS:

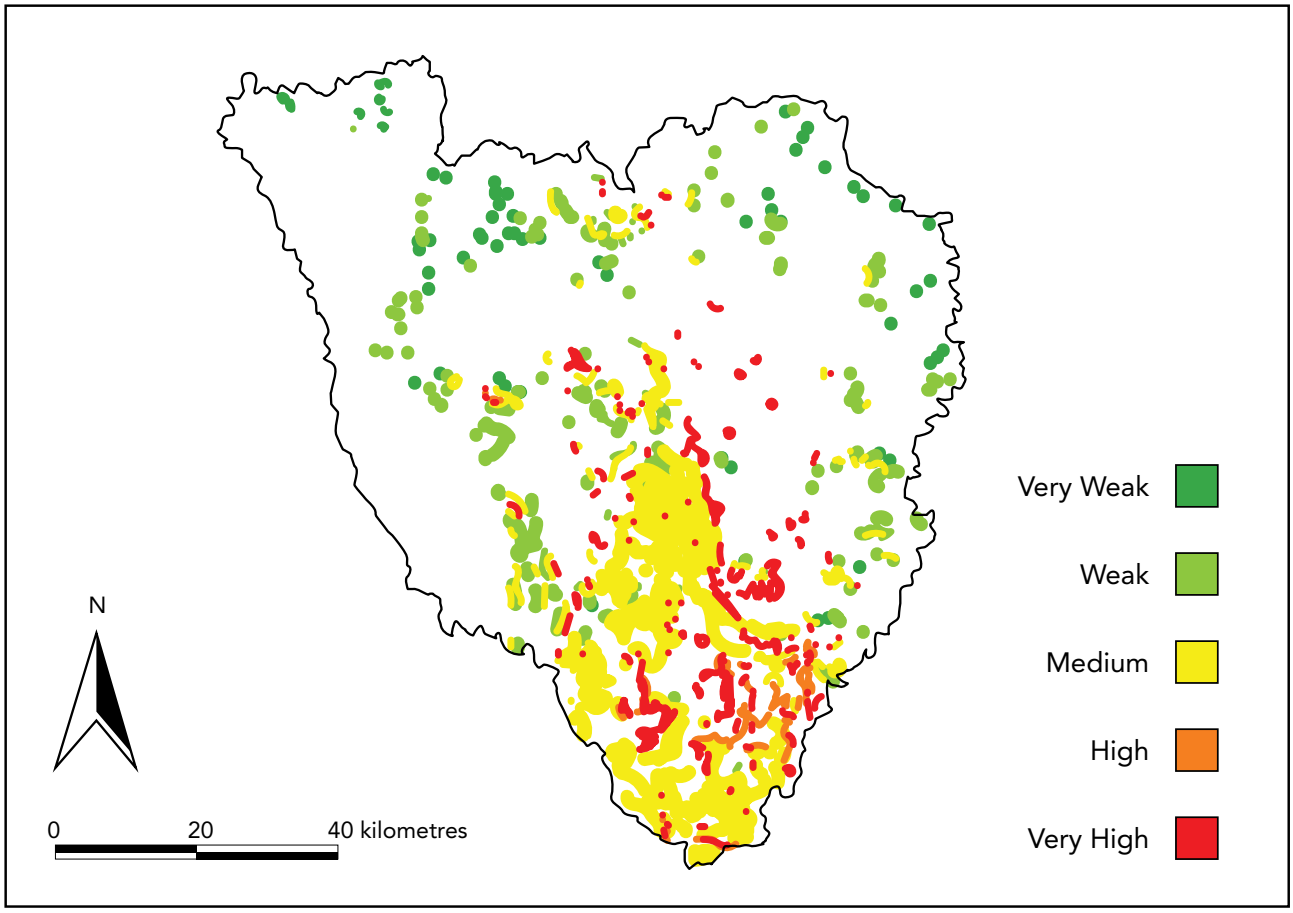
Climate Experts:

Dr Nirivololona Raholijao
Ms Sahondra Ranivoarisoa
Ms Vaohanginirina Ramiandrisoa
Mr Andrianjafinirina Solonomenjanahary

Health Experts:

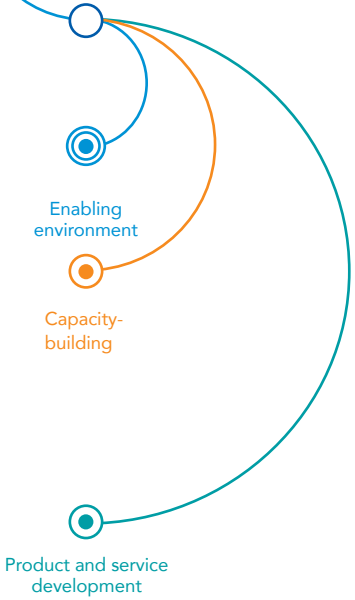
Dr Yolande Raoelina
Dr Alain Rakotoarisoa
Dr Marie Clémence Rakotoarivony
Dr Fanjasoa Rakotomanana
Dr Madeleine Razafindramavo
Dr Manuela Christopher Vololoniaina
Dr Huguette Ramiakajato
Dr Lalao Sabas Rabesahala
Dr Norohasina Rakotoarison

Figure 2.9 Risk gradient for Ankazobe district of Madagascar.



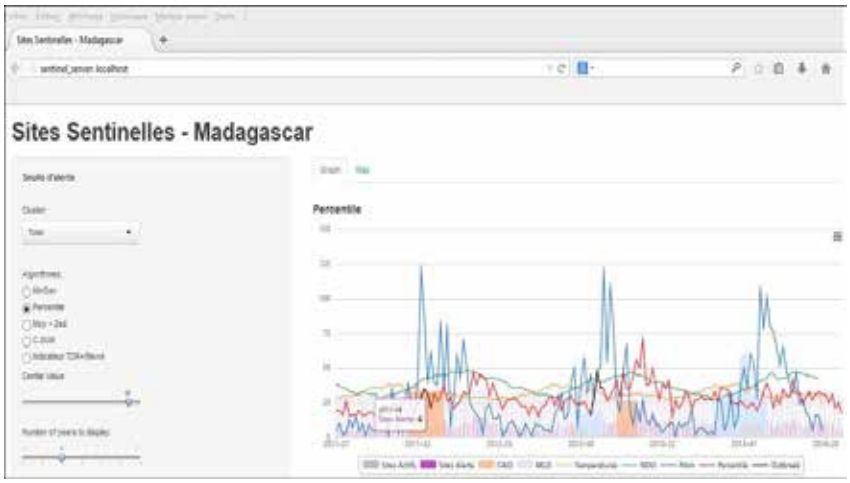
Research is also one of the CHWG activities. The Geographical Information System (GIS) team of the Madagascar Pasteur Institute, led by Dr Fanjasoa Rakotomanana, a member of the group, has conducted a GIS and vector control project to identify priority areas for indoor residual spraying (IRS) with insecticides. This project covers all the highlands of Madagascar and helped improve understanding of the importance of climate for epidemic preparedness and response. The aim is to provide a tool for decision-makers and health actors. Climatic factors and environmental data are used to assess epidemiological risk and support decision-making. GIS and weighted linear regression techniques identify priority areas for indoor residual spraying. Figure 2.9 shows mapping of the risk gradient for the Ankazobe district in Madagascar, from very low risk to very high risk. A buffer zone was drawn around localities to identify priority areas.

CASE STUDY 2D



Since 2007, a fever sentinel system has been implemented in 34 health facility centres across the country. The main objective is to have an early warning system to detect febrile syndromes. The GIS team of the Madagascar Pasteur Institute configured an application to automatically download environmental and climate data from the server of the International Research Institute for Climate and Society. These data are processed and stored in the PostgreSQL virtual server. The data are used to implement a dynamic predictive model of epidemiological risk to trigger health actors. The model includes data such as temperature, rainfall and normalized difference vegetation index, as well as malaria control approaches (long-lasting insecticidal nets, IRS) (Figure 2.10).

Figure 2.10 Alert detection using climate and environmental data, based on real-time data from sentinel sites. Florian Girond, Madagascar Pasteur Institute.



ACKNOWLEDGEMENTS

WMO provided financial support to initiate and maintain the working group. The United States Agency for International Development provided financial support of the Surveillance and Data Management Project, including the GIS sub-project conducted by the GIS team of the Madagascar Pasteur Institute.

BENEFITS AND LESSONS

As a result of the project, meteorological data can be analysed together with epidemiological data (historical, real-time and forecast) and transformed into information to facilitate early detection of fresh disease outbreaks or probable epidemics, and to select the strategies for prevention and response.

The main challenges facing all the stakeholders are sustainability of the activities and maintenance of the current dynamism and enthusiasm. Four key factors are crucial to the long-term success of the health and climate working groups: interest in working together; health professionals' awareness of the need for climate information and services; presence of an external agent (such as WMO) acting as a catalyst to bring the groups together; and availability of seed-funding mechanisms for pilot projects.

Figure 2.11 Patients waiting for diagnosis outside a clinic, which is part of the fever and climate sentinel surveillance system.