

## Results report

1. Title of Research and Development : The project for Development of Rapid Diagnostics and the Establishment of an Alert System for Outbreaks of Yellow Fever and Rift Valley Fever in Kenya
2. Principal Investigator : Kouichi Morita, Professor, Department Head and Dean, Department of Virology, Institute of Tropical Medicine, Nagasaki University
3. Counterpart Principal investigator : Dr. Gerald Mkoji, Kenya Medical Research Institute, Kenya
4. Results of Research and Development:

Development of new diagnostics and outbreak alert system is usually designed in the developed countries. This SATREPS project aims to develop them in the developing country and sustainable manner on technically and economically using the available infrastructure in the local settings. Here, we report the progress of each research activity.

Development of rapid diagnostics antibody detection: Regarding Output-1, RVFV human IgM-capture Immunochromatographic test (ICT) kit was successfully developed using recombinant RVFV Nucleocapsid protein and monoclonal antibody prepared in this project. This academic year (JFY 2015), our project mainly worked on evaluation of this kit such as sensitivity, specificity, storage period (shelf life), optimal storage conditions (temperature and humidity), the condition of sample serum and possible inhibitors. Simultaneously, the marketing team of KEMRI has been conducting the making of marketing strategy for sales of this kit and designing of package for its commercialization and registration of trade mark. Regarding Yellow fever (YF) human IgM-capture ICT kit development, YF virus like particle (VLP) construction using recombinant DNA technology and the stable expression of VLP was improved this year and comparing its reactivity with the recombinant YFV envelope protein.

Development of rapid diagnostics for virus detection: Regarding Output-2, RVFV virus detection ICT kit was successfully accomplished. This newly developed kit can detect RVFV not only from the infected culture fluid but also from the mosquito homogenate. This year (JFY 2015), our project conducted its evaluation. Regarding the strengthening of the Central Reference Laboratory at KEMRI-CVR in Nairobi, 5 strains of RVFV were isolated and 7 stains of 27 unidentified isolates were identified. Then, further identification works are under way at KEMRI-CVR in Nairobi and Nagasaki University in Nagasaki, Japan. Some of the laboratory techniques for identification of viruses were introduced from Nagasaki to Kenya. In another Reference Laboratory at KEMRI-CIPDCR, Alupe in Busia, virus isolation works and serological works were routinely conducted and the small scale of RVF and chikungunya fever outbreaks were detected from Western Kenya as inter-epidemic events. In the coast region of Kenya, dengue fever and chikungunya fever were detected. These findings were reported to the Ministry of Health and also to the public through the presentations at the domestic scientific conferences and publishing in the international peer reviewed scientific journals.

Development of early vigilant diseases outbreak alert system: Regarding Output-3, our project has successfully developed a new alert system (mSOS: mobile short message service based disease outbreak alert system) in Kenya. To evaluate the effectiveness of this new system, base-line survey was conducted in 2013 Quarter 1 and 2 and the end-line survey was conducted in 2014 Quarter 1. The impact of this new system was analyzed using the randomized comparison method and reported at the various international scientific conferences and also it has been published by the international peer-reviewed scientific journal. All the activities of Output-3 described in the Project Designed Matrix (PDM) of this project has been successfully completed by the end of Quarter 2 in 2015. Thus, as an extension of mSOS in two focal counties, our project has started to negotiate with the Ministry of Health (MOH) and other international stakeholders in Kenya to make it possible to be a nation-wide scaled up program. As a first step, the training of trainers (TOT) of mSOS workshops were conducted to cover whole area of Kenya. Our mSOS system was highly recognized as a useful system and it has been integrated with the national health survey system in MOH. Therefore, this system will be maintained and used as a disease outbreak alert system even after this project.