

## Results report

- 1 . Title of Research and Development : Ecological Studies on Flying Foxes and Their Involvement in Rabies-related and Other Viral Infectious Diseases
- 2 . Principal Investigator : Eiichi Hondo (Professor, Graduate School of Bioagricultural Sciences)
- 3 . Counterpart Principal investigator : Srihadi Agungpriyono (Dean, Professor, Institut Pertanian Bogor)
- 4 . Results of Research and Development:

This study aims to clarify how the flying foxes, which show globally migrating ability, are involved in appearance of rabies-related and other viral infectious diseases. It will be discussed in the respect of ecology of flying foxes, according to high throughput identification of viruses in flying foxes, distribution of them, and appearance of diseases. The knowledge will be widely provided via Indonesian National Zoonosis Center, leading to contribution for public health in Indonesia and South East Asia.

For achievement of the objective, this project consisted of 1. Surveillance of pathogens in flying foxes 2. Behavioral investigation for flying foxes, and 3. Investigation for occurrence of infectious diseases mediated by flying foxes. During each process, improvement of the abilities in assessment of the situation of infectious diseases, acquirement of experimental analytic skills in IPB staffs, and effective utilization of the knowledge by Indonesian government, will be realized.

In advance of actual research works, importance of biosafety must be recognized by IPB staffs, and research equipments must be set up in IPB. Here, operation (handling) of flying foxes and viral isolation from them have to be considered and discussed in the point of biosafety. We started to organize Biosafety Committee in IPB. Indonesian versions of rule booklets in Biosafety Committee, Recombinant DNA committee, and Animal Experiment Committee in Nagoya University were prepared and gave explanations on them at the JICA training course in Japan. Also, IPB staffs did site visits to Nagoya University, Yamaguchi University, Tokyo University of Agriculture and Technology, in December 2015. Initially, the above three committees will not be independent, but the Biosafety Committee in IPB deals with all works of each committee. The members of the committee was chosen widely in IPB, including the member from Faculty of Liberal Arts.

To prepare BSL3 laboratory in IPB, which is equivalent to WHO standard laboratory and sufficient level to be authorized by a world accreditation organization or biosafety facility, it was designed under advice by Biosafety Control Division in National Institute of Infectious Diseases, Japan. Procurement procedure for research equipments was initiated immediately after conclusion of the contract on SATREPS between Nagoya University and JICA. All equipment was purchased in December 2015, and was ready to export. They are waiting for shipping because they need to be licensed by Ministry of Commerce and Ministry of Trade in tax free import in Indonesia and we are now in the process of it.

For ecological investigations of flying foxes, the protocol to observe flying foxes by scan sampling and focal sampling methods was prepared to reveal viral transmissions among flying foxes, between flying fox and other animals including humans. Also, various permissions were obtained from Indonesian Government such as Foreigner Research, Entrance in Protection Area, and/or Capture of Flying Foxes.

The questionnaire was performed to know the probability of occurrence of infectious diseases mediated by flying foxes, in south coast of Garut city, West Java Province, Indonesia. This questionnaire contains questions on the direct contact (touch) with flying foxes, the witness account; for the contact of flying foxes with carnivores, undiagnosed deaths of humans, and so on. Based on this, we started to get permission to collect human saliva samples and/or blood to correspond the virus detected, to the questionnaire.

The surveillance of pathogens mediated by bats are conducted only in Japan because the equipment had not been transferred to Indonesia yet. The ELISA kits for serological surveillance in Ebola and/or rabies viruses had been developed, and the real survey was performed for more than 500 Japanese domestic insectivorous bats. Also, degenerate primers for Multiplex PCR was designed to amplify various viruses, which belongs to 88 Genus of viruses, for future use in next generation sequencing in IPB, Indonesia. These primers are strongly anticipated for effective detection of viral genomes in flying foxes of Indonesia.