Ebola – Viruses emerging from the forest

Since the Ebola (EBOV) haemorrhagic fever epidemic in West Africa, international food safety and veterinary public health bodies (OIE, FAO, ECDC, EFSA) have been analysing, based on the current knowledge, the risks associated with animals and their products. This has revealed a clear lack of data on disease ecology and the vulnerability of societies.

A recent study estimated that 22 million people are currently living in zones at risk of the emergence of Ebola in sub-Saharan Africa. CIRAD and its partners are providing their expertise with a view to building disease surveillance and control capacity in the field through ecological, socioeconomic, risk analysis and surveillance methods.

It has been established that:

- several bat species play a key role in maintaining the Ebola virus;
- the various Ebola epidemics that have affected ape populations (gorillas and chimpanzees) in central Africa are undermining the efforts of numerous conservation projects;
- human contamination can occur through close or direct contact while hunting or through eating bushmeat;
- epidemics and the steps required to manage them can have a destabilizing effect on agricultural product market chains and food security.

However, there is still some uncertainty as to:

- how the virus circulates in its natural environment and among wildlife communities;
- the factors that lead to the first case in humans, since the probability of zoonotic transmission appears to be low;
- the social, economic and political mechanisms that make societies more or less vulnerable to the disease.

Some CIRAD projects

The “bushmeat” project in central Africa is working on a socioeconomic and sanitary diagnosis of supply chains (FAO, GEF).

CIRAD research activities on bats in Africa (with IRD and CIRMF) and in Southeast Asia (with Institut Pasteur) have been extended to cover the Ebola virus.

The impact of the Ebola virus on market chains and the trade in agricultural products in West Africa is being assessed (FAO).
Ecology of transmission

What role does wildlife (sensitive hosts and reservoir species) play in virus transmission and evolution? Research has set out to:

- understand the mechanism of Filovirus (Ebola and Marburg) maintenance, circulation and transmission among animal populations and identify reservoir and host species;
- study the ecology of these host and reservoir species: density, migration, use of habitat, reproduction, feeding behaviour, and nature and intensity of contacts between these species;
- model virus maintenance within forest ecosystems. What are the at-risk periods, zones and behaviour? What are the links between Ebola outbreaks and environmental variations (deforestation, climatic variations)?

Ecological and eco-epidemiological studies as part of the EcoHealth approach, can help answer these questions.

Analysis and sociology of risk

Multi-disciplinary research serves to explain the interactions between ecological and socioeconomic dynamics. It explores the following questions:

- What role does the bushmeat market chain play in virus circulation and transmission? What economic and nutritional impact do control measures have?
- What can we learn from the current Ebola epidemic about our collective capacity to manage crises? How can we prevent health crises from becoming major economic and food crises?

Surveillance

How can we improve surveillance of the Ebola virus and its manifestations within forest ecosystems? The aim is to optimize wildlife surveillance systems by using mobile information gathering tools.

How can we involve the people concerned in surveillance? This means adopting the One Health and EcoHealth concepts in the field.

For further information

http://publications.cirad.fr