Climate Change and Ebola Outbreaks: Are they connected?

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The climate factors have an impact on pathogens (resistance, selection, etc), hosts (immunity, movements including migration, etc), vectors (ecological niches, vector capacity) and epidemiological dynamics. The climate can affect the rate of transmission, the way in which pathogens are dispersed, contact networks between individuals and between different species, community structures. Livestock farming methods, or biodiversity and its ambivalent role in disease emergence are also depending of climate factors. The diseases most sensitive to climate factors are parasitic diseases with external life-cycle, vector-borne diseases and infectious diseases passed on by water or micro-mammals including bats. Parts of them are zoonosis.

For a zoonosis like Ebola, several potential drivers are suspected to connect climate change to ecosystems, virus transmission to Human and heath care policies:

1. Ecology and behaviours of the several bat species known to be Ebola virus reservoir could be affected by climate change: population density, migration, habitat, reproduction, feeding behaviour, and nature or intensity of inter-specific contacts. All those parameter would have an impact on the ecology of the Ebola virus. Therefore, researches for understanding the mechanisms of virus maintenance, circulation and transmission and for identifying reservoir and bridge species need to address the correlations between Ebola foci and its environmental factors, including climatic factors.

2. Human contamination by Ebola virus can occur through close or direct contact while hunting or through eating meat from wildlife. Climate changes can for one side, favour contact between wildlife and humans by modifying the natural habitats of the animals that act as pathogen reservoirs and by influencing their movements. For other side, climate evolution may also exacerbate food insecurity, which can in turn modify human behaviour, particularly by prompting people to look for alternative food sources, such as bushmeat.

3. Low-income countries must reinforce their health systems to detect infectious disease and control outbreaks, by adapting their sanitary strategy and policy to climate change. Indeed, health systems are structurally inadequate in the least advanced countries, where they endure rather than anticipate climatic conditions and their variations. The recent Ebola epidemic in West Africa bears witness in particular to the need to step up the early detection and management of the emergence of zoonoses taking into account accurate environmental, social and climatic data.

Research and health management regarding these 3 items should be carried out through the "One Health" concept. This holistic approach includes both animal health and human health in their shared environment. The implementation of a multidisciplinary and intersectoral approach requires above all an awareness of its benefits and greater involvement of all the scientific and policy makers. The issue of climate change and its impacts on viral diseases may be an axis of reflection on this integrated approach, and Ebola disease is a topical issue.

Our poster presents examples of collaboration between teams based in low-income countries and high-income countries, which are fighting together against both climate change and Ebola crisis.

Keywords: Climate change, Ebola, Ecosystem, Bat, Bushmeat, One Health