Climate Change and Ebola Outbreaks: Are they connected?

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Context

The climate factors have an impact on pathogens, hosts, vectors and epidemiological dynamics :

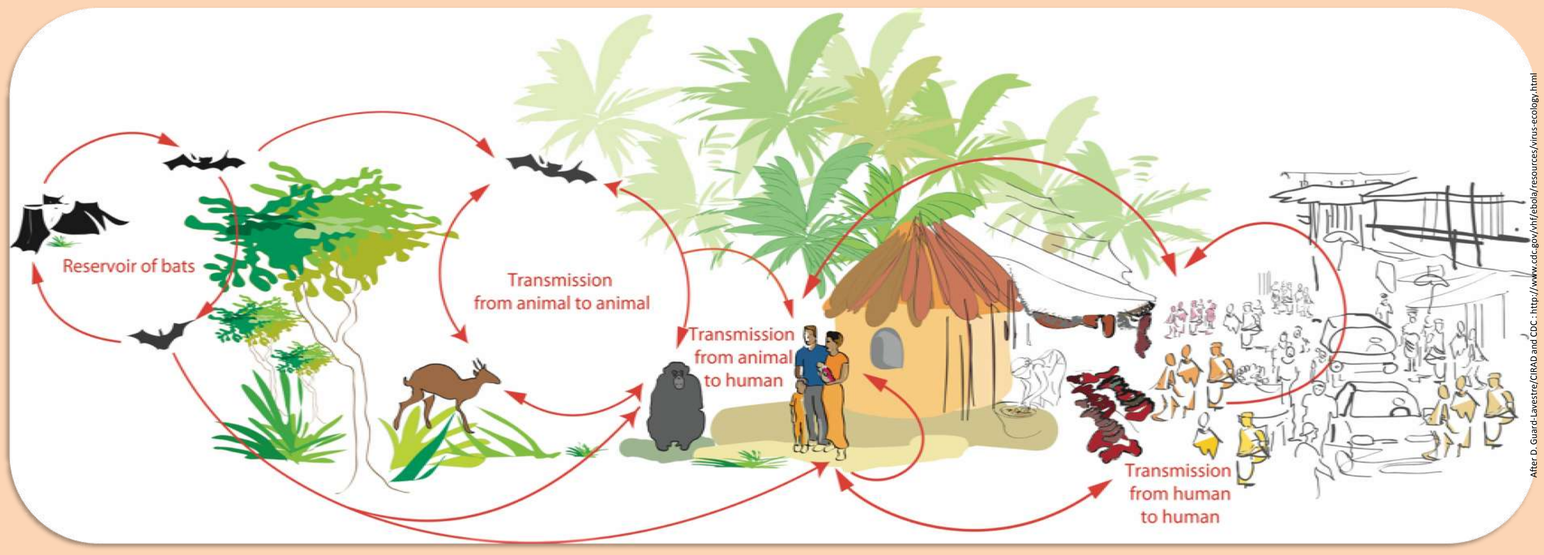
-the climate can affect the rate of transmission, the way in which pathogens are dispersed, contact networks between individuals and between different species. Livestock farming methods, or biodiversity and its ambivalent role in disease emergence are also depending of climate factors.

-the diseases most sensitive to climate factors are infectious diseases passed on by water or micro-mammals including bats. Most of them are zoonosis like Ebola.

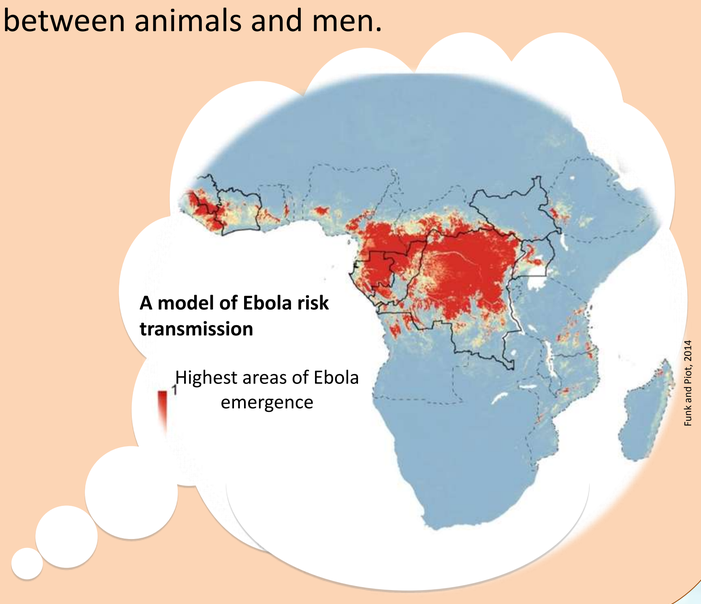
EBOLA VIRUS CIRCULATION AND TRANSMISSION

Several potential drivers are suspected to connect climate change to ecosystems, virus transmission to Human and heath care policies :

- reservoir species (i.e. bats) and their contacts with other animal species
- low income countries health systems
- human activities (like logging and agriculture) worsen climate change impacts and increase contacts between animals and men.



After D. Guard-Lavestre/CIRAD and CDC : http://www.cdc.gov/vhf/ebola/resources/virus-ecology.html



Funk and Pioti, 2014

CLIMATE CHANGE MAY IMPACT ENVIRONMENT, HUMAN BEHAVIOR, HEALTH SYSTEMS AND EBOLA VIRUS EPIDEMIOLOGICAL DYNAMIC

Ecology and behavior of bats

Climate change may affect life history traits of bats (suspected Ebola virus reservoir) :

- population density, migration, habitat utilization
- reproduction, feeding behavior, nature or intensity of inter-specific contact

french.peopledaily.com

Alexander and col., 2015

Seasonal factors may influence wildlife distributions, potentially increasing their contacts with Ebola reservoirs. Thus, Ebola virus may also infect a number of animal species, most notably nonhuman primates mostly in the highest areas of transmission.

HUMAN-ANIMAL INTERFACE

Climate changes can favour contact between wildlife and humans by :

- impacting the natural habitats of the reservoir species
- modify human behavior and activities (deepest incursions in forests)

Gabonews

D. Cornelis/CIRAD

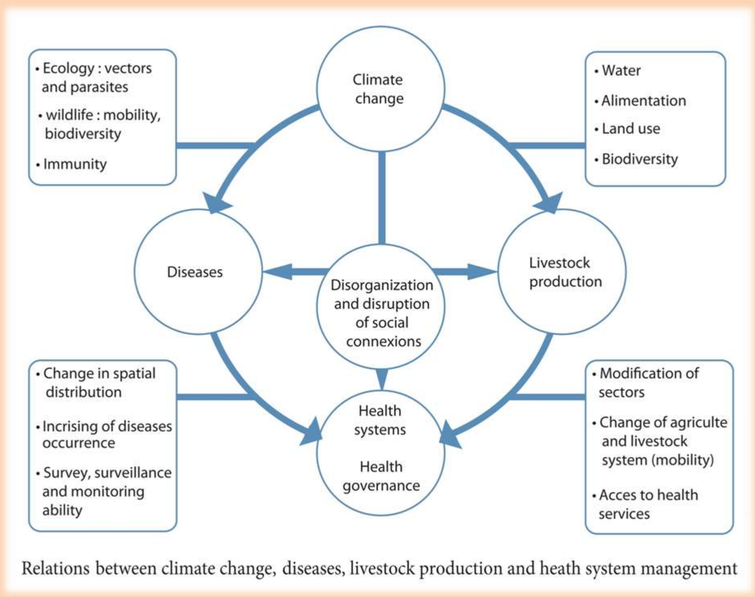
Climate change may exacerbate food insecurity, which can modify human behavior by prompting more people to look for alternative food source such as bushmeat.

Human contamination can occur through contact while hunting or eating bushmeat.

Health systems

Low-income countries must :

- reinforce their health systems to detect earlier Ebola cases and control outbreaks
- take into consideration potential impact of climate change in the sanitary strategy and policy



Relations between climate change, diseases, livestock production and heath system management

To go further

Research and health management regarding these 3 items should be carried out through the “One Health” concept. This holistic approach includes both animal and human in their shared environment. Thereby, the issue of climate change in relation with recent Ebola outbreaks especially and infectious diseases in general, must be taken up in single framework by research teams.

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