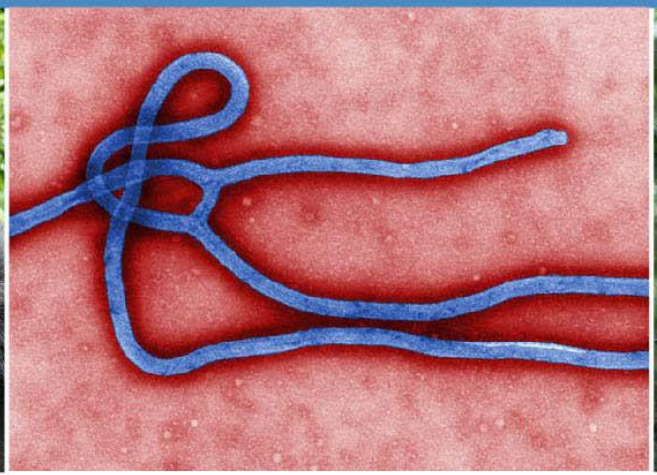
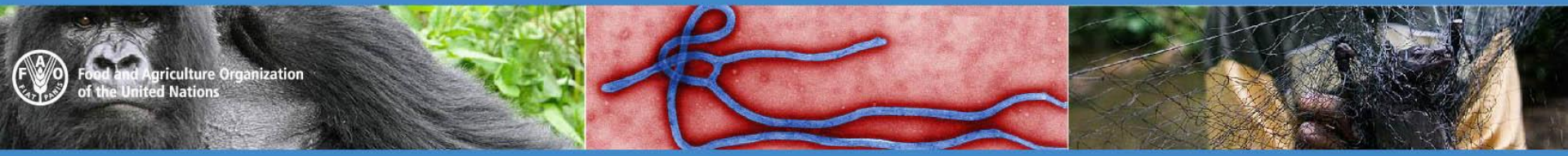
Food and Agriculture Organization
of the United Nations



Ebolavirus and Animals

Our knowledge to date and how animal health can support the public health emergency



Speakers

- Lee Myers

Manager a.I. Emergency Management Centre for Animal Health (EMC-AH)

Coordinator of FAO's Ebola Incident Coordination Group (ICG)

- Cyprien Felix Biaou

Livestock Development Officer, FAO sub-regional Office for Central Africa (FAO-SFC)

- Claudia Pittiglio

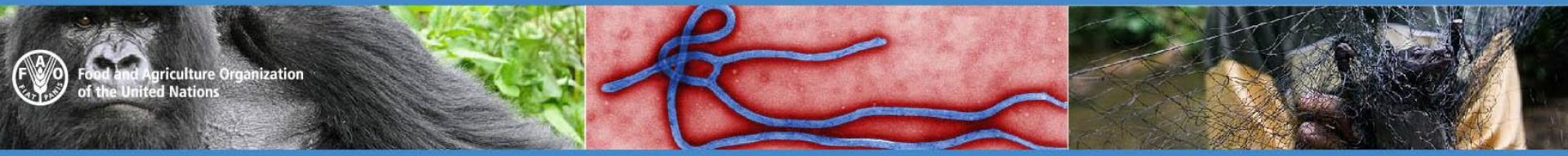
Ecologist

FAO Global Early Warning System (FAO-GLEWS) and Emerging Pandemic Threats Programme Phase 2 (EPT-2)

- Sophie von Dobschuetz

Global Surveillance coordinator (EPT-2)

Emergency Prevention system for transboundary Animal Diseases (EMPRES-AH)



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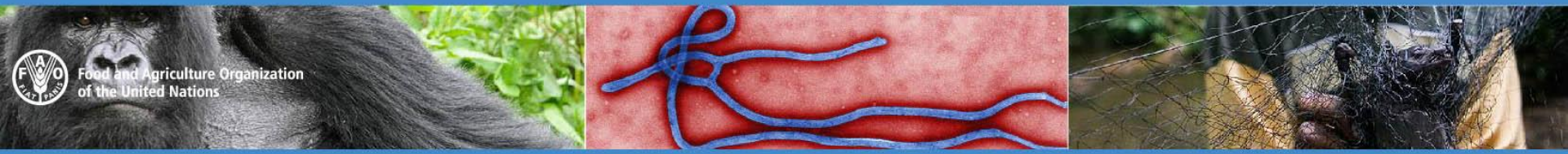
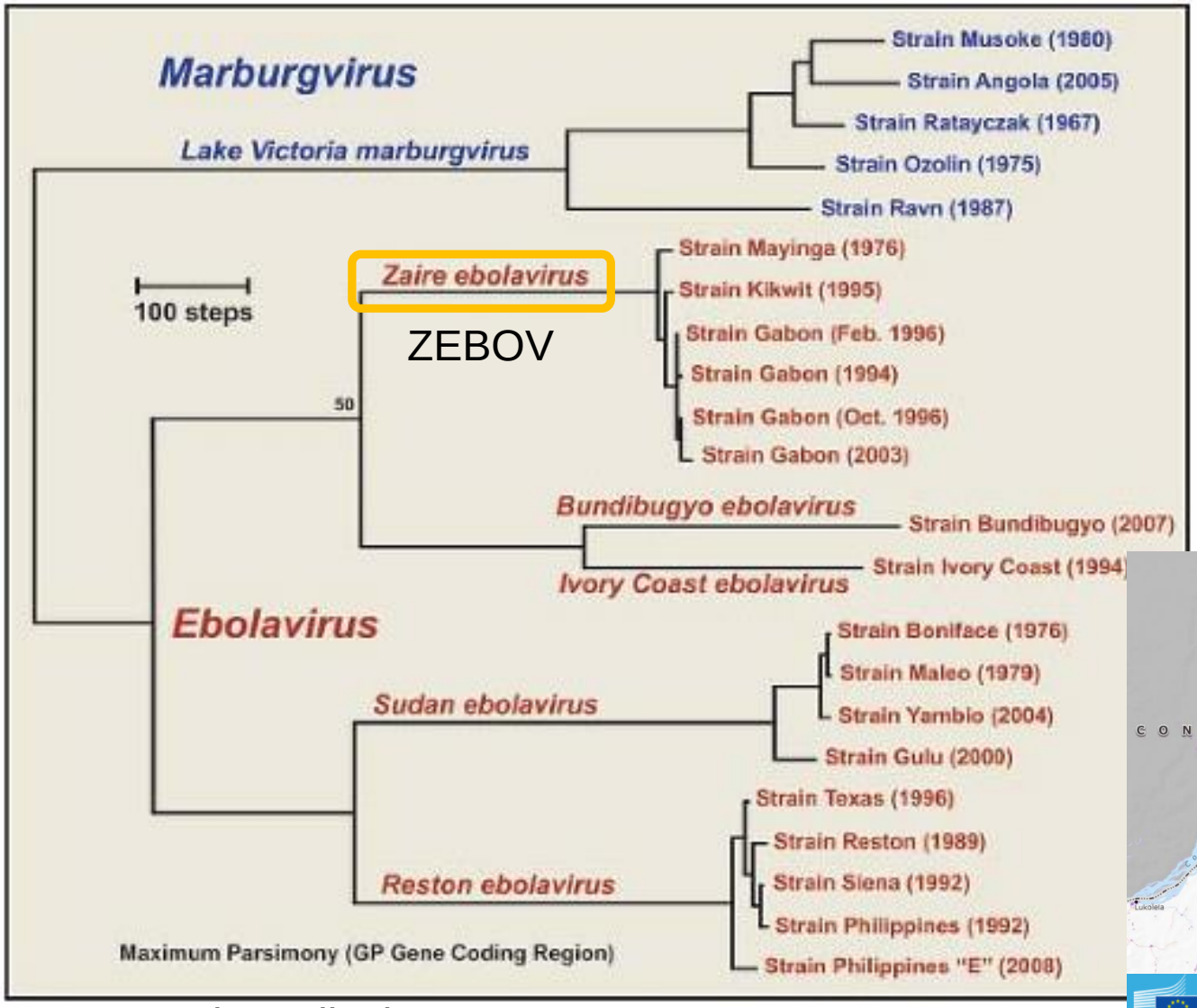


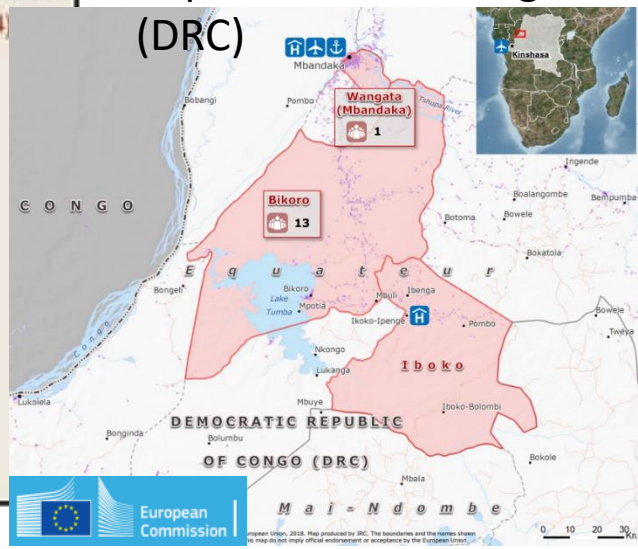


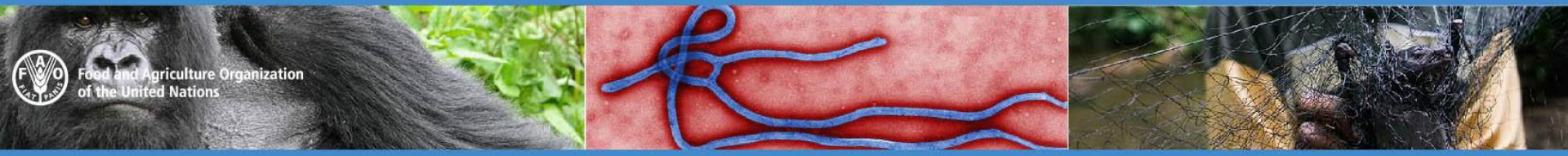
© Basicmedical Key

Context of this webinar:

<Phylogeny of the family Filoviridae

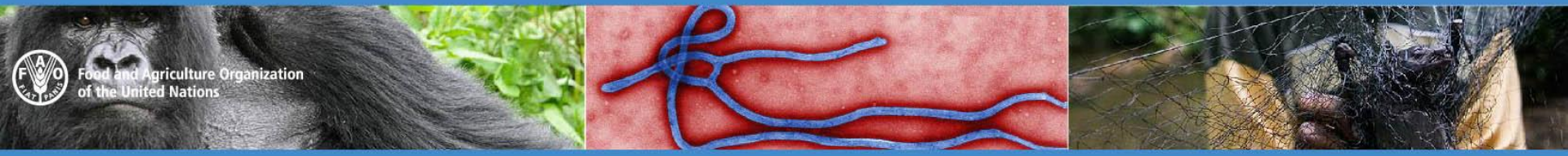
Current outbreak in the Democratic Republic of the Congo (DRC)





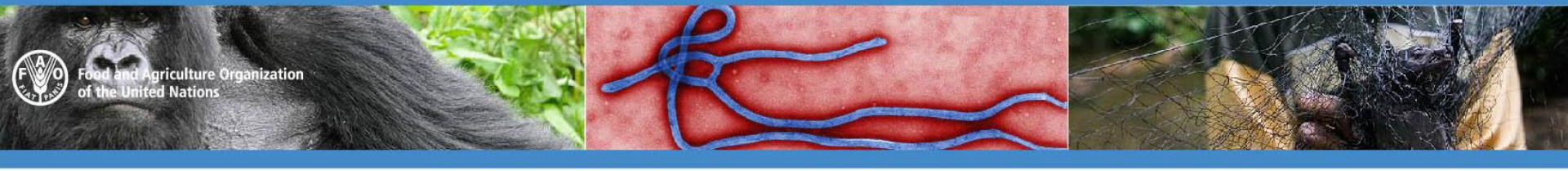
FAO Ebola Incident Coordination Group (ICG)

- In the spirit of One Health, FAO is supporting the efforts of the public health sector in response to the EVD outbreak in the Democratic Republic of the Congo.
- An FAO Ebola ICG organized as an internal FAO group with focal points working together to connect the efforts of FAO personnel at the national, regional and headquarters levels.
- The Emergency Management Centre for Animal Health (EMC-AH) leads the ICG from FAOHQ and is the focal point for WHO GOARN, OIE and other global partners.



FAO Ebola ICG Key Roles

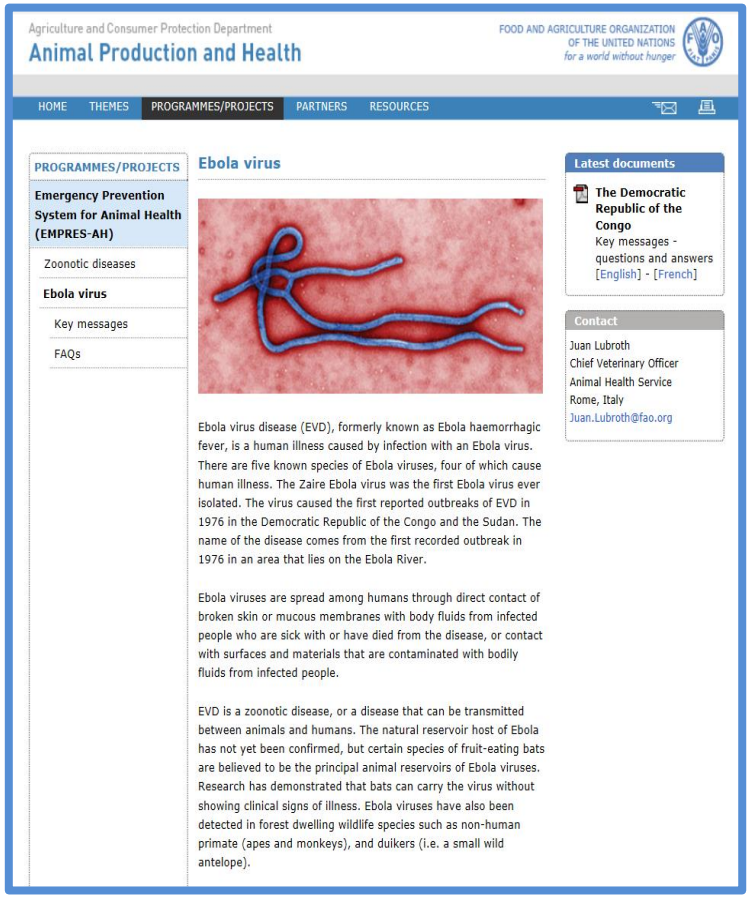
- Maintain situational awareness and share updates from multiple sources,
- Coordinate communication among FAO personnel,
- Offer recommendations for development of FAO policy and risk communication materials,
- Support the FAO country office and national veterinary services, FAO regional office, and WHO upon request, to include possible deployment of emergency responders and resources,
- Provide guidance and tools for emergency response, as warranted, and
- Assess response progress and strategies.

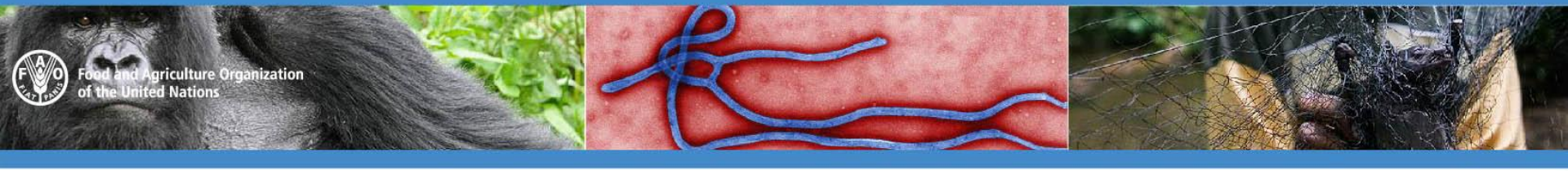


FAO Ebola Information

Key Messages, Talking Points and FAQs

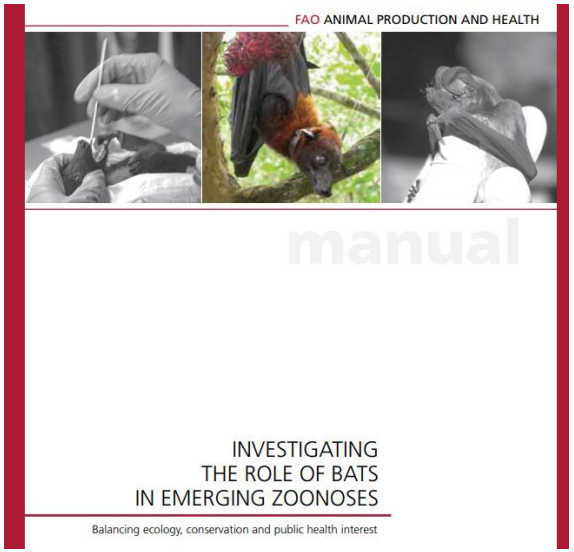
- Developed key messages and talking points for Chief Veterinary Officers, FAO staff, and others involved in the animal health sector relative to the current EVD outbreak in DRC.
- Updated Ebola FAQs
- Created an FAO website dedicated to Ebola virus: www.fao.org/ag/againfo/programmes/en/empres/ebola/index.html

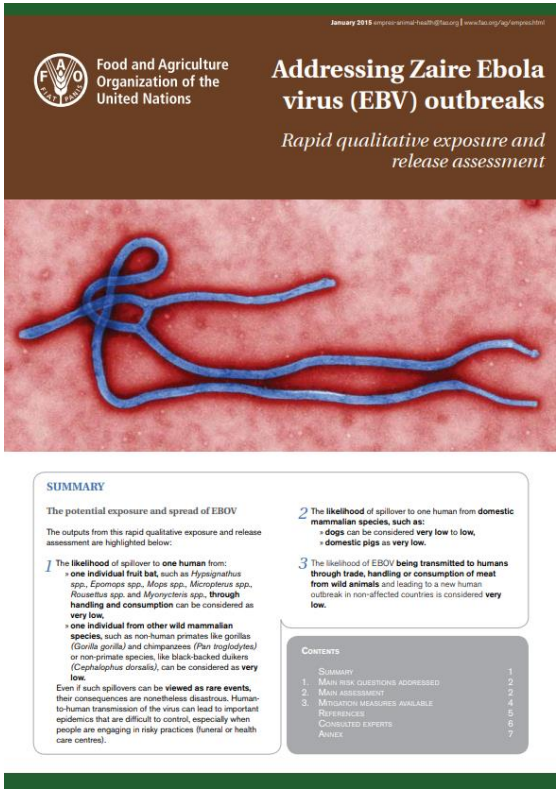


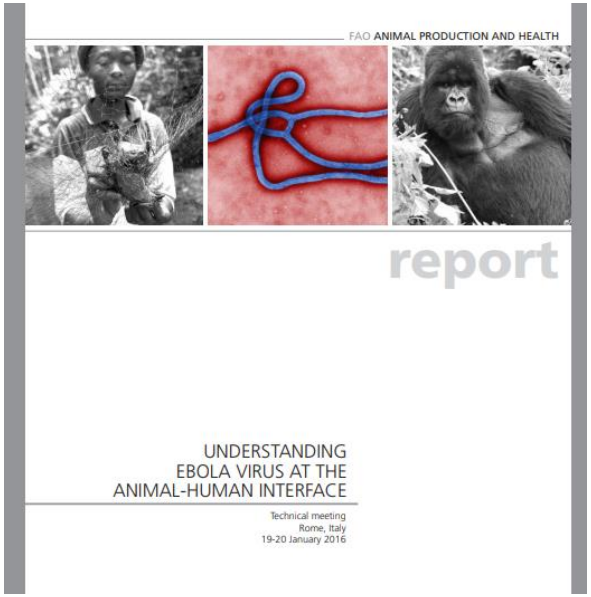


Relevant publications from FAO

http://www.fao.org/3/a-i4364e.pdf

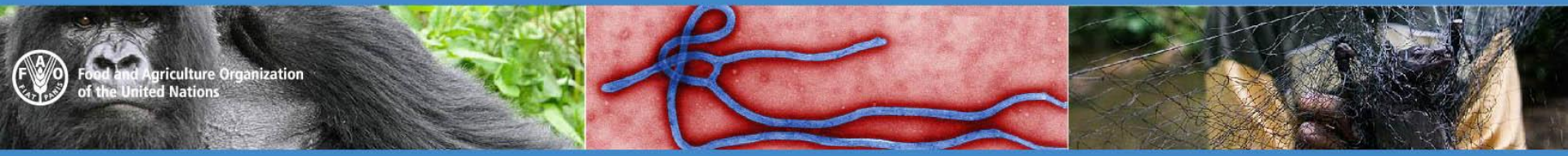






http://www.fao.org/docrep/014/i2407e/i2407e00.pdf

http://www.fao.org/3/a-i5670e.pdf

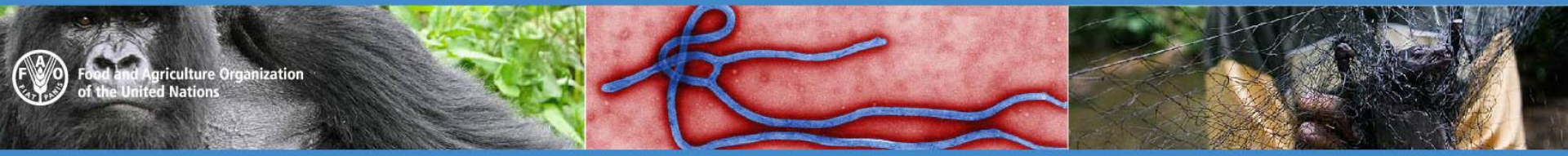


FAO HQ Support

Survey of animal sector surveillance activities and latest findings on susceptibility in wild and domestic animal species.

- Hosting today's webinar "Ebola and animals – Our knowledge to date and how the animal health sector can support the public health emergency"
- Updating the FAO assessment from 2015 on the risks of human exposure to EBV from contact with animals or their products: http://www.fao.org/3/a-i4364e.pdf

FAO urges any unusual animals morbidity or mortality be reported immediately to the DRC animal health authorities.



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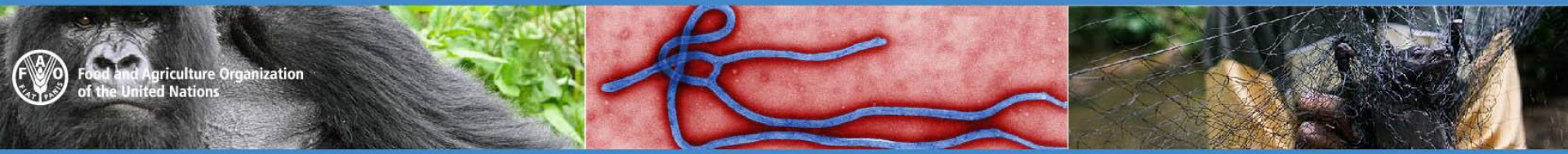
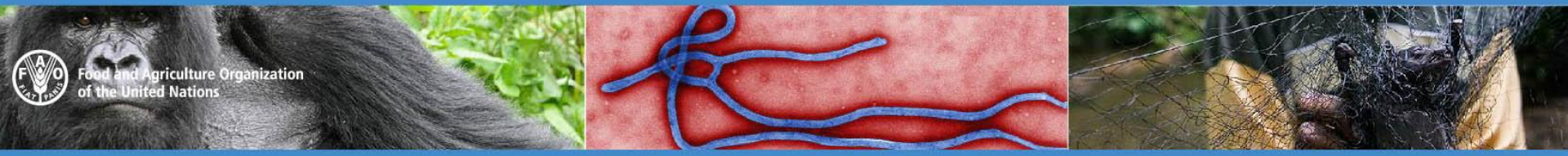


Support to Incident Management and preventing food security issues

"At this point, during an emergency response focused on saving human lives, FAO and partners highly discourage the collection of samples from animals for Ebola testing in affected areas."

However, the outbreak is a renewed opportunity to collaborate, share knowledge, share logistics, address risk communication issues (One Health Approach including food safety) and to anticipate on impact on food security and stigmatisation of farmers affected or at risk



Context of the Ebola outbreak in DRC

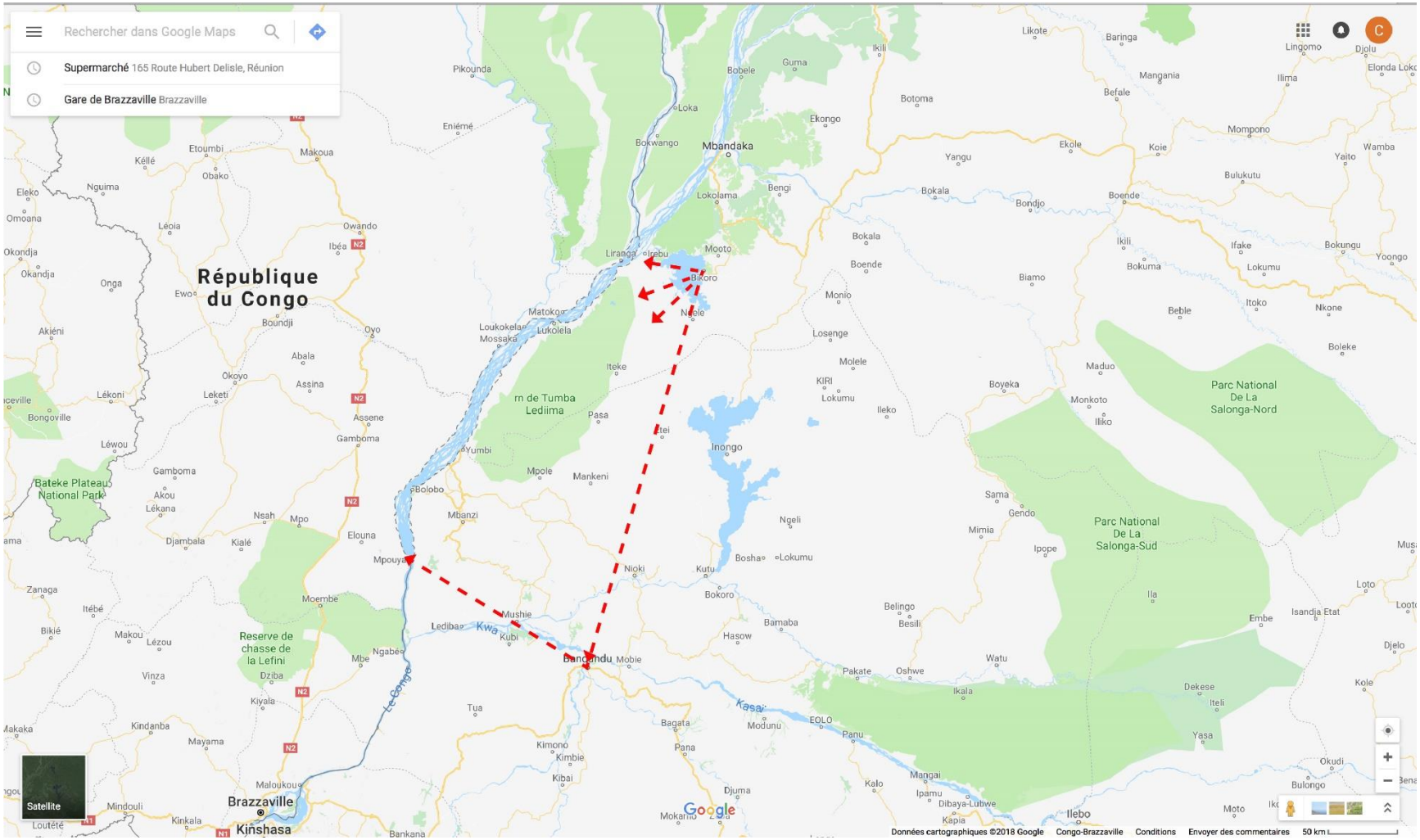
- not the only challenge the country is facing. Others include massive population displacement, food and security and malnutrition, and multiple simultaneous outbreaks of cholera, measles and polio

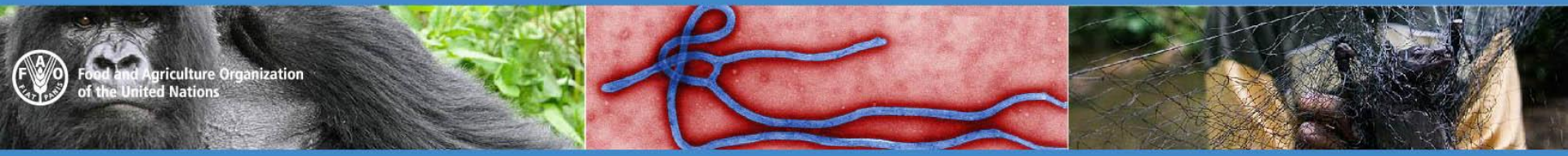
- This outbreak is a combination of two patterns of Ebola outbreaks : isolated rural outbreaks + outbreaks in small towns

- Remoted and forested area inhabited by populations for which animals and wild meat represent main sources of proteins and income

- Many terrestrial and water routes that connect villages, disease epicentres and large cities (Kin, Brazza, Pointe Noire) through the Congo river

High potential for further amplification


Rechercher dans Google Maps
Supermarché 165 Route Hubert Delisle, Réunion
Gare de Brazzaville Brazzaville
République du Congo
Mbandaka
Bikoro
Inongo
Bandundu
Mpouya
Brazzaville
Kinshasa
Le Congo
Kwa
Kasai
Parc National De La Salonga-Nord
Parc National De La Salonga-Sud
Bateke Plateau National Park
Reserve de chasse de la Lefini
Satellite
Données cartographiques ©2018 Google
Congo-Brazzaville
Conditions
Envoyer des commentaires
50 km



FAO support to partners on the field

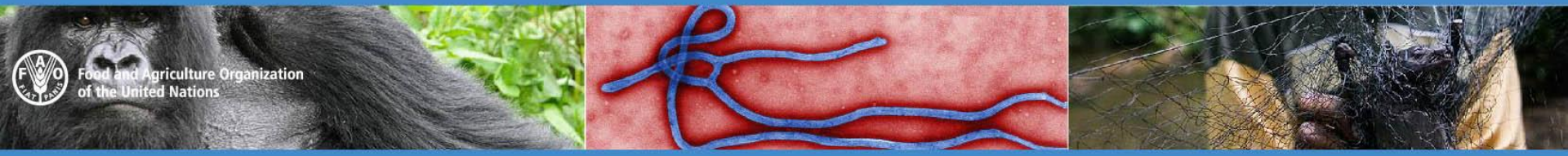
- Two countries priority 1 by WHO : CAR and Congo
- Other countries (priority 2 and 3) : joint UN actions

DRC: affected

- Outbreak management meetings (Comité National de Coordination de la MVE et équipe Labo)
- Office space Mbandaka
- Motor vehicles (3) and motorbikes (4) to WHO vaccination teams in Mbandaka
- 150 EPPs to support WHO and field investigations
- Sitreps
- Food security sensitive events : information and preparedness for actions

Congo : non affected

- Preparedness meetings and field missions (risk Communication!)
- Local stock of EPPs (300) direct use or support to PH use when required
- Sitreps
- Food security sensitive events : information and preparedness for actions (see ToRs of the animal/wildlife sector)



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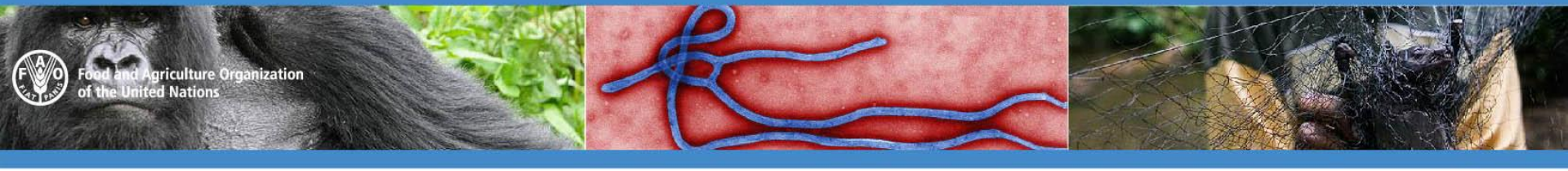
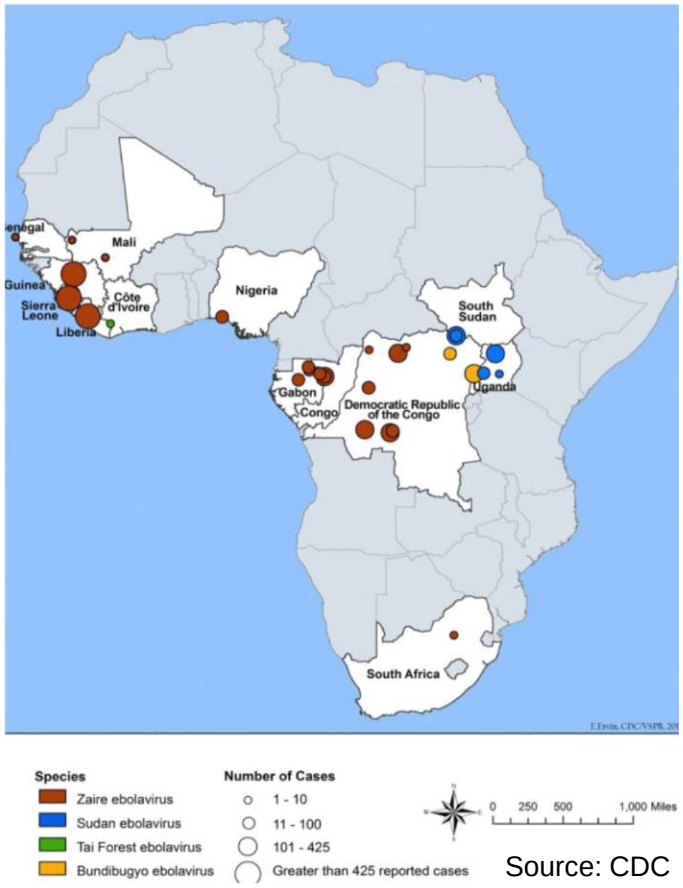


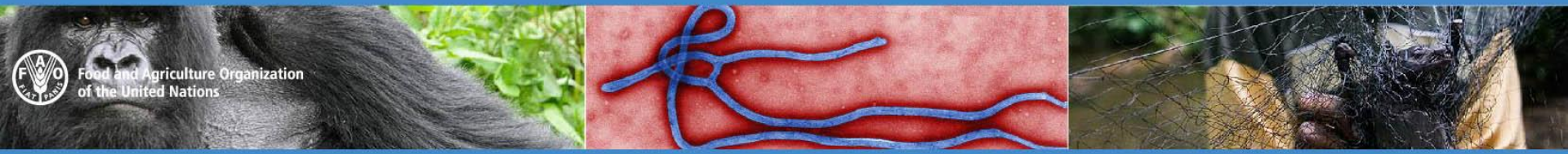
Ebola virus largest outbreaks by species (1976--)

Four different strains of Ebola have emerged in Central and West Africa, from varying presumptive wildlife sources

Country	Town (Year)	Species	Year
DRC	Bikoro (2018), Likati (2017), multiple (2014), Isiro Health Zone (2012), Luebo (2007 and 2008), Mbomo (2002-2003), Not specified (2001), Kikwit (1995), Tandala (1977), Yambuku (1976)	*Zaire ebolavirus, Bundibugyo ebolavirus*	1976, 1977, 1995, 2001, 2002, 2003, 2007, 2008, 2012, 2014, 2017, 2018
Guinea Sierra Leone Liberia	Multiple (2014-2016)	*Zaire ebolavirus*	2014-2016
Uganda	Luwero District (2012), Kibaale District (2012), Luwero District (2011), Bundibugyo (2007), Gulu (2000)	*Sudan ebolavirus, Bundibugyo ebolavirus*	2000, 2007, 2011, 2012
South Sudan	Yambio (2004), Nzara (1979 and 1976),	*Sudan ebolavirus*	1976, 1979, 2004
Gabon	Libreville (2001), Booue (1996), Mayibout (1996), Mekouka (1994)	*Zaire ebolavirus*	1994, 1996, 2001
South Africa	Johannesburg	*Zaire ebolavirus*	1996
Côte d'Ivoire	Tai Forest	*Taï Forest ebolavirus*	1994

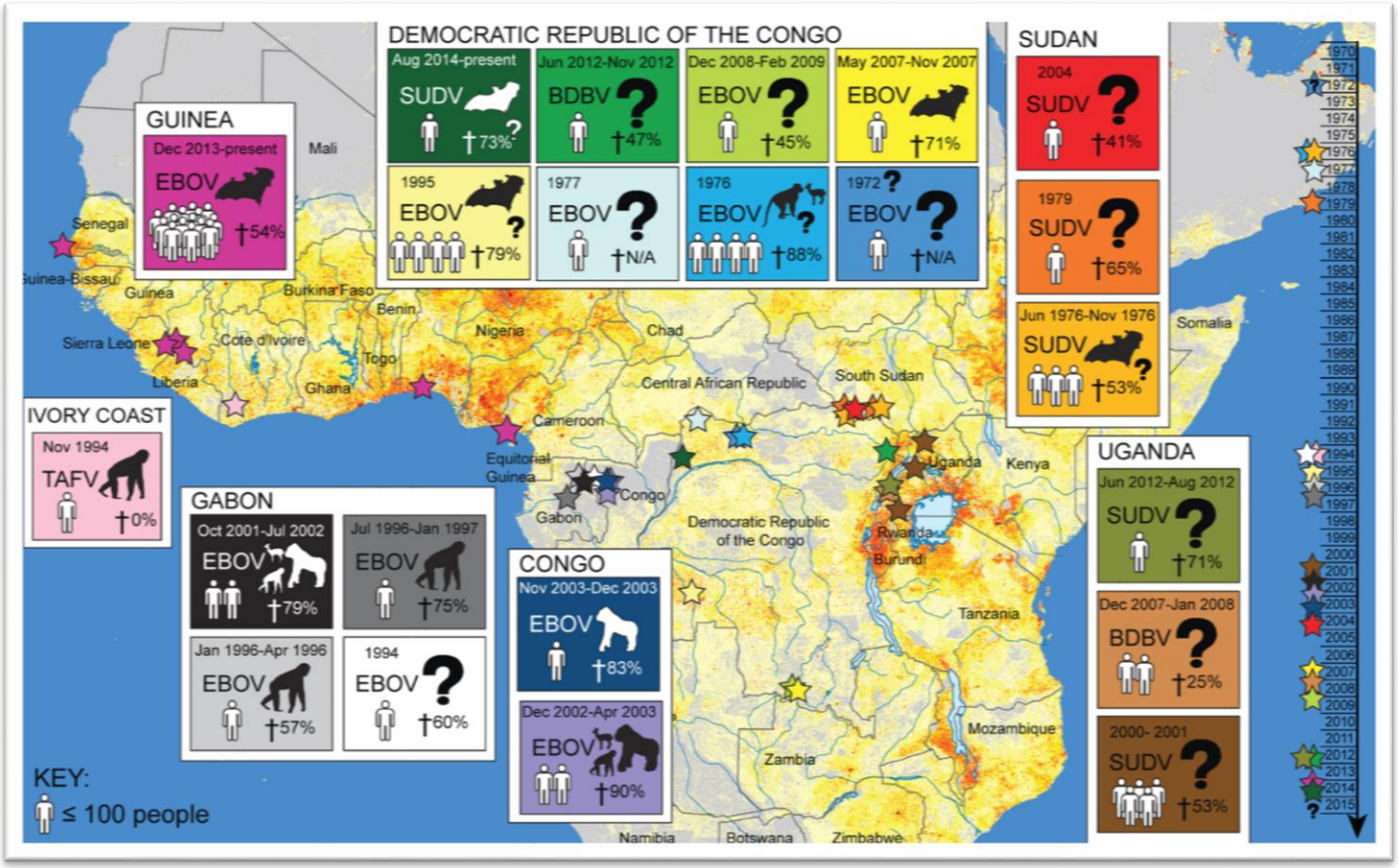


Source: CDC

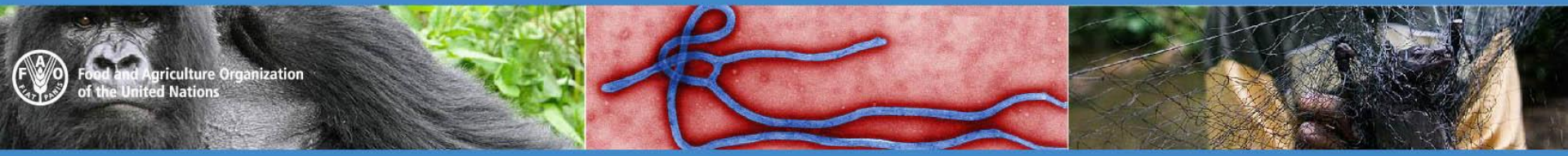


Wildlife spill over events

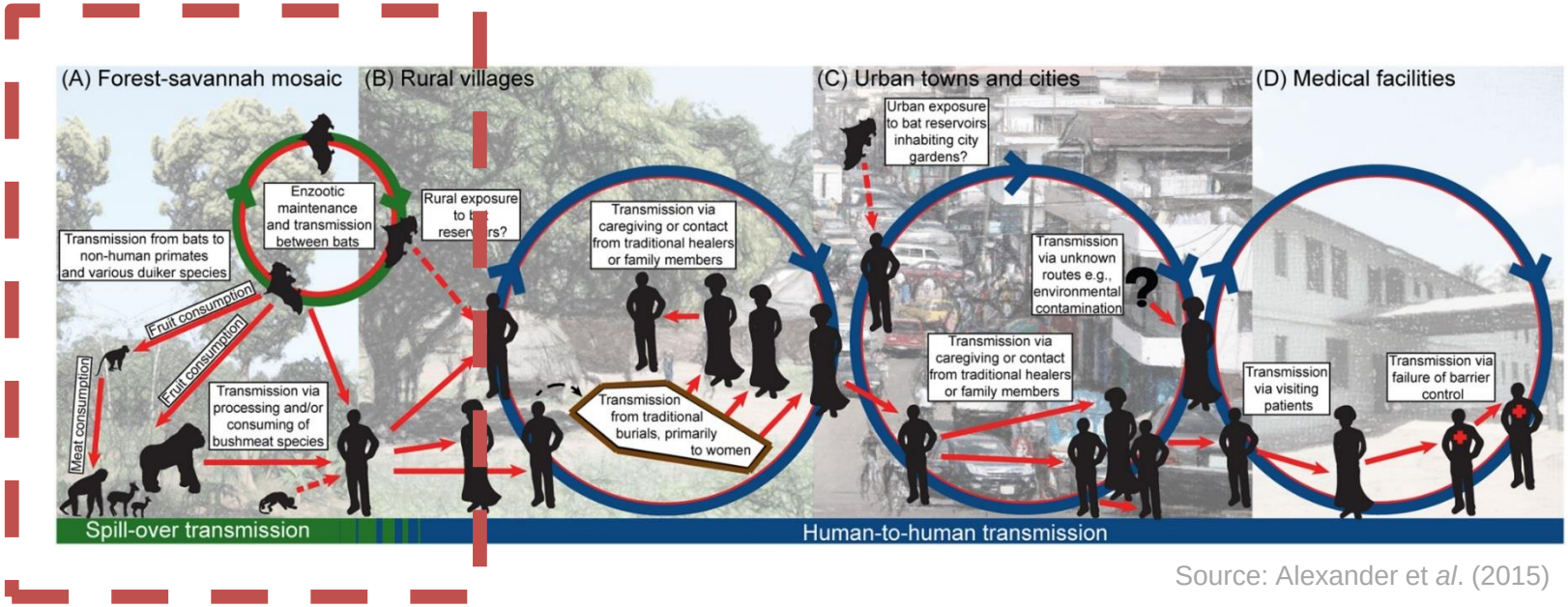
Out of **22** large Ebola outbreaks, **5** are possibly linked to bats and **9** to non-human primates, duikers, monkeys, bush meat



Source: Alexander et *al*. (2015)



Transmission patterns and wildlife spill over events



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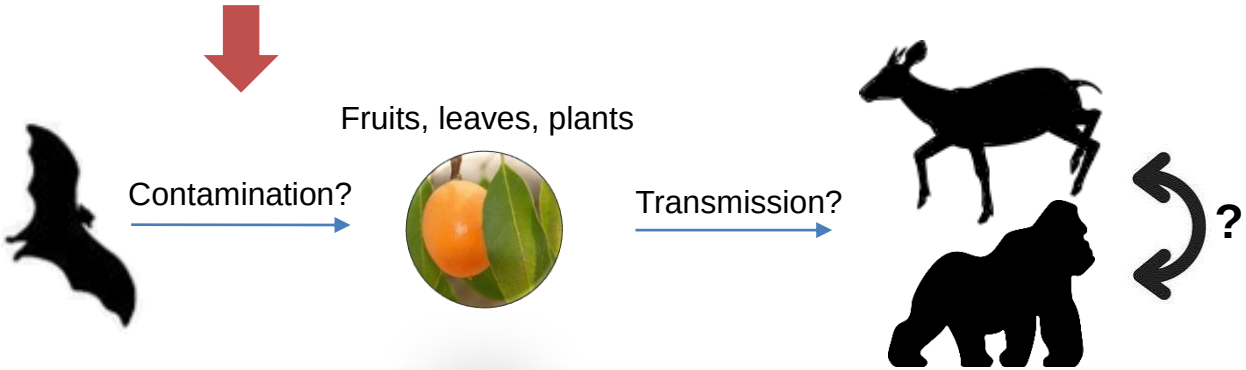
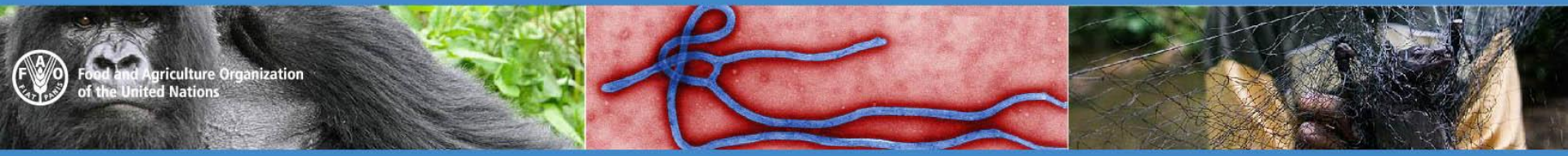


Source: Xavier Roche (FAO)

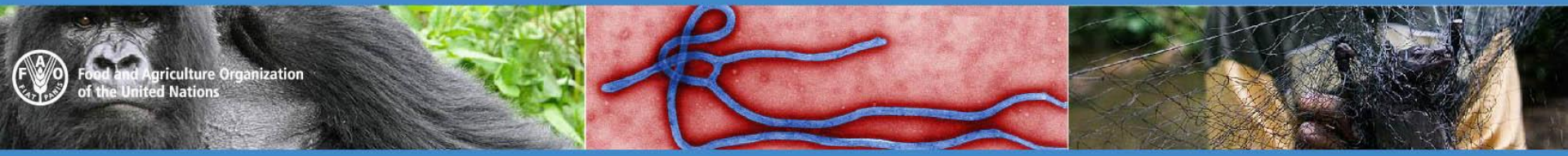


Susceptibility of mammals - field studies

- Non-human primates and duikers (tiny African antelope): high mortality during EBOV outbreaks (virus isolated / RNA amplified from carcasses) *(Leroy, 2004; Bermejo, 2006; Wittmann, 2007)*

- EBOV RNA found in wild small rodents (no virus isolation or sequence confirmation) *(Morvan, 1999)*

- No evidence in other animals (bush pigs, brush-tailed porcupines…) *(CFSPH, 2016)*



Susceptibility of Bats – field studies

Fruit bats (*Pteropodidae*) are considered natural hosts for EBOV (e.g. *Epomops spp.*, *Hypsignathus spp.*, and *Myonycteris spp.*...)

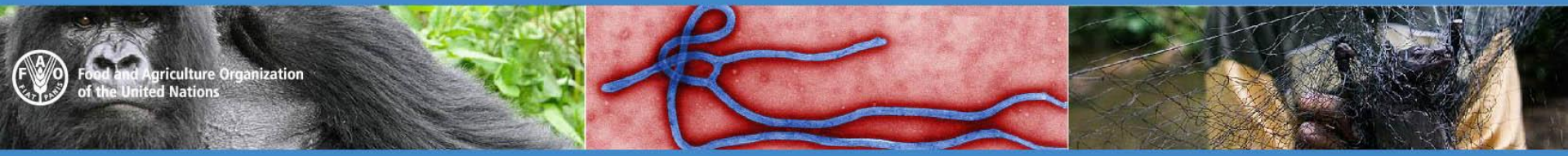
Assumed epidemiological links: 2002-3 Congo & Gabon, 2007 Gabon & Congo, 2014 Gabon

- Assumed links between EBOV outbreaks and bats (*wildlife deaths*, *geo-distribution*)
- Several studies on seropositivity of fruit bats to EBOV *(Olson, 2012; Ogawa, 2015; Pourrut, 2007, 2009; Hayman 2010, 2012; De Nys poster, 2017)*

Hypsignathus monstrosus

Several bat species are exposed to EBOV and survive infections

No virus isolation from naturally infected bats



Susceptibility of Bats – lab studies

Viral replication
Species dependent

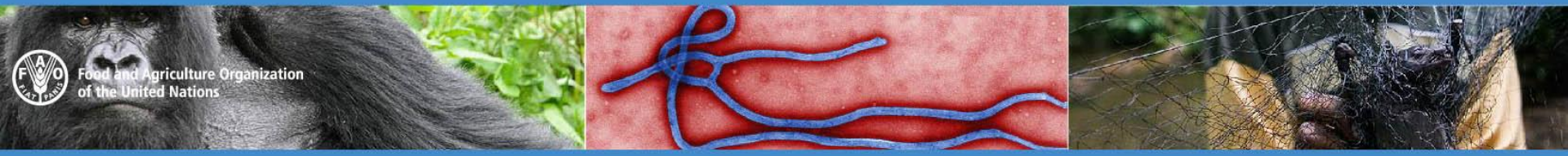
No clinical signs

(Swanepoel, 1996; Paweska, 2016)

- <u>No virus in bat secretions or excretions</u> except scarce evidence in feces *(Swanepoel, 1996)* → Intermittent shedding?

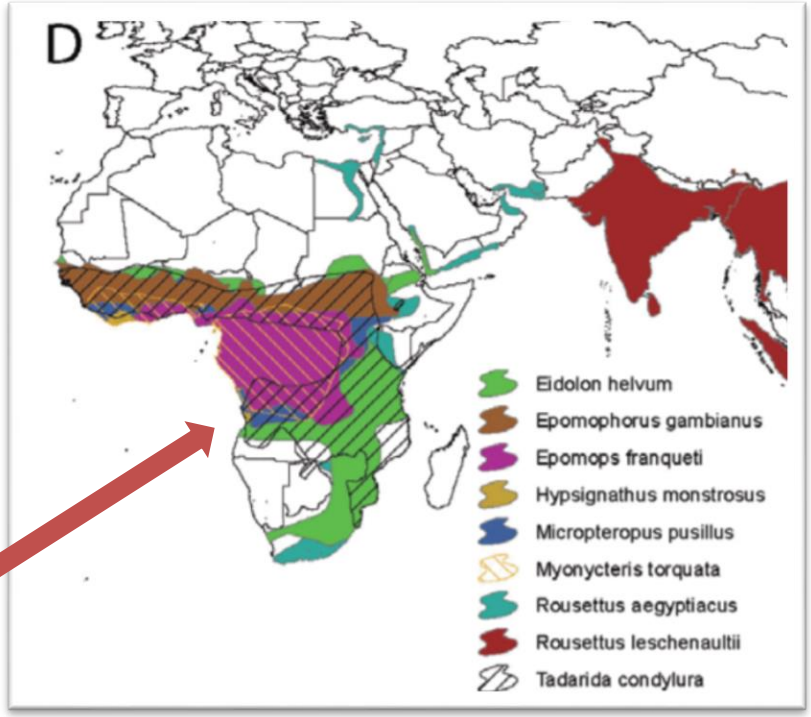
Epomops franqueti

Rousettus aegyptiacus



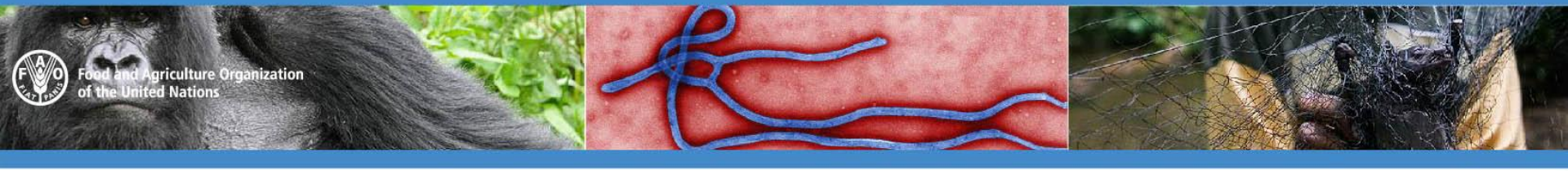
Bat species positive to Ebola

Virus	Bat Species	Detection Method	References
Marburgvirus	*Epomops franqueti*	Antibodies	[77]
	Hypsignathus monstrosus	Antibodies	[77]
	Miniopterus inflatus	Antibodies; PCR	[18,77]
	Rhinolophus eloquens	Antibodies; PCR	[18]
	Rousettus aegyptiacus	Antibodies; PCR; Viral Isolation	[18,19,28,77–79]
Lloviu virus	*Miniopterus schreibersii*	PCR; HTS	[16]
Reston ebolavirus	*Cynopterus sphinx*	Antibodies	[80]
	Hipposideros pomona	Antibodies	[80]
	Miniopterus schreibersii	Antibodies	[80]
	Myotis pilosus (=Myotis ricketti)	Antibodies	[80]
	Pipistrellus pipistrellus	Antibodies	[80]
	Rousettus amplexicaudatus	Antibodies	[64]
	Rousettus leschenaultii	Antibodies	[63,80]
Zaire ebolavirus	*Eidolon helvum*	Antibodies	[76]
	Epomops franqueti	Antibodies; PCR	[30,75,77,81]
	Epomophorus gambianus	Antibodies	[75]
	Hypsignathus monstrosus	Antibodies; PCR	[30,75,77,81]
	Micropteropus pusillus	Antibodies	[77]
	Tadarida condylura (=Mops condylurus)	Antibodies	[77]
	Myonycteris torquata	Antibodies; PCR	[30,77,81]
	Rousettus aegyptiacus	Antibodies	[77]
	Rousettus leschenaultii	Antibodies	[63]



Source: Olival and Hyman (2014)

Evidence in Central and West Africa & in epidemic and non epidemic areas

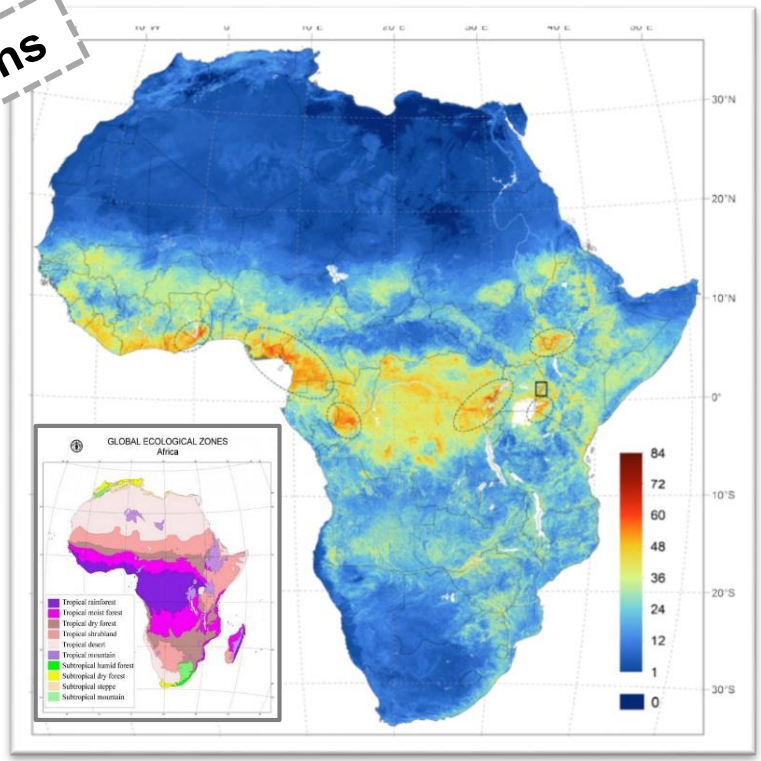


Bat ecology

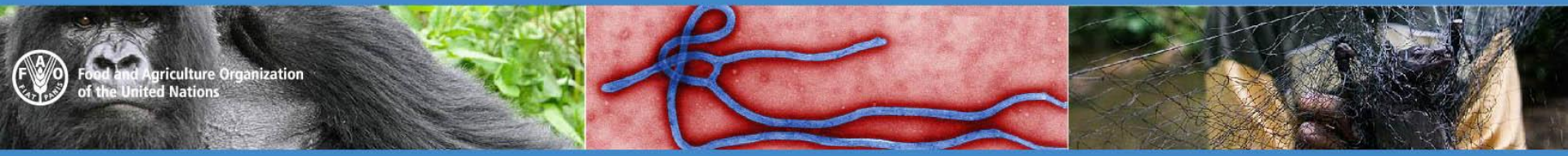
- Mainly in **tropical rainforest, dry forest**
- Highest **species diversity/richness** in Central and West Africa
- Pollinators, seed dispersal, forest regeneration control of invertebrate agricultural pests (provide **ecosystem services**)
- **Threatened** by human activi[illegible], habitat loss, deforestation, roo[illegible]bance, hunting, and climate chan[illegible]
- **Fruit bats** [illegible] to one family, the Pter[illegible], with some **173** species
- [illegible]bats do not hibernate and are highly **dependent on plants for food** (fruits, nectar, flowers, leaves) all year around
- **Migratory** or **nomadic**
- **Crop raider** of mango, banana, oil palm, etc.

Many unknowns and inconsistency among regions

Predicted species richness of African bats



Source: Herkt et *al*. (2016)



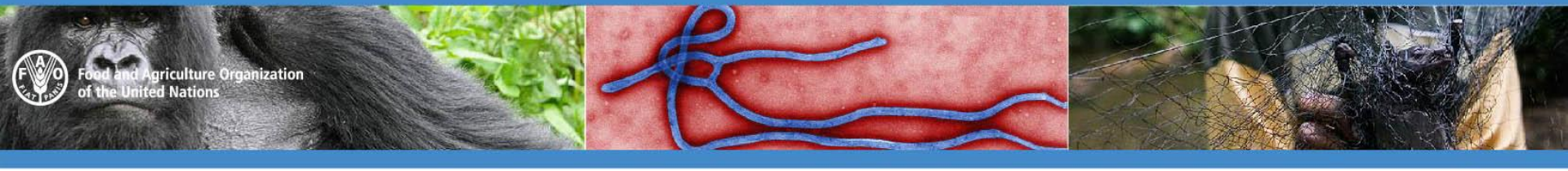
Potential risk factors for Ebola spill over from bats

Seasonal factors may influences forage and bat distributions, potentially increasing their contact with Ebola reservoirs:

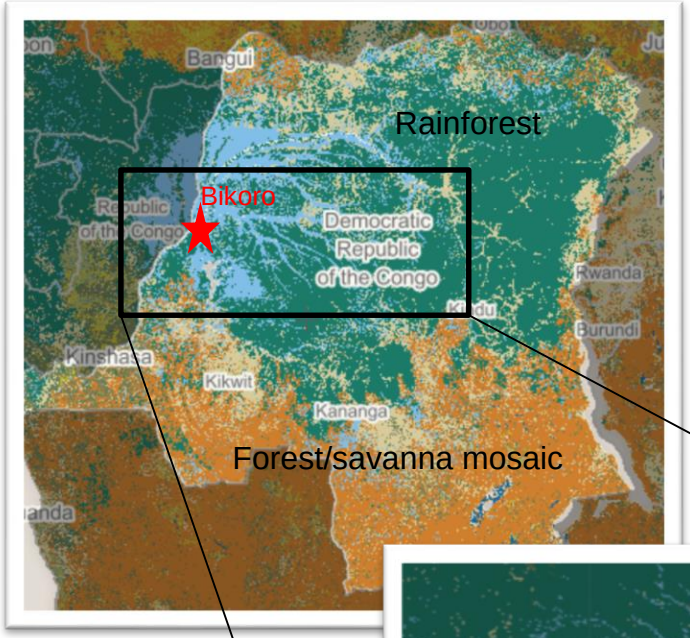
- Climate and vegetation phenology (flowering, fruit production, etc.)
- Bat ecology and behavior (e.g. fighting and breeding, birthing, lactating, diet, migration)

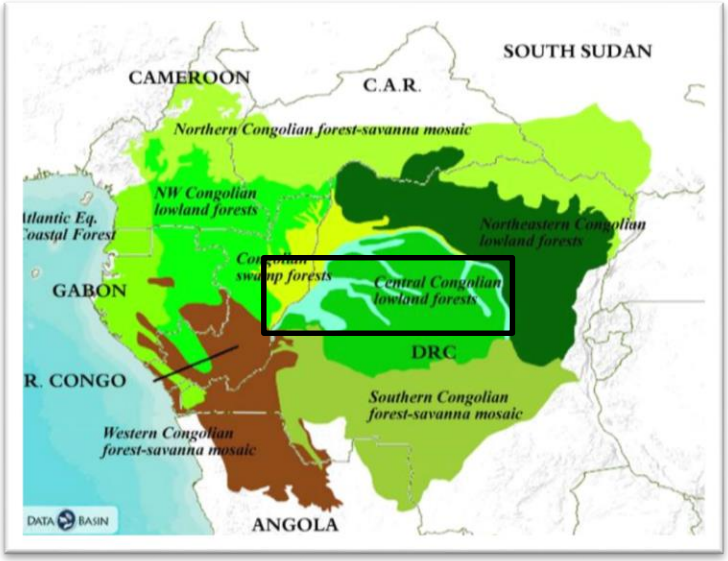
Human-mediated **landscape changes**:

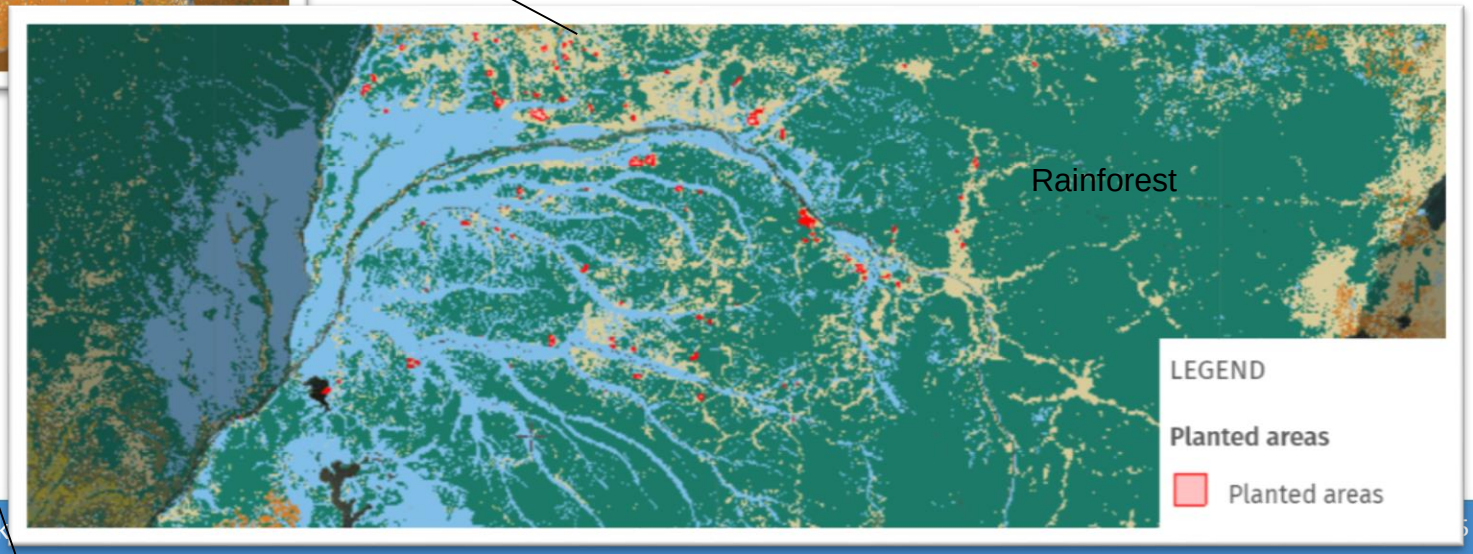
- Land use change (deforestation, habitat loss, plant / crop cultivation, mining, etc.)
- Human-bat conflicts for crop raiding of mango, banana, oil palm, etc.



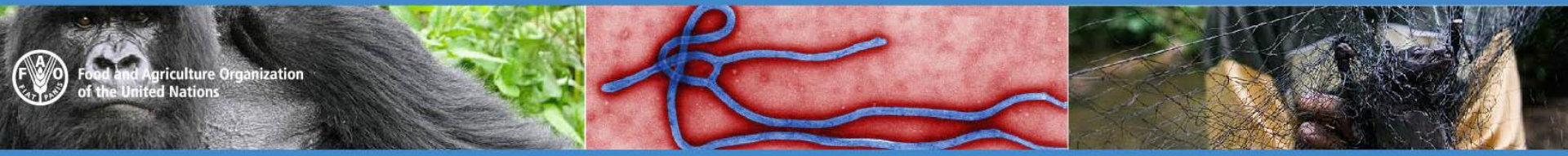
Bat habitat





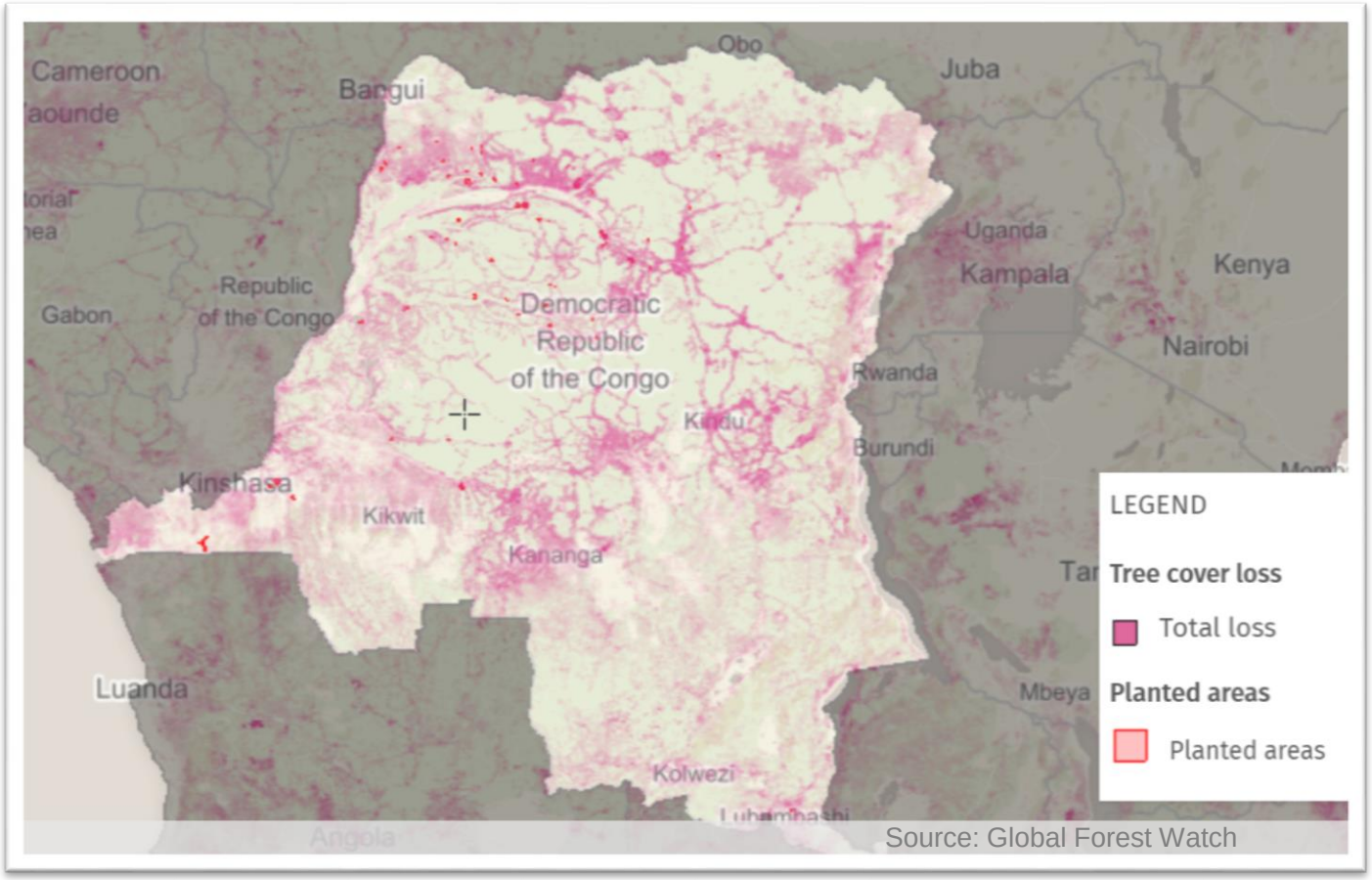


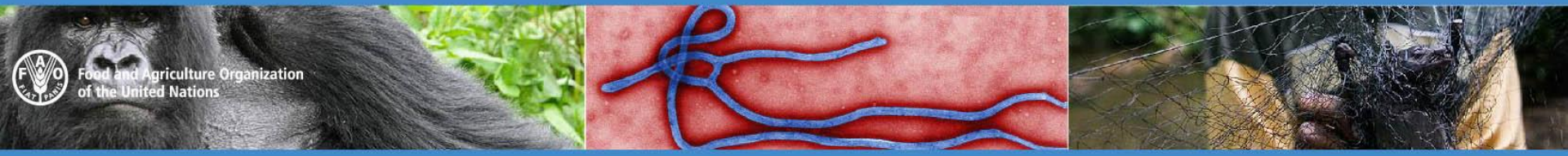
Source: Global Forest Watch



Forest loss

Recent loss of closed forest (~ 2 years) is associated with Ebola virus disease outbreaks (Olivero et *al*. 2017)





Bat migration: What species are able to disperse?

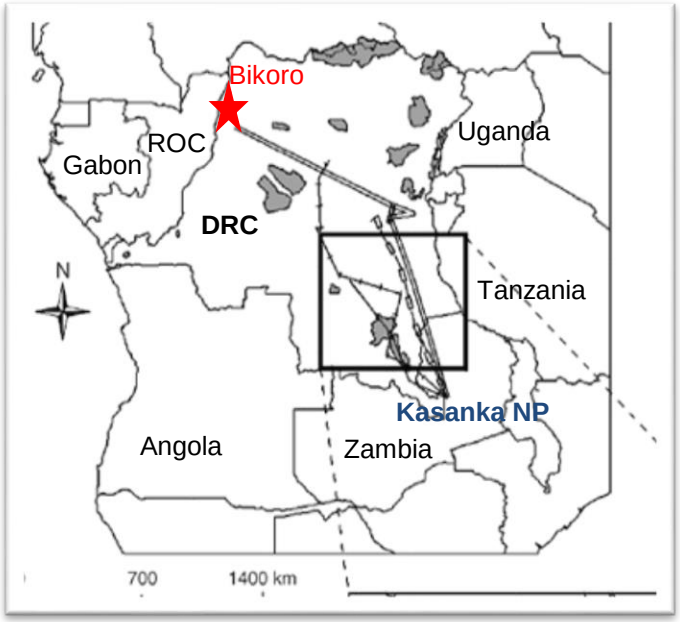
Satellite-telemetry results:

- ***Heidolon helvum**:* Evidence of North-South migration (1000 km just in one month)
- ~10 000 individuals migrate from DRC to Zambia (Kasanka NP) every year (Nov-Dec)

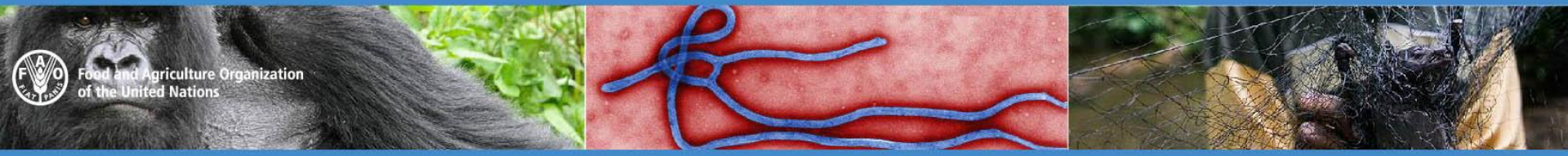
Phylogeographic results:

- **Species common in savanna woodlands** can disperse between C and W Africa (*E. Gambianus, E. helvum, M. pusillus, N. veldkampii, R. aegyptiacus*)
- **Species restricted to the rainforests** do not disperse long distances (*C. argynnis, E. franqueti, M. azagnyi, M. leptodon, M. torquata, M. woermanni, S. bergmansi, and S. occidentalis, with the exception of H. monstrosus*)

Satellite-tagged fruit bats (*E. Helvum*) migration



Source: Richter and Cumming (2008)



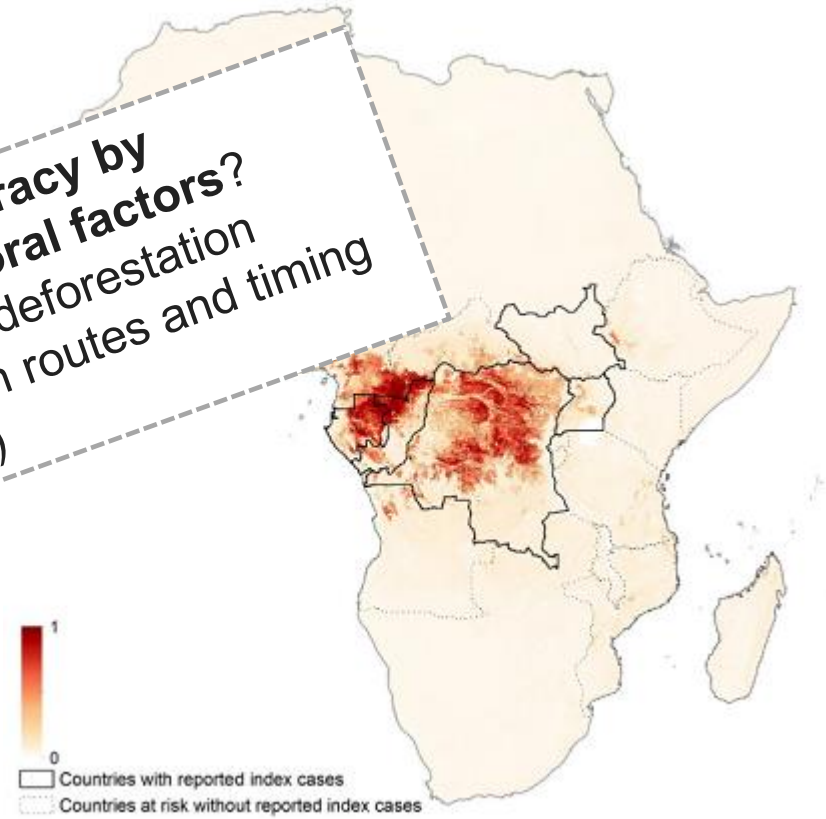
Ebola risk mapping/Ecological Niche modelling

Main risk factors

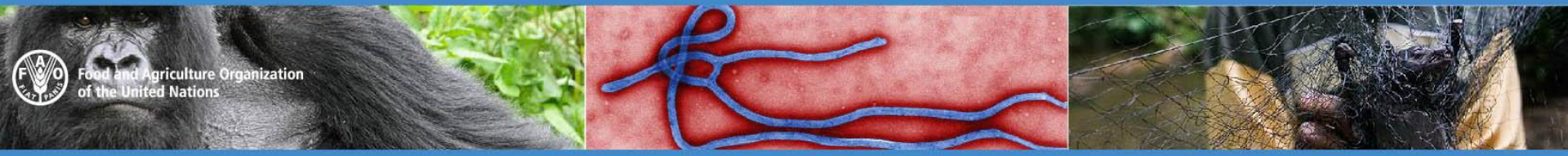
- Vegetation
- Elevation
- Temperature
- Evapotransp
- Suspected res distributions

Increasing model accuracy by including spatiotemporal factors? vegetation phenology, deforestation patterns, bat migration routes and timing and seasonality, etc.)

Predicted suitability for the zoonotic transmission of Ebola



Pigott et al. (2016)



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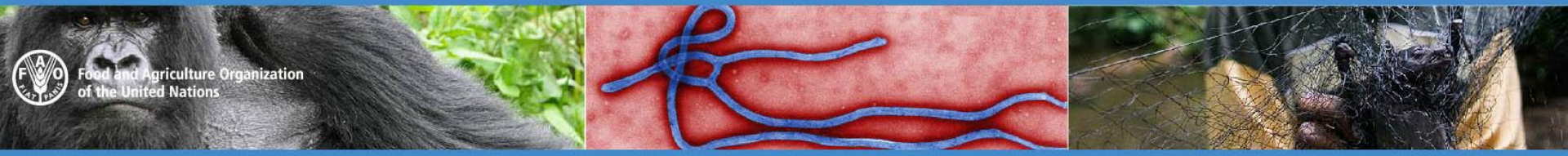
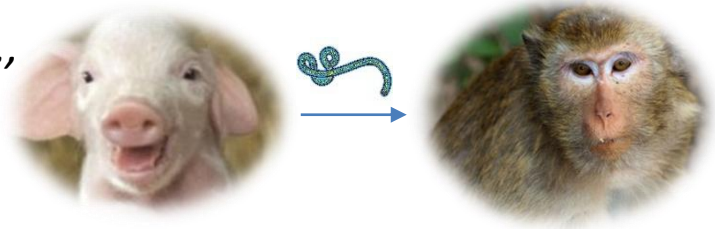


Domestic animals: Susceptibility of pigs and ferrets field and laboratory studies

- Ferrets intranasally inoculated with EBOV died; high virus titers were found in liver and spleen *(Cross et al., 2016)*
- EBOV causes fever and severe lung pathology in pigs; replication with high virus titers *(Kobinger, 2011)*
- Large scale sero-surveys undertaken in Uganda in 2015/2016 (n=650 pigs) and Sierra Leone/Guinea in 2016/2017. Results pending. *(Atherstone and Diederich, personal comm.)*
- Pigs shed EBOV (resp. tract) and transmit to naïve pigs and macaques *(Kobinger, 2011; Weingartl, 2012)*
- ????Pig mortalities prior to human outbreaks????

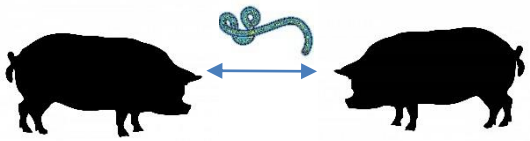
Cynomolgus macaques



Indirect transmission

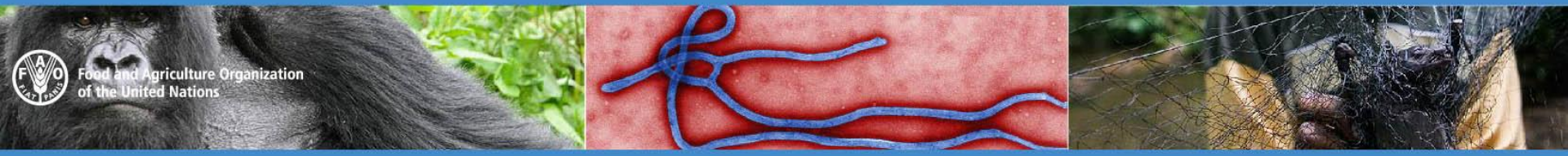
(Weingartl, 2012)

Domestic pigs as possible amplifying host?
> Needs field verification



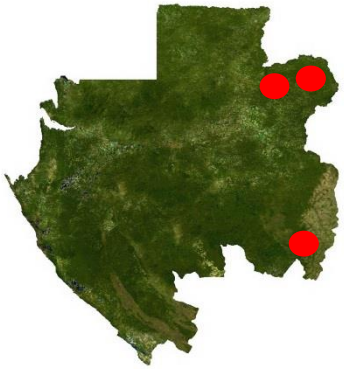
In-contact transmission between pigs

(Kobinger, 2011)



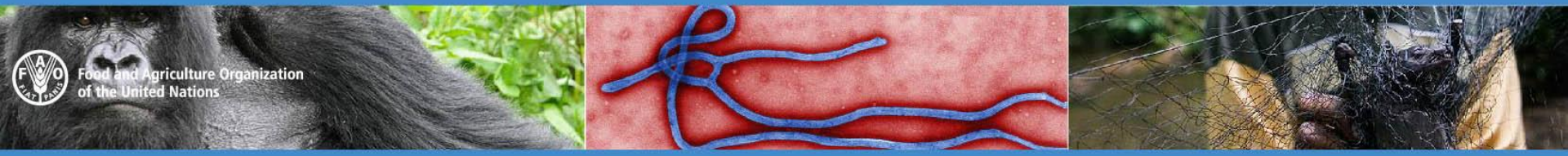
Domestic animals: Susceptibility of dogs and cats field and laboratory studies

- Dogs have shown to develop immune reaction to EBOV in highly infected areas. No RNA or virus detected. *(Allela, 2005)*
- Canine and feline cells: susceptible to EBOV-GP mediated infection BUT infectivity reduced significantly compared to NHP/human cells (*Han, 2016*)
- Dogs/cats feed on animal carcasses (and human carcasses? e.g. during an ongoing outbreak…)
- High uncertainty about viraemia, virus shedding or clinical signs in dogs or cats



Gabon, after the outbreak of 2001-2002: seroprevalence of 31.8% in dogs *(Allela, 2005)*

Could dogs/cats transmit the virus mechanically?
> Needs field verification



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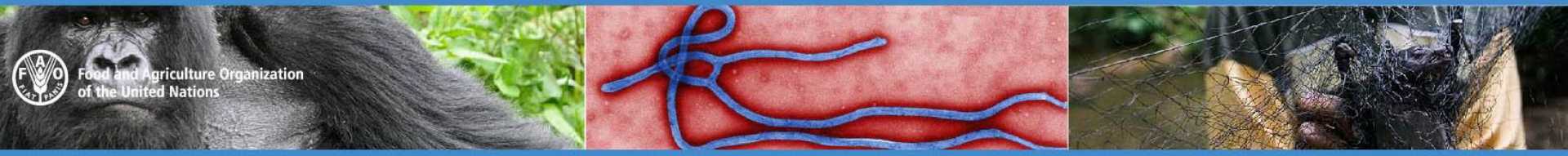
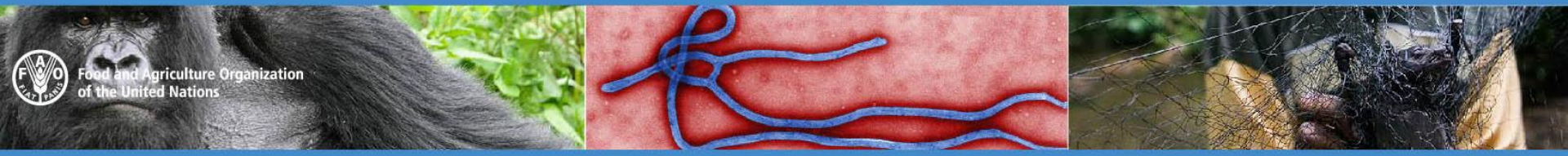


Currently used diagnostic tests for animal samples - virology

- Virus isolation with cell culture (e.g. Vero E6 cells) → highly accurate
- RNA detection (tissue/blood) by PCR methods → Rapid and sensitive
- LAMP assay: target trailer region of ZEBOV: Se and SP *(Kurosaki, 2007)*

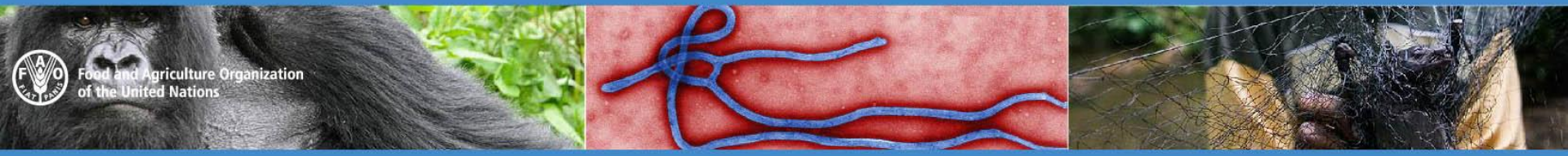
Limitations in the use of current virological tests: BSL-4 lab, trained staff, time, cost, sample transport, handling risk, virus isolation on carcasses unsuccessful so far, new/divergent strains, sampling restriction (LAMP), viraemia suspected to be short.



Currently used diagnostic tests for animal samples - serology

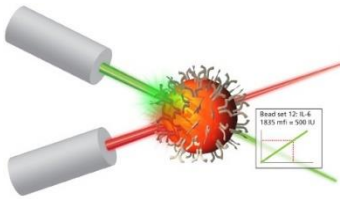
- Most antigen ELISAs can detect EBOV antigens (GP, VP40 or NP); rapid and sensitive; Sensitivity and Specificity promising in tissue samples
- Antibody ELISA can detect IgM and IgG (with prolonged virus circulation); good Sensitivity and Specificity
- IFA/Immunoblotting } Easy to perform / Difficult to interpret

Limitations in the use of current serology tests: BSL-4 lab, trained staff, time, cost, sample handling risk, cross-reaction. No commercially available kits for large-scale antibody monitoring in different species.



New sampling and testing approaches

- Serological assay based on Luminex tech., promising results *(Ayouba, 2017)* - adapted to screen bats, rodents, primates, goats, pigs, duikers

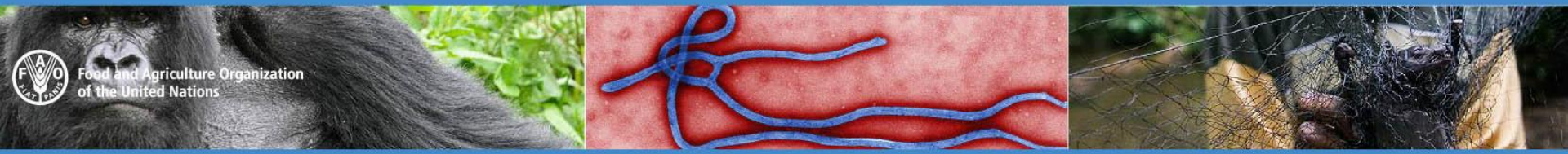


- Rope chew sampling: Pigs can shed EBOV up to 7 days with saliva; Easy pooling *(Weingartl, personal comm.)*
  - Can be a viable sample collection and testing (RNA) method
  - Sampling is non-invasive (generally accepted)

Outbreak

- Ongoing work on diagnostic tests in swine: both virus and antibody detection semi-validated *(Weingartl, personal comm.)*

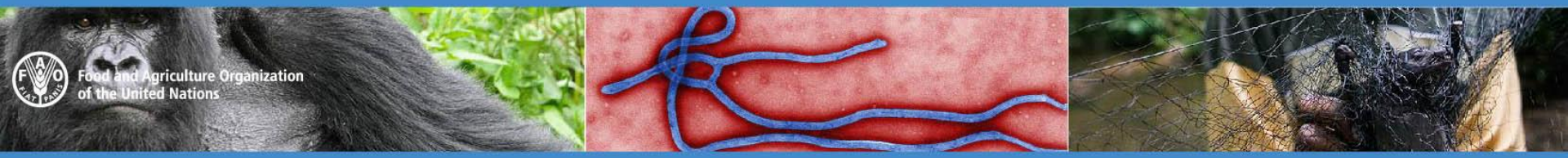
- In humans: Rapid, easy-to-use & transportable RT-(q)PCR methods are being tested in field settings (high SE & SP) *(James, 2018; Biava, 2018)* - rapid PoC test available "GeneXpert Ebola" *(Semper, 2016)*



Challenges with diagnostics

- Only few BSL-4 laboratories worldwide; animal infection studies are expensive
- Lack of commercially available serological tests for large-scale screening
- Sampling of animals during ongoing human outbreak not encouraged, however
  - Viraemia short (1-2 days in pigs?; *Weingartl, personal comm.)*
  - Virus presence in carcasses only 3-4 days *(CFSPH, 2016)*
  - ZEBOV antibodies in pigs seem to start dropping after 21 days post infection… unclear how long they persist *(Weingartl, personal comm.)*

Short window

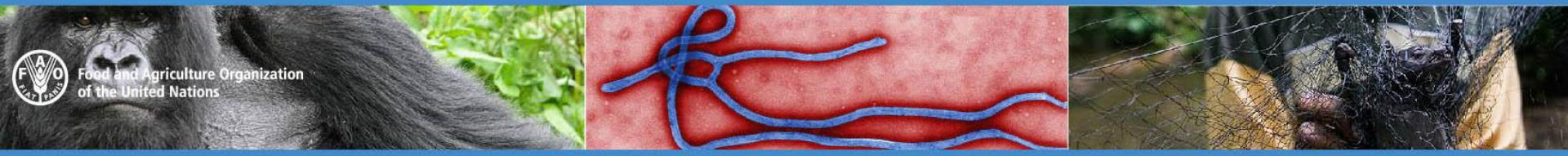


Emergency response or research?

*"At this point, **during an emergency response** focused on saving human lives, FAO and partners highly discourage the collection of samples from animals for Ebola testing **in affected areas**."*

Reasons for holding back field teams to sample domestic animals in Ebola affected areas during the ongoing public health emergency:

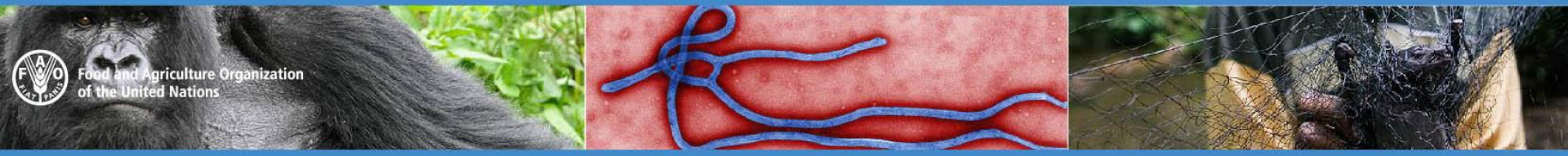
- To not interfere with the PH outbreak response
- Avoid putting sampling teams at risk
- Avoid negative perception of local populations affected by Ebola seeing people in PPEs sampling their livestock
- *If* samples were taken and *if* they tested positive, what would this mean???



Issues with interpretation of tests

- Interpretation of laboratory results: what does a ‘positive’ sample really mean?
  - Lack of positive controls to validate tests for animal samples
  - Difficulties with validating existing tests in the field
  - Species-specific tests (except e.g. Luminex)

- Impact of positive laboratory results in animals on value chain dynamics and livelihoods, social consequences
  - Risk communication is crucial, adapted to target audiences
  - Policy advice on risk mitigation measures
  - Cross-border and trade aspects/regulations?



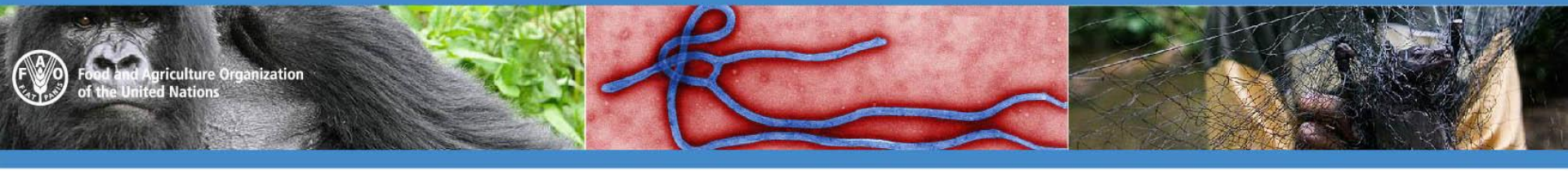
Risk communication and mitigation

Links (confirmed/assumed) to human outbreaks so far have been from wildlife

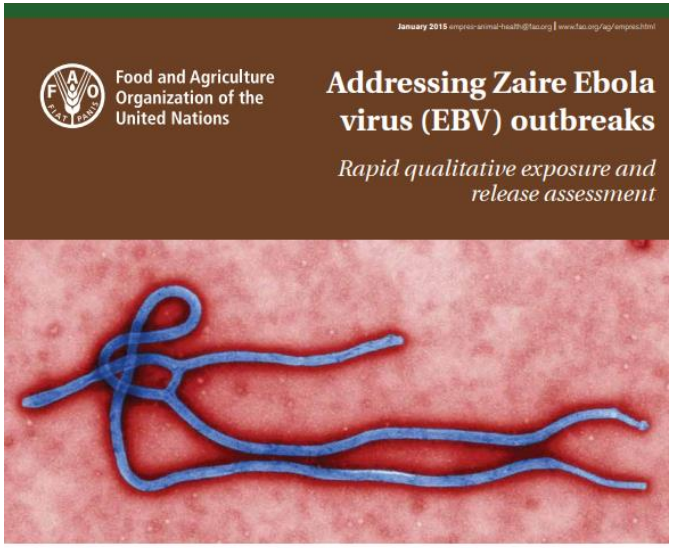
- Sporadic and rare events; but with disastrous consequences for public health
- Messages / interventions should focus on
  - Reducing human exposure risks during wild meat hunting, preparation, selling and consumption practices
  - Reducing contact of domestic with wild animals

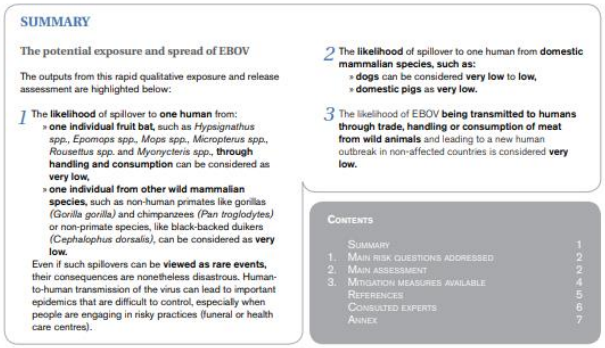
"People should not handle, slaughter, dress, sell, prepare or consume meat that originates from wild animals or livestock that are sick or that have died from unknown causes.

Any unusual morbidity or mortality of animals should be reported to the animal health authorities."



Susceptibility of animals to Ebolavirus what we know to date





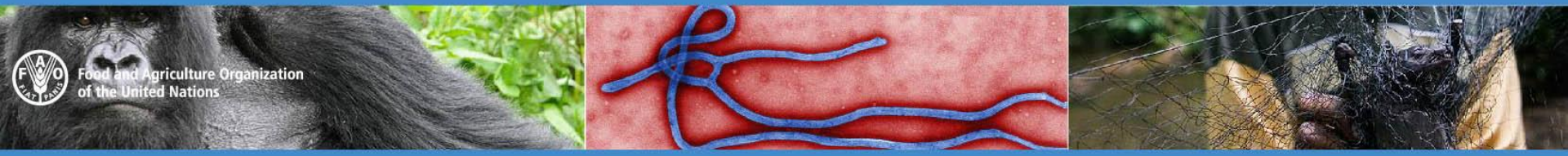
Update of FAO's 2015 risk assessment in progress:

- Literature review (*Xavier Roche, FAO EMPRES-AH*)
- Updates from partner agencies and institutions
- Expert opinion

Publication of FAO's Ebola risk assessment update planned for June 2018

Jan 2015 assessment available online:

http://www.fao.org/3/a-i4364e.pdf



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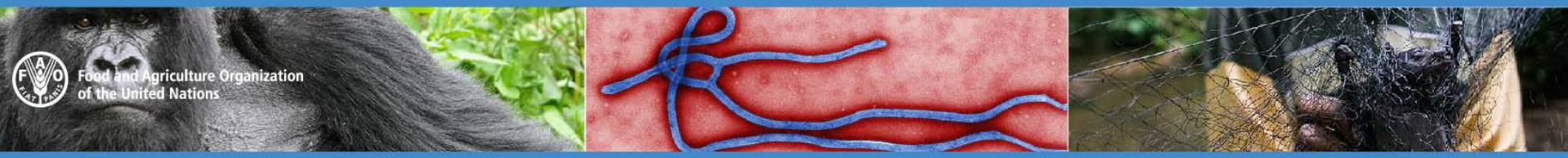


What AH-related agencies and partners are doing

IAEA
International Atomic Energy Agency

European Commission

FRIEDRICH-LOEFFLER-INSTITUT
FLI
Bundesforschungsinstitut für Tiergesundheit
Federal Research Institute for Animal Health

cirad
LA RECHERCHE AGRONOMIQUE POUR LE DÉVELOPPEMENT

Government of Canada / Gouvernement du Canada
Canadian Food Inspection Agency

oie

CIFOR

IRD
Institut de Recherche pour le Développement
FRANCE

Institut Pasteur

WCS

PREDICT 2

USAID
FROM THE AMERICAN PEOPLE

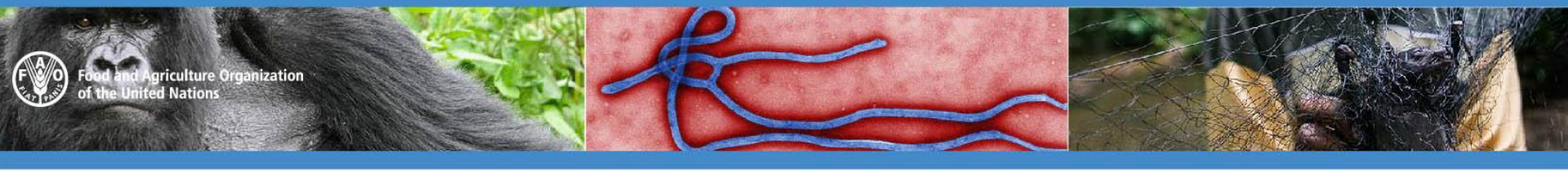
UCDAVIS
VETERINARY MEDICINE
One Health Institute

WILDLIFE CONSERVATION SOCIETY

EcoHealth Alliance

METABIOTA

Smithsonian Institution



FAO's component of the USAID-funded GHSA and EPT-2 Programmes

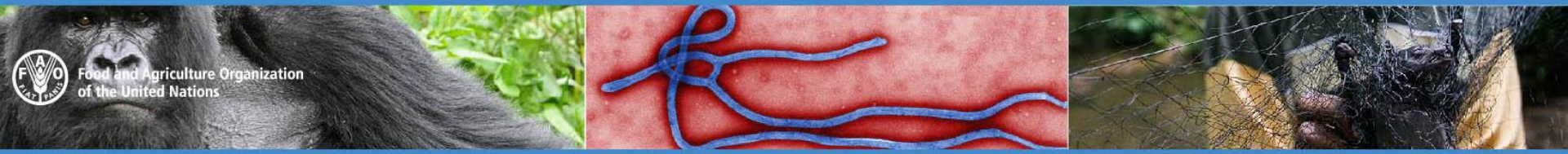
Global Health Security Agenda:

« build countries' capacity to help create a world safe and secure from infectious disease »

Target countries: 14 GHSA countries in Africa

Goal: build and increase capacity of veterinary services to early detect and control priority zoonotic diseases in a One Health approach

Haemorrhagic fevers, including Ebola: prioritized by 9 project countries



PREDICT-2 : Hosts, Viruses and Geography

Viral Family Level Testing
Filoviruses,
Paramyxoviruses,
Orthomyxoviruses,
Coronaviruses,
Flaviviruses

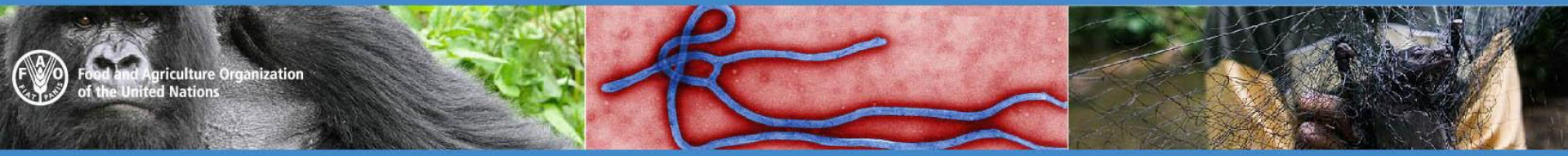
Hosts
Humans
Wildlife
Domestic Animals

Asia
Bangladesh
Cambodia
China
Lao PDR
India
Indonesia
Nepal
Malaysia
Mongolia
Myanmar
Thailand
Vietnam

Africa
Cameroon
Cote d'Ivoire
DR Congo
Ethiopia
Gabon
Ghana
Kenya
Republic of Congo
Rwanda
Senegal
Tanzania
Uganda

M.E.
Jordan
Egypt

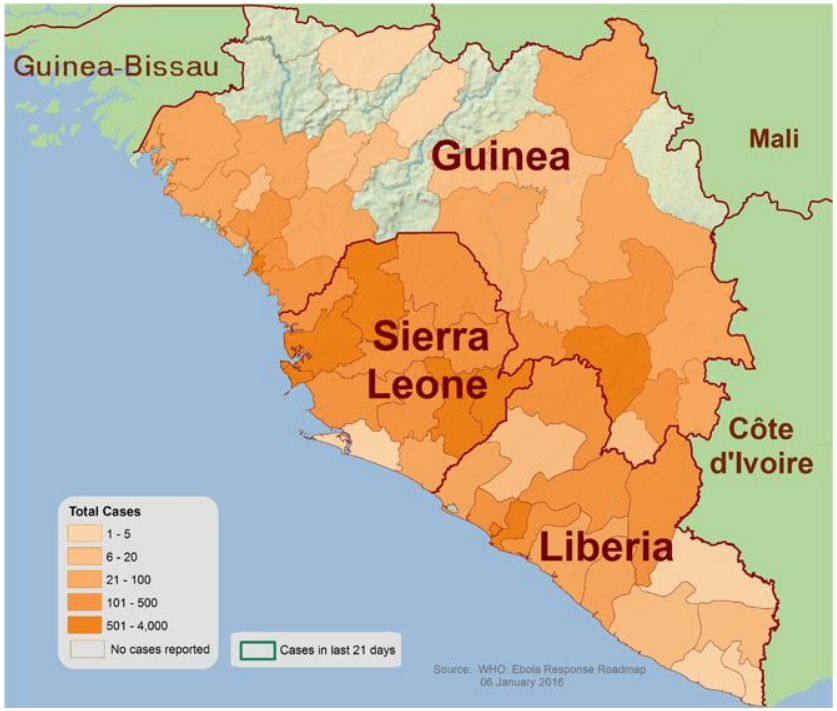
USAID FROM THE AMERICAN PEOPLE | Emerging Pandemic Threats Program 2 (EPT-2)



Overarching Goals of Ebola Host Project (EHP) - different from the main PREDICT-2 project:

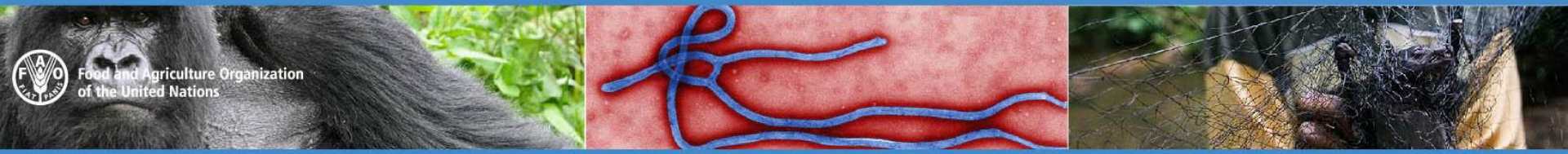
- To determine the animal origins and potential spillover of the 2014-2016 EBOV-Makona outbreak
- Detect other novel filoviruses and pandemic threats
- Enhance in-country capacities
  - field ecology, surveillance, laboratory
- Contributes to GHSA action packages
  - Zoonotic Disease, surveillance, laboratory capacity strengthening, workforce development, emergency operations, reporting/information systems

Sierra Leone, Guinea, Liberia



2014-16 Ebola outbreak West Africa - affected areas
Source: CDC, January 2016

USAID FROM THE AMERICAN PEOPLE | Emerging Pandemic Threats Program 2 (EPT-2)



PREDICT-2 EHP Successes

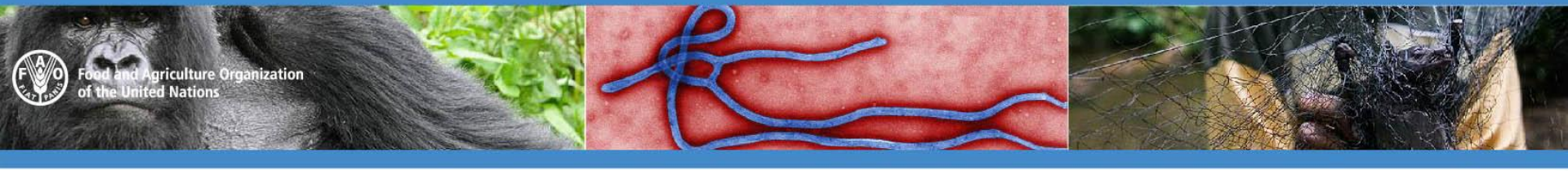
- Capacity Gains:
  - **60 PREDICT staff & 110 gov't staff trained**
    - field ecology, cold-chain transport, biosafety and security, sample storage and data management, lab testing
  - First comprehensive One Health zoonotic disease surveillance teams in-country
- Partner Engagement
  - Active in over 50 communities
  - Liberia: Arcellor Mittal
  - EPT (P&R) and host-governments
- One Health Platforms
  - National level and district One Health platforms supported with by PREDICT

USAID FROM THE AMERICAN PEOPLE | Emerging Pandemic Threats Program 2 (EPT-2)

Member State	BioSafety	Diagnostic	Workshops	WildLife	SubTotoal
Algeria	2	3	2	1	8
Angola			1		1
Benin		1			1
Botswana		1			1
Burkina Faso	1	3	6		10
Burundi	1	2	2	1	6
Cameroon	5	4	3	1	13
Central African Republic	1	1	6	1	9
Chad		1	4		5
Congo, DRC	2	4	3		9
Congo, Rep. of		2	2	2	6
Cote d'Ivoire	2	3	2		7
Egypt		1			1
Eritrea	1	1	1		3
Ethiopia		2	1		3
Ghana	1	1	1		3
Kenya	2	4	3		9
Lesotho		1			1
Madagascar	2	1	2	1	6
Mali	4	9	5		18
Mauritania		2			2
Mozambique		1			1
Namibia		1			1
Niger		2	6		8
Nigeria	1	3	3	2	9
Senegal	1	1	2	1	5
Sierra Leone		5	1	6	12
Swaziland		1			1
Togo	2	4	6	2	14
Uganda	2	5	1		8
United Republic of Tanzania		1			1
Zambia		1			1
Zimbabwe	2	2	1	2	7
TOTAL PARTICIPANTS:	32	74	64	20	190
TOTAL MEMBER STATES:	17	32	23	11	33

IAEA
International Atomic Energy Agency

- Laboratory and technical support to IAEA and FAO VETLAB laboratories for the early and rapid diagnosis and control of transboundary animal and zoonotic diseases
- Technology transfer/capacity building through national and regional training courses/workshops in Biosafety, Diagnostics and Wildlife sampling (*see table*)
- Each affected and at risk country received emergency support including PPE and a sampling/disinfection box
- Provision of diagnostic reagents and technical support upon request (e.g. DRC at present)
- Characterization support (i.e. sequencing and interpretation) and development of molecular biological standards for emerging and re-emerging zoonotic diseases (RVF finalized, others in progress)



Sustainable Wildlife Management Programme

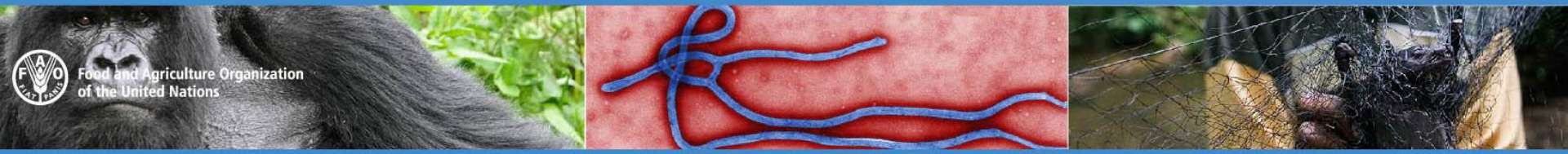
Recipient: Global (ACP Countries)

Budget: 45 M€ (Intra ACP strategy 11th EDF)

Partners: FAO, CIFOR, CIRAD, WCS

Duration: 7 years (84 Months)

Goal: to **reduce hunting of wildlife to sustainable levels**, protecting endangered wildlife species, conserving biodiversity, maintaining the essential ecological roles of wildlife within forested and savanna ecosystems, and **securing stocks and flows of provisioning ecosystems services essential to some of the poorest and most politically marginalized people on the earth.**

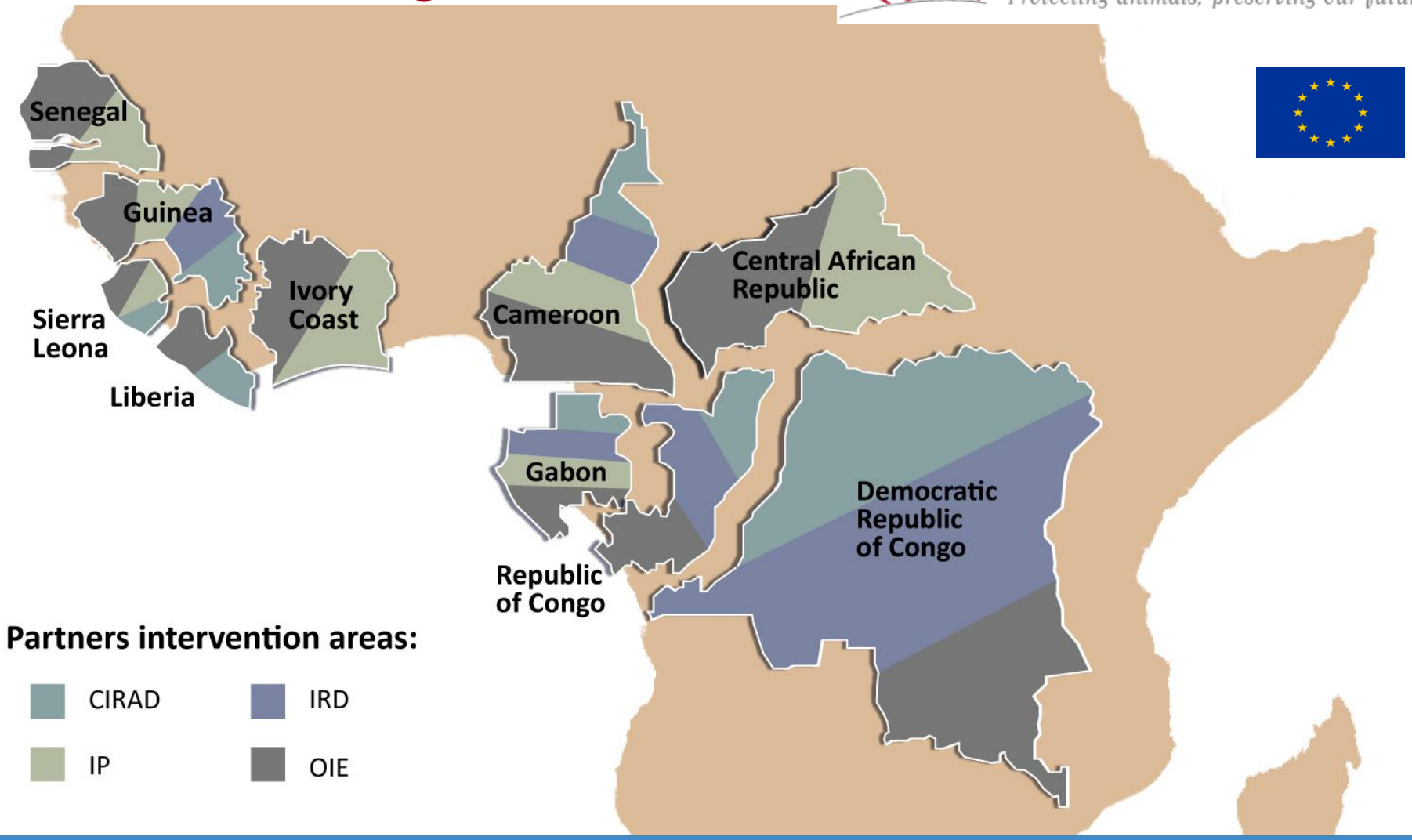


Sustainable Wildlife Management Programme

- **REPUBLIC OF CONGO** - Sustainable community management of hunting within logging concessions
- **GABON** - Sustainable community management of hunting in the quasi-closed catchment of a small town and in a low human density context
- **DEMOCRATIC REPUBLIC OF CONGO** - Sustainable community management of hunting within and outside of protected areas
- **ZIMBABWE & ZAMBIA** - Community commercial conservancy as a wildlife-based land use option in populated communal lands
- **MADAGASCAR** - Shifting subsistence consumption of highly vulnerable endemic species to resilient exotic and domestic species
- **SENEGAL, MALI, CHAD, SUDAN** - Sustainable management of migratory waterbirds within wetlands for the benefit of local communities
- **PAPUA NEW GUINEA** - Revitalizing customary management practices for hunted species in the Pacific Islands
- **GUYANA** - Integrated sustainable hunting and fishing on indigenous lands buffering a protected area

EBO-SURSY – target countries

WORLD ORGANISATION FOR ANIMAL HEALTH
Protecting animals, preserving our future



OIE: EBO-SURSY – objectives and activities

IMPACT

Strengthening early detection systems in wildlife in West and Central Africa, using a One Health approach to prevent Ebola virus disease (EVD) and other zoonotic disease outbreaks.

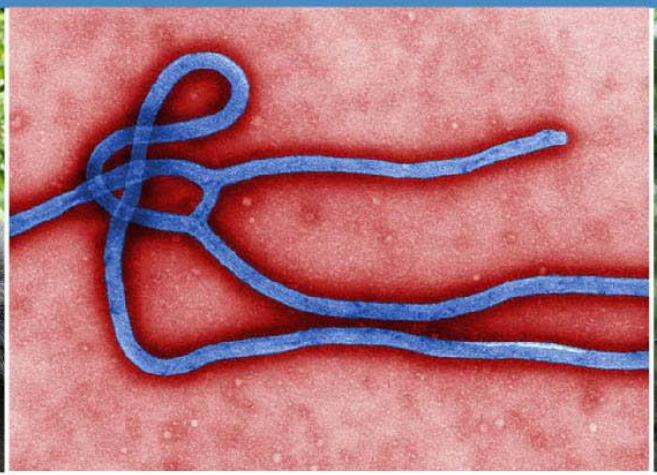
RESULTS

- CAPACITY BUILDING
- COMMUNITY AWARENESS
- SURVEILLANCE PROTOCOLS' REINFORCEMENT

ACTIVITIES

- OIE Focal Points' trainings
- Students and professionals from the health and the environmental sectors' trainings
- Laboratory Twinning
- One Health workshops for human and animal health services
- Communication material production
- Local communities' awareness meetings
- Scientific communication
- Field sampling
- Laboratory assays, analyses and studies
- Epidemiologic, socio-economic, ecological, and ethnologic field surveys
- Database building
- Performance of Veterinary Services Pathway (PVS)

http://www.rr-africa.oie.int/projects/EBOSURSY/LEAFLET_EN.pdf



Ebolavirus and Animals

Thank you for your attention.

Any questions?