

IV. Environment & Epidemics

Covid-19 and Ebola comparisons

EE406: Contemporary Economic Issues

Semester 1/2020

Faculty of Economics, Thammasat University

Man-Nature Relation as a Cause of Covid-19

- Several viruses exist in the coronavirus family. The respiratory disease called Covid-19 is caused by one of them: the SARS-CoV-2.
- Covid-19 is a zoonotic disease, meaning that the virus which is now spreading through human populations originated in another animal species.
- Coronaviruses are well-known to infect bats, and SARS-CoV-2 shows rather high similarity to viruses found in some bat populations, pointing to a likely bat origin.
- What is still unclear is the chain of events that led to the transmission of SARS-CoV-2 to humans, and whether another species acted as an intermediate host.

- The market where the current outbreak may have started, the Huanan Seafood Wholesale Market in Wuhan
- In the market, wild animals were sold. Some of them were even illegal.



Huanan Wholesale Seafood Market in Wuhan, China, on January 12, 2020.
NOEL CELIS/AFP via Getty Images



Man-Nature Relation as a Cause of Covid-19

- Pictures of bat soup seem to give us some incorrect ideas about how the disease infect human. It should not be by eating soup!



Man-Nature Relation as a Cause of Covid-19



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A new report indicates that the deadly Chinese coronavirus may not actually have originated at a wet market in Wuhan

Sahar Esfandiari Jan 27, 2020, 10:56 PM



In spite of its unclear origin, Covid 19 brings us to think about the relation between human and environment.

Man-Nature Relation as a Cause of Covid-19

- It is clear that environmental destruction, especially in the highly biodiverse tropics, is making the emergence of infectious diseases more likely
- Ecosystem degradation can also cause individuals of a species to migrate or forage closer to human settlements, carrying their pathogens with them.
- In this general context of disturbance, the more contact people or their farmed animals have with wildlife, the higher the chance of an eventual human contamination
- This is not news. History can give us some examples.

Man-Nature Relation as a Cause of Covid-19

- Brief note before getting to the history
- Those who have chronic diseases, regardless of their ages, are most vulnerable to the Covid threats
- These chronic diseases are more or less environmental-related. For example,
 - PM2.5 can cause asthma, cardiac arrhythmias, bronchitis
 - Climate change affects the social and environmental determinants of health clean air, safe drinking water, sufficient food and secure shelter. These lead to malnutrition, malaria, diarrhea and heat stress.
- Therefore, it could be argued that environmental issues contribute to the severity of Covid 19 as well

The Yellow Fever Revisited

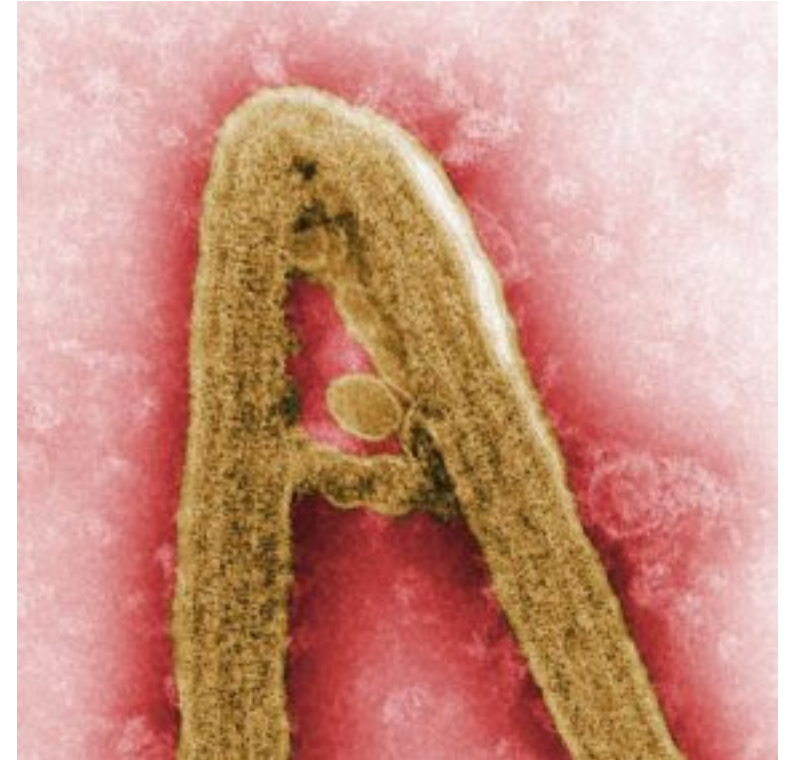
- As we already discussed, sugar cultivation transformed the ecology of Saint-Domingue during the 18th to 19th century.
- Forest clearing destroyed the natural habitat of the insect-devouring birds that limited a number of mosquitos.
- In addition, deforestation led to soil erosion and flooding that were a suitable living condition for mosquitos.



Ebola & the Environment

Ebola: The Symptoms

- Ebola virus is a member of the family of Filoviridae.
- After the incubation period, the “dry” stage begins. Fever, headache, fatigue, sore throat => these are just similar to seasonal influenza.
- After several days, the “wet” stage, characterized by unstoppable loss of fluid from vomiting, diarrhea, blood show up.
- For most cases, loss of fluid leads to death.



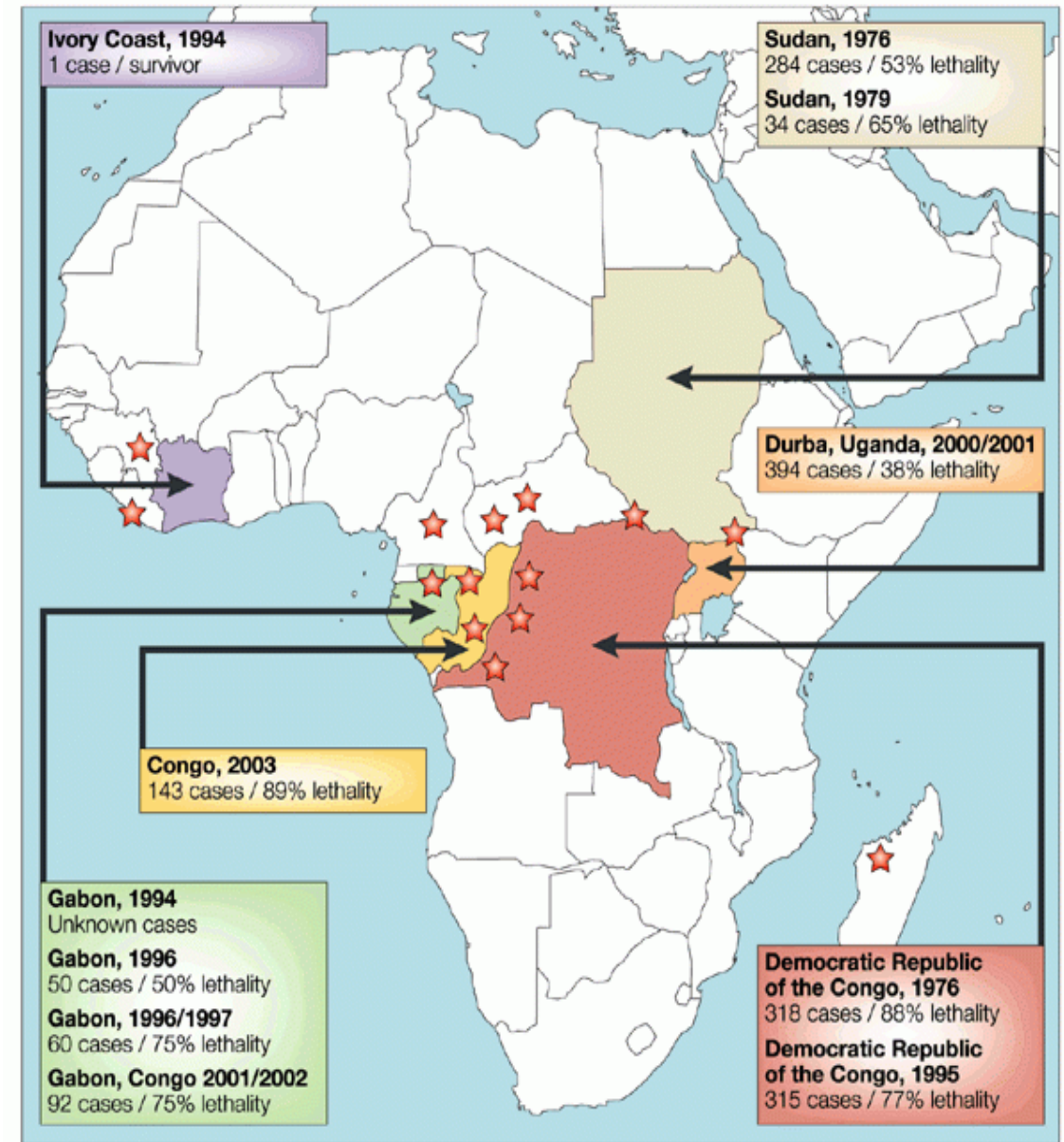
Ebola: The Symptoms

- The fear of Ebola was enhanced by the fact that no curative means are known.
- The standard care involves “advanced life support therapies.” That is, just make a patient stay alive.



Ebola: The Outbreaks

- There had been a long series of Ebola outbreaks since 1976.
 - Sudan: January – November 1976, 284 cases.
 - Zaire (Currently Democratic Republic of Congo): August 1976, 318 cases. Patient zero visited Ebola River and got the disease. This is why it is named “Ebola.”
 - Zaire: May – July 1995, 315 cases.
 - Uganda: October 2000 – January 2001, 425 cases
 - And the largest one: Guinea 2013 before spreading to several countries, 28,616 cases.



Ebola: Spillovers to Human

- Ebola is a zoonotic disease whose natural hosts are fruit-eating bats.
- Spillover can occur due to contaminated bush meat when forest dwellers eat bats or other infected animals.
- The spillovers were cultural. There were even campaigns to stop African natives' strange practices of eating bats.
- But the last outbreak is different



Ebola and Deforestation

- Patient zero of this outbreak was just a child: Emile Ouamouno.
- He lived in a village in the forests of southeast Guinea. His home was located in the Mano River Basin which are the borders of Guinea, Liberia, and Sierra Leone.



Ebola and Deforestation

- It is important to understand that he is not really remote from the forest.
- Indeed, the three countries afflicted by Ebola were subject to a frenetic pace of deforestation and land clearance to meet international demand of resources
- The most illustrative is the example of palm oil industry.



Ebola and Deforestation

- Oil palm is native to West Africa. Its name – *Elaeis Guineensis* - even specifies its origin in Guinea.
- It had long been used.
- What was new was the project to cut down the forests and establish large palm oil plantations.
- This type of project was funded by the World Bank, the African Development Bank, and the IMF together with their “partners” – the local governments.
- These governments, by laws, undertook to dispossess the villagers.
- This “land grab” provided cheap and extensive acreage to plantation owners.

Ebola and Deforestation

- For local governments, the oil palm was very attractive. As a cash crop, palm oil targeted export markets, thereby alleviating foreign debt and generating economic growth.
- Entrepreneurs generated substantial profits, and they rewarded officials who were involved with their businesses.
- Therefore, in brochures, mission statements, and reports, the industry represented itself as environmentally friendly in its promotion of the indigenous tree, as economically progressive in creating jobs, and as “modern” in its technology.
- Further more, it would yield jobs, infrastructure, and education.

Ebola and Deforestation

This is example of such statement from one of the “land grabbers.” I cropped this from its website:

<http://peakpalmoil.com/>

WELCOME TO PEAK PALM OIL

The latest Crude Palm Oil price from Palm Oil HQ.

Peak Palm Oil PLC understands its responsibilities to the local community. Provision of education, electricity, safe drinking supplies, healthcare and good sanitation are key to ensuring a mutually beneficial relationship with our workforce and their families. **Peak Palm Oil PLC** aims to benefit the local community wherever we operate by providing employment and opportunities for advancement. Our people are our most important asset which is why we are committed to constantly improving our communication with our communities and making the necessary adaptations when they arise.

Palm oil is one of the most important edible oils in the world. Palm oil is extracted from the reddish, plum-sized palm fruit and refined into CPO (Crude Palm Oil). Due to its abundant availability, low-cost, and diverse functionality, it is the most widely produced edible oil in the world, with just over 37 mT produced in 2007.

Using an environmental management plan we want to advocate the market expansion of Guinea Palm Oil. Through education, environmental concern and management **Peak Palm Oil PLC** wants to promote a better awareness of palm oil and its environmental benefits.



Ebola and Deforestation

- Not only the favorable political conditions just mentioned.
- Tropical Forests such as those in the Mano Basin provide optimal environmental conditions — temperature, humidity, wind, and soil - for *Elaeis Guineensis*.



Ebola and Deforestation

- Palm oil companies began by destroying the existing primary forest by fire.
- Then established a monoculture of oil palm in large plantations.
- Some negative impacts have been pointed: deforestation, population displacement, low wages and harsh working conditions, loss of biodiversity, etc.
- Of course, Ebola was one of the negative impacts mentioned.

Ebola and Deforestation

- The areas where Ebola outbreaks have occurred since 1976 map perfectly onto the geography of deforestation.
- Deforestation disrupts the habitat of fruit bats.
- Before, the arrival of agrobusiness, the bats normally roost high in the forest canopy, far from human activities.
- The clear-cutting brought them down to household gardens scattered with trees and crops.
- “Three nations have deforested more than 75 percent of their land, forcing the inexorable meeting between Ebola-carrying bats and people.”

Ebola and Deforestation

- As already mentioned, patient zero of the 2013 outbreak was just a child: Emile Ouamouno. He was only 2 years old at the time.
- It is reported that he played in the hollow of a fruit tree adjacent to his home at the edge of his village of Meliandou
- The village was no longer located in a forest area but was “surrounded by a landscape strongly reshaped by plantations.”
- Hence, the hallow in which Emile chose to play harbored thousands of fruit bats, whose droppings were almost certainly the source of infection



Ebola and Deforestation



- A. The village of Meliandou.
- B–D. The burnt hollow tree; in (D), the arrow points at a stick, most probably left there by children.
- Meliandou is a small village of 31 houses, surrounded by farmland and few larger trees
- Villagers reported that it burned on March 24, 2014 and that once the tree caught fire, a “rain of bats” started and a large number of bats were collected for consumption
- But, consumption of fruit bats in the household is an unlikely source of infection for the index case; no hunters were members of this household and a food item-borne transmission would likely have affected adults before or concurrently with the index case.
- <https://www.embopress.org/doi/10.15252/emmm.201404792>

Ebola and Deforestation

- In the twelve outbreaks of Ebola known to have occurred from 2004 to 2016, the index cases have been consistently traced to the edges of deforestation that happened during the previous two years.
- Eight of the twelve confirmed index cases were traced to fragmentation hot spots
- One of them occurred very close to the fragmentation hot spot.
- Two of them associated with hunting in the forest.
- Only one of them was a genuine outlier.

Ebola and Transmission

- Ebola is very infectious from person to person, but only through direct contact between healthy person and infected person's bodily fluids.
- What transformed the epidemiological history of Ebola was the fact that West African forests are linked to urban centers. Palm oil established extensive connectivity between the forested area and the outside world via goods transportation, investment, and labor migration.
- Further, multiple industries, not palm oil alone, contributed to the connectedness of the forests with the urban.



- Logging, rubber, mining.
- These resource-exploiting activities led to forest-urban connectedness and mobility of the disease

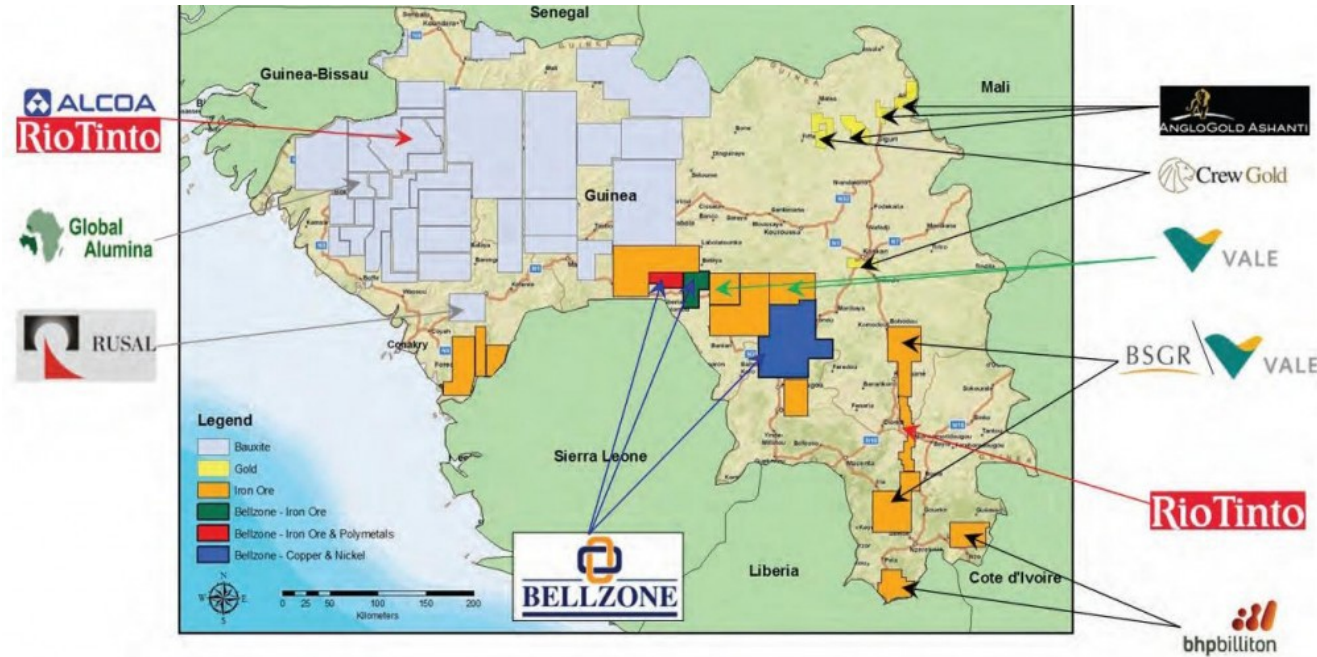
Tropicore Your sourcing solution for African commodities

OUR COMPANY ABOUT US PRODUCTS ORIGINS CONTACT LINKS

Our Company

TROPICORE was incorporated in 2010. Tropicore specializes in the commercialization of tropical commodities including rubber, cocoa and coffee.

Its Managing Director and its team have more than 30 years experience in the marketing of tropical raw materials produced and exported either by smallholders or by industrial estates from West Africa.



Ebola and Transmission

- For twelve weeks after the death of Emile in December 2013, Ebola circulated silently in the rural, unseen by a health system.
- Eventually, the disease reached Conakry – capital and the most populated city in Guinea on February 2014.
- An infected member of Emile's extended family brought the disease from forest to city.
- Ebola then erupted in slums that lacked sanitation.
- That is, transformation of the forest environment allows Ebola to break out, the degraded and overcrowded conditions enabled it to spread exponentially.

Responses to Ebola: the case of the 2013 outbreak

- The recovery plan focused on:
 - improving health care systems to respond more effectively to the next “inevitable” outbreak
 - restoring economic growth according to previously defined development trajectories.
 - addressing the adverse conditions that enabled a localized epidemic to escalate into national crises
 - minimizing the risk of future pandemics particularly strengthening primary health care, disease detection and quarantine systems,
 - making sure that schools, health facilities and water resources are safe and more hygienic
 - rehabilitating social infrastructure such as rural roads
 - socio-economic revitalization through restoring agriculture, mining and stimulating private investment to enhance human capital and livelihoods.

Responses to Ebola: the case of the 2013 outbreak

- However, almost no efforts focus on preventative controls for future EVD outbreaks.
- The Guinea Ebola Recovery Plan is based on four fundamental pillars: (A) social sector support, (B) economic recovery, (C) infrastructure development, and (D) governance support.
 - Within this plan, “Environment” is the smallest at US\$2.7million.
 - Of the environmental allocation, US\$860,000 is to fund latrines in schools and US\$140,000 is earmarked for environmental awareness in Conakry. US\$1.71 million is for “Nature conservation and preventative fight against EVD”, which appears to focus primarily on contact with wildlife and wildlife management
 - There is no provision for forest management.

Responses to Ebola: the case of the 2013 outbreak

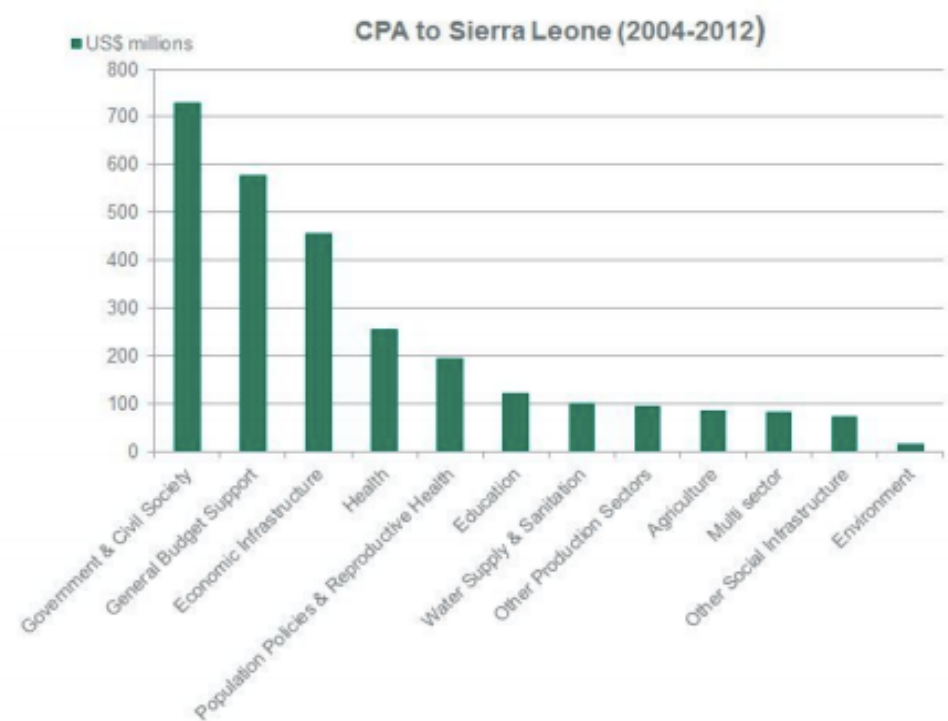
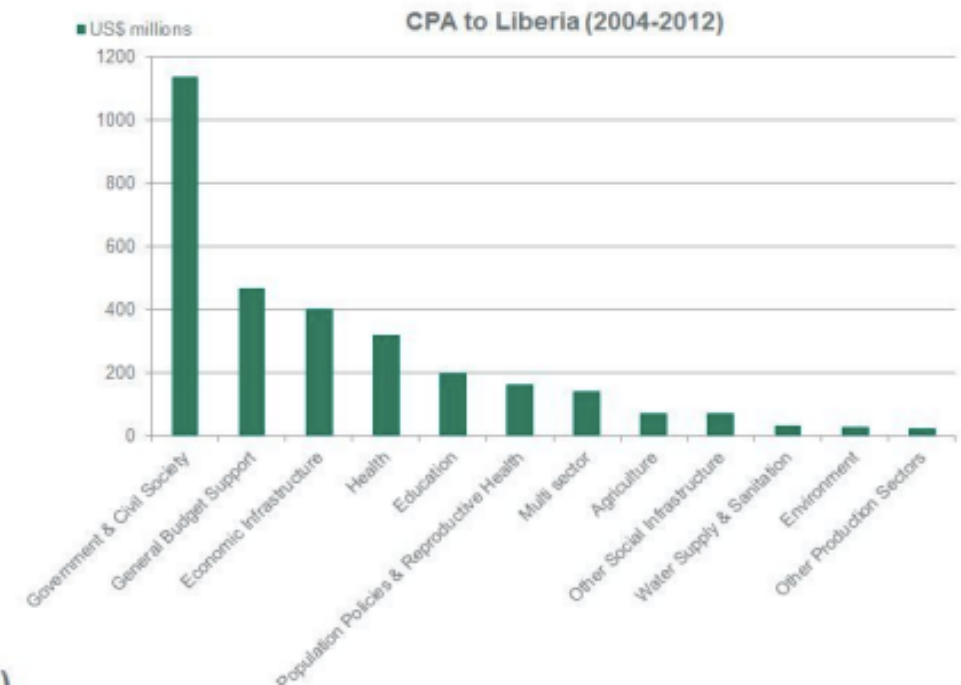
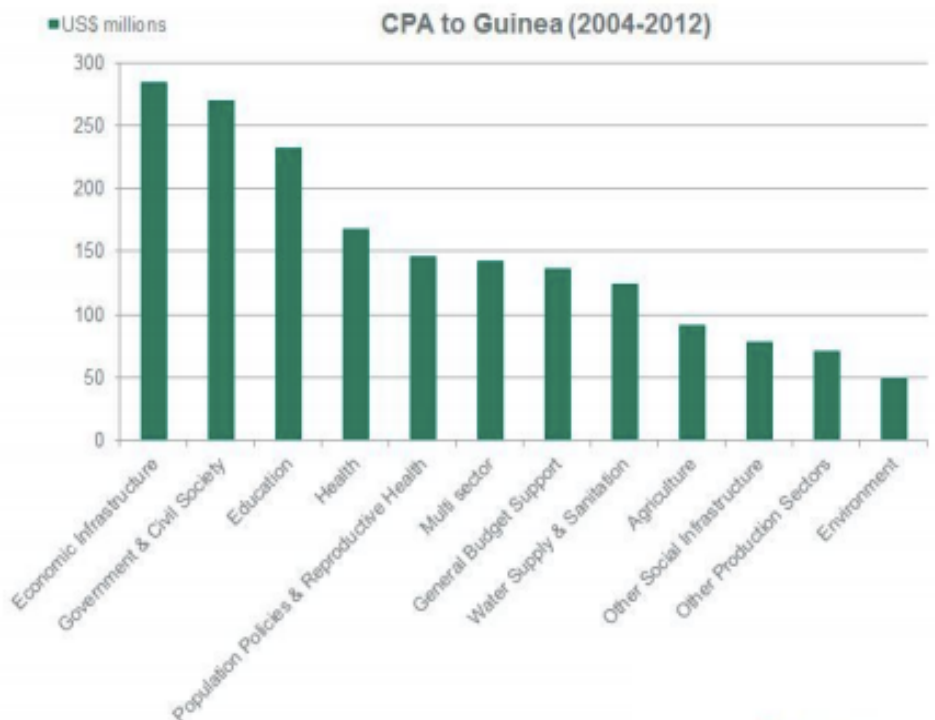
- For the National Ebola Recovery Strategy for Sierra Leone, the estimated cost of implementing the strategy between 2015 - 2017 is US\$1.7 billion.
 - The strategy does state the need to apply “lessons learned” and identify “missed opportunities,”
 - but there is no reference in the list of key deliverables to forest or wildlife management, or to the need for improved management of natural resources to reduce the risk of zoonotic disease outbreaks.

Responses to Ebola: the case of the 2013 outbreak

- The overall objective of Liberia's Economic Stabilization and Recovery Plan (ESRP) is to get the economy back on track
 - The three core objectives are
 - revitalize growth to precrisis levels whilst ensuring that it is inclusive and that it creates more and better jobs
 - provide support for the poor and other at-risk groups to strengthen resilience and reduce vulnerability
 - rebuild and strengthen capacity to deliver core social services including education and health with better coverage, particularly in the rural areas
 - Unlike the recovery plans for Sierra Leone and Guinea, the Liberian plan makes reference to the sustainable management of natural resources, but not in significant detail or in a way that deviates significantly from a 'business as usual' approach to forest management.

Responses to Ebola: the case of the 2013 outbreak

- A number of donor organizations actively support natural resource management and conservation in Guinea.
- Funding for environmental protection and natural resource management has consistently ranked at or near the bottom of sectoral funding in Guinea.
- The same is true for Liberia and Sierra Leone
- See Country Programmable Aid (CPA) to Guinea, Liberia and Sierra Leone (2004 – 2012) as follows:



Impact of COVID-19 on the environment

Impact of the COVID-19 pandemic on the environment

Increased Waste

- When millions of people suddenly start wearing one or a couple of masks daily, single use gloves and hand sanitizers, the amount of trash created is going to be substantial.
- The contrary impacts of such medical wastes are far-reaching.
- When these are remained discarded in an animal's natural habitat in both land and ocean this could cause animals to mistakenly eat this as food and lead in their death (Hellewell et al., 2020).

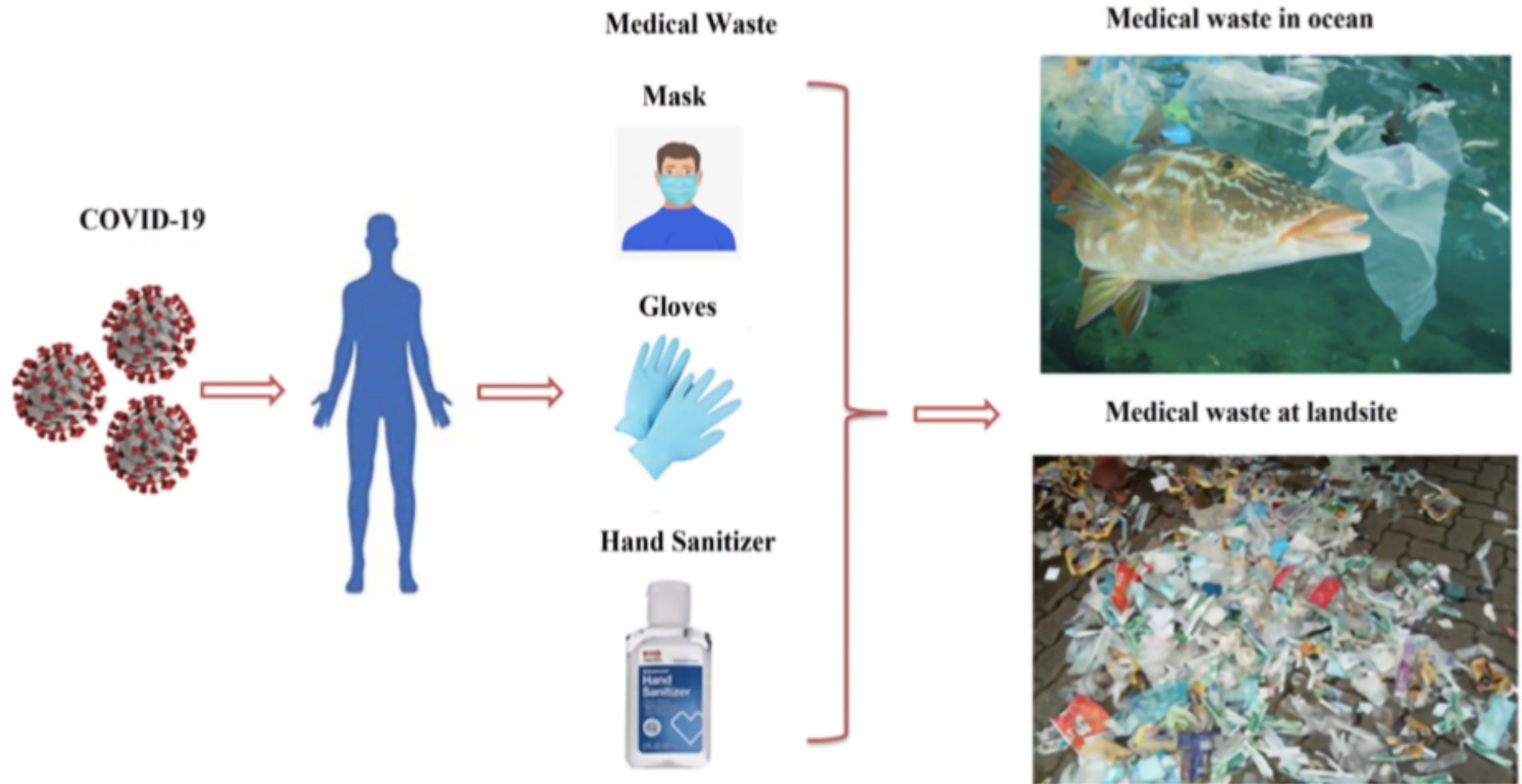


Fig. 1. Medical wastes generated during COVID-19 pandemic in the environment.

Impact of the COVID-19 pandemic on the environment

Reduction in Waste Cycling

- Waste recycling has always been a major environmental problem of interest to all countries
- As a result of the pandemic, countries such as the USA have stopped recycling programs in some of their cities, as authorities have been concerned about the risk of COVID-19 spreading in recycling centers.
- In particularly affected European countries, waste management has been restricted. For example, Italy has prohibited infected residents from sorting their waste.

Impact of the COVID-19 pandemic on the environment

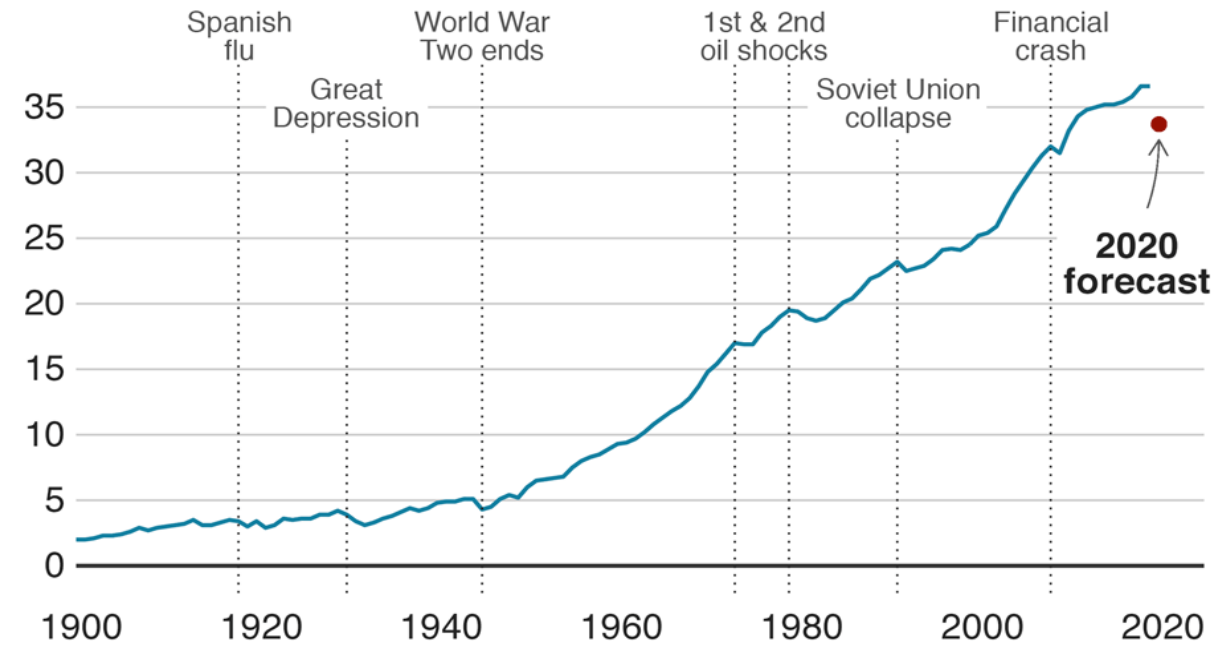
- There are some positive impacts
- Quarantines and lock-downs reduce air pollution
 - Delhi experienced a 60 percent reduction in PM2.5 readings compared to the same time period in 2019.
 - Seoul had a reduction in air pollution of 54 percent compared to 2019.
 - Air pollution in Mumbai was down 34 percent during the lockdown period.
 - São Paulo was down 32 percent year over year.
 - Los Angeles saw its longest streak of clean air on record: during its lockdown period, fine particle pollution in LA was down 31 percent when compared to 2019, and down 51 percent when compared to the previous four-year average.
 - London and Madrid saw more modest reductions in air pollution at 9 percent, 11 percent respectively.
 - Rome saw a 30 percent increase in pollution during its lockdown period.

Impact of the COVID-19 pandemic on the environment

- the pandemic could cause emissions cuts this year in the region of 2,000m tonnes of CO₂

Global CO₂ emissions, 1900-present

Billion tonnes of CO₂ per year



Source: Global Carbon Project, CDIAC & IEA

BBC

Impact of the COVID-19 pandemic on the environment

- While the lockdown might feel rather uniform across the world, there have been huge variations in emissions reductions from different cities.
 - If we take Paris and New York as examples, the contrast, as shown on our chart, is huge.
 - Paris saw a CO₂ drop of 72% (+/-15%) in the month of March compared to normal.
 - New York in the same period, saw a CO₂ fall of around 10%.

Impact of the COVID-19 pandemic on the environment

- The lack of tourists, as a result of the social distancing measures due to the new coronavirus pandemic, has caused a notable change in the appearance of many beaches in the world.



Bangsaen Beach during the closure and a day after reopening



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Impact of the COVID-19 pandemic on the environment

- The impact is only short-lived, however.
- Analysis shows that even if some lockdown measures last until the end of 2021, global temperatures will only be 0.01°C lower than expected by 2030.
- Encouraging some of the lockdown behavioural changes could have longer-term impacts on environmental problems.
- But, since a lot of people suffer from economic slowdown during the lockdowns, could these changes be permanent?

What's Next for the environmental Issues and Epidemics

- It is important to realize that Covid-19 is not accidental.
- Epidemics afflict societies through the specific vulnerabilities people have created by their relationships with environment, other species, and each other.
- It is predictable that, within our generation, we will see other pulmonary epidemics.
- However, we barely talk about how the appropriate environment and the appropriate man-nature relation should look like to prevent the future epidemics.