Medicon Agriculture & Environmental Sciences
Volume 3 Issue 1 July 2022
Editorial

Pandemics and Deforestation: An Interlinking Relationship of the Changing Urban Ecology

Misha Roy*

Department of Environmental Science, Centre for Online and Distance Education, Vidyasagar University, Midnapur, West Bengal, India

***Corresponding Author:** Misha Roy, Department of Environmental Science, Centre for Online and Distance Education, Vidyasagar University, Midnapur, West Bengal, India.

Received: June 21, 2022; **Published:** June 24, 2022

Humanity is facing some major global challenges that are of immediate concern. Two of them are Pandemic and Deforestation. The connection between deforestation and a pandemic sounds strange or a bit far-fetched but unfortunately, these are linked together, in a very complex way. Deforestation refers to the decrease in forest areas across the world for other uses such as agricultural croplands, urbanization, mining activities, monoculture, etc. Pandemics are outbreaks of infectious diseases that can cause morbidity and mortality over a wide geographic area and cause significant economic, social, and political disruptions [1]. Urban ecology is study of the relation of living organisms with each other and their surroundings in the context of an urban environment. Deforestation is the root cause of biodiversity loss which in turn leads to ecosystem disruption, *i.e,* it affects the ecosystem services. Evidence suggests that the pandemics have increased over the past century because of urbanization, changes in land use, exploitation of natural resources, and destruction of habitats. The rapid increase in population has resulted in speedy reforms in urban ecology, which has resulted in deforestation and habitat defragmentation and human encroachment into the forest.

Deforestation and Pandemic

Deforestation has its consequences on the environment. Primates and other wild animals, who either lose their habitat or come close to humans or other domestic animals due to land-use change becomes the vectors and host of pathogens who maneuver such pandemics. As humans diminish biodiversity by cutting down forests and building infrastructures, they're increasing the risk of pandemics, as the forest can act as an incubator for vector-borne and other infectious diseases that afflict humans [2-3]. As the forest is degraded, the habitats of the wilds are lost and they struggle to survive on the fragments of natural vegetation left over. When human settlements encroach on these forests, human-wildlife contact increases, and creates opportunities for animals to migrate in. The resulting disease spread shows the interconnectedness of natural habitats, the animals that dwell within them, and humans [4].

A recent report showed that the increasing prevalence of vector-borne diseases such as dengue or Chikungunya was associated with land conversion, including forests, to commercial in Southeast Asia [5]. It is very difficult to disentangle the respective influences of deforestation other land-use changes, increased human, industrial and agricultural encroachments, or the pressures of hunting on the rise of pandemics. Several studies have as revealed that multiple factors are responsible for the outbreaks of various epidemic diseases all over the globe. Not only has the emergence of new diseases but also epidemics of infectious diseases appeared to be linked to deforestation as evidenced by malaria epidemics in Brazil [6]. Changing the existing forest with commercial plantation can also create new risks of infectious diseases; abandoning agricultural land creates a patch matrix which may lead to risk of zoonoses.

The pathogens are always a part of the ecosystem, however, when they are in an isolated and closed ecosystem, they don't pose any threat. The problem arises when these ecosystems and natural forests are destroyed and encroached. These alterations lead to the spread of the pathogens and increase the opportunities for host switching and adaptation to a new host. This in turn increases and amplifies the transmission and increases the rate of infection and pathogen city. Pathogens adapt and evolve according to the new environment and the host body to avoid immune system detection, increased opportunities for interaction of endemic infection cycles

and pathogen strains, and greater density and genetic variability of pathogen populations. The history of the pandemics and possible emergence mechanism is summarized in table 1.

Name	***Time Period***	***Pathogen***	***Vector***	***Possible Emergence Mechanism***
Black Death, Bubonic plague, Pneumonic plague, Septicemic plague, and Sylvatic plague	1347-1351 1885- ongoing	*Yersinia pestis*	Rabbits, Hares, Rodents, Ferrets, Goats, Sheep, Camels and Fleas	Climate Change; Flood; Environmental Degradation
Leishmaniasis	1500 BCE onwards First recorded in 1756	*Leishmania spp*	Sand fly	Human expansion into forest Urbanization, Habitat alteration, Deforestation
Yellow fever	1648- ongoing	*Flavivirus Sp.*	Aedes aegypti	Deforestation and expansion of settlements along forest edges, Hunting, Water and wood collection, Urbanisation, Lack of proper sanitation
Malaria	First Coined in 1718	*Plasmodium Sp.*	Female anopheles Mosquito	Deforestation, habitat alteration Human expansion into forest, unplanned Urbanisation
Rabies	1768- ongoing	*Rabies lyssavirus*,	Bites of infected Animals	Human expansion into forest
Dengue	1789- ongoing	*Flavivirus Sp.*	Aedes aegypti	Urbanization and ineffective vector control programmes, Lack of proper sanitation
African sleeping sickness (sleeping sickness)	1896-1990	*Trypanosoma brucei*	Glossina species	Human expansion into forest, disease incidence associated with forest edge
H1N1 Influenza (Spanish Flu)	1918 to 1920	H1N1 influenza A virus	Horses, pigs, domestic and wild birds, wild aquatic mammals and farmed carnivores	Environmental Degradation, Human expansion into forest
Rift Valley fever	1931-2001	Phlebovirus	Cattle, buffalo, sheep, goats, and camels	Environmental degradation; Deforestation. Human invasion into Forest
Zika Virus	1960- ongoing	Flavivirus Sp.	Aedes mosquito	Environmental degradation, Human invasion into Forest, Deforestation
Lyme disease	Recognized in the United States in the 1960s and 1970s Discovered in 1981	*Borrelia burgdorferi* *Borrelia mayonii.*	Blacklegged ticks	Possible association with deforestation and habitat fragmentation
Monkey pox	1970- ongoing	*Orthopox virus*	Rope squirrels, Tree squirrels, Gambian pouched rats, Dormice,	Deforestation, Habitat Encroaching, Human invasion into Forest

Ebola Virus	1976 ongoing	*Ebolavirus* sp	Chimpanzees, gorillas, orang-utans, fruit bats, monkeys, shrews, forest antelope and porcupines	Hunting and butchering Log-ging Outbreaks along forest fringes Agriculture Alteration of natural fauna
HIV AIDS	1981 ongoing	Simian immune deficiency virus	Primates	Hunting and butchering, Habitat Encroaching, Human invasion into forest
Leptospirosis	1994- ongoing	*Leptospirain terrogan*	the urine of infected animals such as rats, mice, pigs, horses, goats, sheep, cattle, buffaloes, opossums, raccoons, mongoos-es, foxes, dogs, Rodents and other wild animals	Watershed alteration and flooding
H5N1 Influenza (Avian Influenza or Bird flu	1997 to 2019	A virus subtype H5N1	Wild birds, domesticated birds such as chickens	Environmental degradation, Habitat defragmentation
Severe Acute Respirato-ry Syndrome (SARS)	2002-2003	SARS-CoV or SARS-CoV-1	Bats	Harvesting, marketing and mixing of bats and civet cats Wildlife trade for human consumption
H1N1 Influenza (Swine Flu)	2009-2010	Viruses (H1N1, H1N2, H2N1, H3N1, H3N2, and H2N3)	Pigs	Environmental degradation
Middle East Respiratory Syndrome (MERS)	2012- ongoing	MERS-CoV	Camels	Habitat Encroaching, Human invasion into Forest, Defor-estation
COVID-19	Dec. 2019-ongoing	SARS-CoV-2	Bats	Habitat Encroaching, Human invasion into Forest, Wildlife trade for human consump-tion

Table 1: History of the Pandemics around the world.

Concluding Remarks

Protecting our forest resources is essential, not only to protect the ecosystem services but also to break the risk of future zoonotic disease outbreaks. We still overlook the link between forests and public health, and the solutions for public health and forest conser-vation are separately designed and implemented. The health experts rarely include and consider the role of forests and the associated deforestation and habitat defragmentation in the policy-making regarding pandemic prevention, preparedness, and response. In order to prevent future pandemics from recurring, we need to integrate forest and public health concerns.

References

1. Roy M. "Effects of Restrictions during COVID-19 on Air Quality in India: An Opportunity to Reshape the Earth by in Research & Reviews". Journal of Ecology 10.1 (2021): 1-13.
2. Roy M. Ecosystem Restoration: Only Way for the Mitigration and Management of Pandemics by in Academia Letters (2021).
3. Roy M. Earth's Restoration: An opportunity to reshape the world after COVID-19 in Socioeconomic and Scientific aspects in COVID environment, Bhattacharya ed. Ideal International E-Publication 1 (2020): 1-6.

4. Roy M. "COVID-19, Air Pollution and Climate Change: The Interaction between the Existential Threats". Medicon Agriculture & Environmental Sciences 2.2 (2022): 1-3.
5. Shah HA, Huxley P, Elmes J and Murray KA. "Agricultural land-uses consistently exacerbate infectious disease risks in Southeast Asia". Nature Comm 10 (2019): 4299.
6. MacDonald AJ and Mordecai EA. "Amazon deforestation drives malaria transmission, and malaria burden reduces forest clearing". Proc Natl Acad Sci, USA 116 (2019): 22212-8.

Volume 3 Issue 1 July 2022