

# **ENVIRONMENT AND SOILS IN THE CONTEXT OF COVID-19 PANDEMIC**

## **A communication**

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This brief elucidates a theoretical account of the link between environment and soil characteristics in the context of the COVID-19 pandemic. Insights are extracted from recent research fora. The pandemic has wreaked havoc across the world disrupting economies, businesses, education and gatherings. The environment has however shown positive results.

Studies have identified a potential relationship between the longevity and possible abundance of the Covid-19 virus and soil pH. Soil reaction is regarded as a master variable that among other key agronomic functions, determines the survival of microorganisms. This relationship appears to tie in with the COVID-19 pattern of infection rates and locality. For example, the Western Province of South Africa which has mainly slightly alkaline soils (pH >7) has recorded the highest virus infection rates (60%) followed by the Eastern Cape (pH 6.0 to 7.5) followed by Gauteng and KZN with mainly moderate to strongly acid soils ranging from pH 4.5 to 5.5 (Jan Meyer, Retired Soil Scientist via Researchgate).

The risk of virus persistence, stability and duration of infectiousness in the environment seems to be favored by alkaline soil pH (Bosch et al., 2006). This fact could lead us to realize the importance of considering soil pH levels in the current areas where there has been a massive and rapid epidemic of SARS-CoV-2. Studies over the past few decades indicate that in neutral and alkaline soils, viruses will not bind to any particulate matter and may move freely in the soil environment (Bosch et al., 2006).

It can therefore be hypothesized that a neutral to alkaline soil contaminated with SARS-CoV-2 could cause massive and rapid epidemic outbreaks, visible in current hot zones of COVID-19 such as in Italy, Spain, the United States, Iran, Wuhan and some areas of France, UK and other

parts of Europe. The pH of the soil should be taken into account in addition to the population density and the average rate of human-to-human contacts (Hu et al., 2013).

However, some areas are displaying a disparity to this generalization. This is because the effects of pH are totally linked to monthly changes in environmental variables associated with weather conditions such as surface temperature and relative humidity of the environment (Oliveiros et al., 2020). These areas include North Africa, India and the Middle East which have alkaline soils favorable for the development of SARS-CoV-2 but infections are relatively low because the environmental variables of temperature and humidity do not act in favor of the appearance of a large-scale epidemic. It may be postulated that the higher the temperature, the lower the persistence of the virus in the soils.

The Covid-19 pandemic resulted in untold suffering to the human race across the globe. However, the pandemic brought about interesting positive environmental implications. The snowcapped aesthetic appeal of Mt. Kenya was visible afar due to decreased haziness resulting from reduced air pollution. For the first time in several years, many Kenyans were able to enjoy a glamorous view of the snowcapped peaks every bright morning. The Himalayas was also visible from Punjab, many miles away, a scenario never witnessed before for the last over three decades before the pandemic. Many cities were reported to be pollution free. Lockdowns and stay-home orders worldwide drastically reduced vehicular movement therefore cutting down on carbon emissions.

Due to the closing of offices, schools and factories, road traffic circulation dwindled to a minimum, airlines reduced flights and many other human activities were banned. As a result, air quality levels in many cities improved substantially. The other positive public engagement activities like keeping hands clean by thoroughly washing them, keeping a one-meter social distancing, wearing of masks and proper disposal of used masks enhanced environmental hygiene. The use of masks virtually eliminated the occurrence of the usual seasonal coughs and colds. The regular hand washing too virtually eliminated running tummies which is usually a major environmental concern especially in informal settlements.

Cholera, Typhoid, Amoeba, food poisoning and a myriad of other illnesses that are mostly from unhygienic conditions were reduced. Accidents, robberies, syphilis, gonorrhoea, HIV, herpes and

related ailments are perceived to have reduced. Many hospitals experienced reduced patient visitations. This observation has been necessitated by strict government regulations which are primarily environmental in nature. Human health is a function of environmental compliance as dictated by human behaviour.

There was an adverse negative impact of the coronavirus pandemic in the likes of the waste management crisis. With millions of people staying indoors, concerns were raised over increased generation of household wastes primarily the non-degradable type. This was due to reduced staff at work and suspended recycling activities.

There are fears of poaching as rural communities lose vital income and have little to turn to except natural resources, notwithstanding an upsurge of game animals in many parks. In India, there have been reports of an upsurge in tiger poaching, while there are fears in Africa that the rhinoceros and other endangered species could be at risk. The illegal trading of pangolins which are usually sneaked into China for their scales and also delicacies went down. This is a positive aspect towards the survival of the endangered mammal.

Island habitats depend on human conservation efforts. When humans inhabited islands, they brought with them invasive menaces like rats, which can wreak havoc on native species that often are not adapted to dealing with mammals. Ground-nesting seabirds, for instance, are particularly vulnerable to rats hungry for eggs. Some species on islands are now reliant on ongoing efforts to remove invasive species. Under lockdown, populations of animals like rats has exploded on various islands to the detriment of seabirds.

Recently, it has been possible to detect the presence of SARS-CoV-2 in wastewater in different countries (Medema et al., 2020). This observation opened up a range of opportunities in the investigation of the SARS-CoV-2 virus in wastewater in order to monitor and mitigate the spread of COVID-19 in the community. As these studies show that the SARS-CoV-2 can be identified in the wastewaters, sewers can be a source of coronavirus environment contamination. Wastewater treatment is therefore strongly suggested.

## References

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