Implications of Living in Harmony with Nature for Urban Sustainability in the COVID-19 Era

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Abstract

In the present globalising world, technological advancement, breakthroughs, innovations and flourishing civilisation are hinged on the kindness and benevolence of nature and its resources. When in a harmonious relationship with man, nature nurtures mankind to abundance, peaceful coexistence, livability and prosperity. However, man's present consumption and production patterns, coupled with ostentatious lifestyles, have created a scenario of the unabated onslaught of abuse, neglect, and disregard for the environment, resulting in resource exploitation, climate change, deforestation and wildlife trade, degradation, loss of biodiversity, and a host of others –which are the growing challenges presently confronting and threatening the entire human settlement; whether rural or urban setting, developed and developing nations. This paper examines the meaning, origin and dimensions of the concept of harmony and highlights the paradigm shift of its relationship with humanity to the present age. It also traces the origin, causes and spread of the COVID-19 pandemic to humanity's disharmony with nature through contact with pathogens of zoonotic origin that often result in the sustainability crisis. Until now, most efforts to prevent the spread of new diseases tend to focus on vaccine development, early diagnosis and containment, but very little consideration has been given to strategies for living in harmony with nature to ensure urban sustainability in the post-COVID-19 era. Content review, analysis and synthesis of relevant documented evidence such as newspaper reports, publications and data of organisations and agencies, as well as Google search, were utilised for the paper. Concepts of carrying capacity and ecological footprints provide the theoretical anchor for the study. Findings established that human factors or activities such as urbanisation, deforestation, resource exploitation, etc., are responsible for the disharmony with nature and exacerbate the spread of zoonotic diseases from animals to humans, especially during the COVID-19 pandemic. The paper further reveals that pandemic risks can be lowered by reducing human activities that drive the loss of biodiversity and the conservation of protected areas. The paper recommends that government invigorate enforcement of laws in all aspects of illegal wildlife trade and improve community education in disease hotspots about the health risks of wildlife trade.

Keywords: COVID-19 pandemic, harmony, humanity, nature. urban sustainability

1.0 Introduction

Right from the early days of man's existence on earth to the present globalised world of technological advancement, breakthroughs, innovations and flourishing civilisation, humanity has been riding on the kindness and benevolence of earth and its resources. Nature not only aids and propels the human will to endure but also fosters prosperity, profitability, health, and fulfilment. As the global population continues to grow exponentially with the present over-exploitation of resources and ostentatious lifestyle patterns, the environment has begun to suffer unabated manipulation and onslaught, abuse, stress and neglect, leading to environmental challenges such as climate change, loss of biodiversity, increasing emissions of harmful gases into the atmosphere, increasing deforestation, desertification, depletion of the ozone layer, environmental degradation, shortages of water, food insecurity, and a host of other issues.

Many of these global environmental challenges today have been attributed to the Earth's 'overshoot' or feedback from overloading Mother Earth and its resources (Oduwaye, 2014). It is imperative to know that the ever-increasing anthropogenic activities responsible for climate change and its consequences on biodiversity also account for pandemic risk from emerging pathogens of zoonotic origin. Several studies have linked the emergence and spread of deadly pandemic such as COVID-19 to the close interactions between wild species and human as a result of unprecedented exploitation of natural resources to respond to the demand of the growing human population for energy and animal-based foods (Cristina, 2020; Javandeka, 2020; Arora et al., 2020 and Arora and Mispha, 2020). Succinctly put, urbanisation, economic development, and societal shifts towards environmental apathy have destroyed contemporary human interactions with the natural world.

However, the sudden appearance and prevalence of the novel COVID-19 pandemic and its ravaging effects on humans constitute one of the heaviest disease burdens on the world's wealthy and less privileged countries. The pandemic is a global tragedy that warns us that failure to stabilise the climate, protect our natural world, and control pollution will inevitably lead to losing the chance of creating a world of prosperity, equality, and peace. Therefore, planners, urban analysts, heads of governments, and non-governmental organisations must urgently examine the current, complex course of development in favour of planning and management strategies that minimise the ongoing deleterious repercussions of man's environmental impacts. Given this, and within the contextual understanding of the mutual, inalienable rights between humans and the environment, the paper offers an alternative planning strategy to current thinking and practice that led the world into the growing and deepening crises of disharmony between humans and nature in the 21st Century. The emergence and consequences of the crisis of the COVID-19 pandemic globally are traceable to a direct link between the destruction of nature (due to resource exploitation, deforestation, wildlife trade, etc.) and exposure to diseases-carrying animals like bats and pangolins.

Meanwhile, the COVID-19 pandemic is partly an expression of the limit of the earth's carrying capacity that demands a reset to avoid a total collapse of the earth's system. However, humanity's attempt to embrace nature-based solutions (regenerative agriculture), investment in biodiversity, and regulatory and strict enforcement of illegal wildlife trade will ultimately promote peace, health, resilience, livability and prosperity in the post-COVID-19 pandemic era and beyond.

Literature Review and Conceptual Framework

Meaning, Definition and Origin of the Concept of Harmony

'Harmony' has a rich, intuitive meaning in common usage. The term is a word that connotes mutual relationship as several interrelated parts forming an order or balance. It relates to a situation whereby different parts, or several interrelated parts, form a connected whole agreeing to produce an order, balance or unit. According to Sylvia (2009), harmony is a human value that addresses compatibility and accord in feelings, actions and ideas, relationships, opinions and interests. In his view, Griffith (2015) points out that harmony creates balance, union, synthesis, calm, tranquillity and peacefulness. Man can be in harmony with self, his family and colleagues, society and even nature. Harmony cements components together and brings out order, stability and firmness. Harmony douses tension and suspicion while its elusiveness in a nation threatens national integration. From the perspective of coming together to address critical issues, harmony promotes unity in diversity, forming a collective consensus to solve urgent problems like the ones facing the world today (Sharma, 2014).

Marcus Garvey once likened a people who have no idea of his history, origin and culture to a tree without roots. In other words, a cursory exploration of the term 'harmony' can be traced to a Geek language (harmonica), meaning 'fastening or joining'. The practice of harmony was an age-long philosophy in Chinese culture. Tracing the conceptual meaning of harmony back to Confucianism and Dao/Taoism in East Asia, the term "harmony" was coined by a Chinese sage and philosopher, Yan Zi, using the notion of "soup and music" (Chenyang Li, 2008). According to Yan Zi, cooking a good and balanced soup entails many

combined ingredients, such as water, fire, tomatoes, pepper, vinegar, and salt, eventually producing a tasty and balanced food that satisfies or purifies the heart of a virtuous person.

Similarly, Yan Zi believes that good music is like a flavour that requires numerous sounds in various modes. Music brings a plurality of sounds into concord. Different elements compete with one another to produce melodious effects. In these scenarios, the multiplicity of sounds responds to one another to promote, complement, and mutually stabilise each other, just like a soup cooked with only one ingredient cannot be appealing but tasteless to the appetite (Cheng, 2009). Thus, the way peoples' hearts are deeply moved and their morals improved by music is the same way harmonious sound makes people gentle and kind.

However, just like a symphony composed of only one instrument is boring, so also is the government made of only one voice is stagnant and dangerously treading on the part of disintegration and eventual collapse. Therefore, for a government to make progress and achieve sustainable development agenda, the voices of various stakeholders that make up the country (women, students, artisans, traders, government officials, professionals, pressure groups, and a host of others) must be given consideration and attention to. For example, in fighting the COVID-19 pandemic, the whole world has realised that everyone, every country, is, indeed, necessary. However, harmony relates to combining diverse system elements, using them proportionately to fill in others' deficiencies and mitigate others' excesses to create unified effects.

Harmony is connected to human happiness. Considering the perspective of humans, their societies and their environment, Fred (2012) conceptualises harmony to connote an act of peaceful coexistence, where no one exploits another but helps in the actualisation of every individual's potential for the satisfaction of basic materials and non-materials needs and to feel secure, safe, happy and fulfilled as human beings. Meanwhile, according to Chenyang (2008), a failure to recognise this interdependency will always result in conflicts, resentments, chaos, disagreements or even wars. It is worthy of note that harmony is a highly important, valued and cherished human ideal.

Dimensions of Harmony

Three dimensions of harmony are identified in the literature: harmony with oneself, harmony with others and nature (Chengang, 2008; Fabio & Tsuda, 2018).

- **Harmony with self**

Just as we find balance in nature, an individual also seeks to find balance within self. Harmony is deeply connected with the balance of the mind, body and soul (Kerarovska, 2013). When an individual brings together his thoughts, motives, words and actions, it results in peace, strength and truth. Within the individual, harmony refers to the person and the process of harmonising various parts of the body- heart, and different purposes in life in a well-functioning organic whole (Fabian & Tsuda, 2018). If an individual aligns his thought with a deep feeling of accomplishment inside of him, he will be fulfilled, and harmony will be created. However, when there is a physical, emotional or mental distortion in the harmonious human system, the body is bound to be exposed to sickness. Similarly, when there is a distortion of the earth's system (either through urbanisation, land-use change or over-exploitation), the earth will be exposed to pathogens capable of transferring viruses from animals to humans.

- **Harmony with others**

Harmony between humans is achieved when two or more people or groups are living together, assessing issues, taking responsibility while respecting their differences and resolving their conflicts in a non-violent way. The people co-exist together (in time or place) and develop a sense of belonging (cultural worth), mutual cooperation, communication skills, concern for a sense of reconciliation and shared goals, mutual understanding, tolerance and desire for the whole. According to Shama (2014), 'harmony helps generate collective consciousness among individuals, groups and organisations to provide unique and valuable services. Meanwhile, Banban (2018) identified feelings of cultural tolerance and sharing, including different faith systems and cultural traditions, and peaceful co-existing in the social space as a fundamental embodiment of harmony. Bate (2009) aptly observes that the most prosperous nations in the world are those with happy, healthy, safe and free citizens, and not necessarily those with a high GDP.

- **Harmony with Nature**

Nature is the foundation stone of the flourishing world. Nature and its resources constitute the mother Earth. The term 'Mother Earth' is used in different cultures to symbolise the inseparable bond between humans and nature. Nature and its resources provide the basic needs to support human existence. Humans need the cooperation of nature to flourish; we have created civilisation from it; we engage in the consumption of goods such as plants, trees, sands, and rocks for building and animals as protein sources. Our flourishing civilisation is powered by extracting chemicals and elements from rocks, water and air. Plant materials are extracted for energy, to clothe ourselves and provide bedding, bathroom linens, and the air we breathe for survival. Humans and nature are intimately and interdependently intertwined. They interact reciprocally over time and affect each other in a relationship characterised by continuous change. The Mother Earth cares for, supports and nurtures mankind to abundance and prosperity. Jen (2019) notes that the Earth is our home, and we need to care for it, just as a mother is supposed to care for her children. In the same way, the children will reciprocate love, gratitude and honour in return.

To be in harmony with nature is to improve the inseparable bond between humans and nature and to uphold the ethical basis of their relationship. It must be noted that apart from the magnanimity of nature in providing means of sustenance to mankind, interacting and living in harmony with nature also contribute to health, well-being, education, development and growth (Peter & Benjamin, 2019). Experiencing nature has equally been linked to reducing stress, anxiety, depression, and aggression and restoring energy and health (Kirsten, 2020; USDA, 2018; Well and Evans, 2003). To live in harmony with nature simply means to accept nature as an inalienable component of the environment that has a right to the environment, too. Therefore, the relationship that exists between them must be valued, respected and treasured, not nature being seen as a voiceless and impassive component of the environment.

Paradigm Shifts in Nature and Humanity's Relationship

For a billion years past, there was harmony between man and his natural environment-the, the atmosphere, the ocean, and the land (Peter et al., 2019), and forces of nature generally determined the pattern of human occupation on the earth's surface. In other words, the philosophy of determinism opines that the decisions and actions taken by man are just effects and are governed by causal laws. By implication, humanity's culture, level of development, lifestyle and stages of development of social groups or nations are largely governed and controlled by physical factors of the environment. At that time, natural forces integrated multiple arrays of available species of microbes, plants and animals in a dynamic but stable ecosystem: the biosphere (Martins et al., 2019). Thus, the forces of nature kept everything in balance, and man's activities were primarily determined by nature and its forces.

Consequently, during the industrial revolution of the 18th Century, there was a fundamental shift of perception that there was a limit to what could be drawn from the land through muscles, hydraulic, and wind power to the unlimited productions based on technological innovation and massive use of non-renewable fossil energy resources (Martins et al., 2019). Thus, this notion of a limitless human-built world was encouraged by the voyage of exploration and discoveries that heralded the wealth of resources on Earth.

However, ever since the 20th Century, humanity has embraced development paths that have given birth to a plethora of concerns over sustainability and the threat of exceeding the coping capacity of the whole earth system to support humanity (Hirschnitz-Garbers et al., 2016; O Neill et al., 2018). Today, excessive release of carbon emissions, deforestation and, land degradation, anthropogenic activities have unquantifiable deleterious repercussions on our ecosystems and environmental biodiversity, as well as bringing us to closer contact with the emergence and spread of new pathogens and exposure to infectious diseases like the COVID-19.

Origin, Causes and Spread of COVID-19: A Global Challenge

On the 17th of November, 2019, a 55-year-old man was discovered to have been infected with coronavirus in the city of Wuhan, an emerging business hub in China. A team of Chinese Doctors officially pronounced the coronavirus to the World Health Organization, who later declared the scenario a pandemic on 11th March 2020. A pandemic is an occurrence of an infectious disease that is widely spread in a community at a particular time. The first reported coronavirus disease-2019 in Africa occurred in Egypt on 14 February 2020 (The Guardian, 2020). The disease was imported into the country through international travellers returning from COVID-19 hotspots in Asia, Europe and the United States. The first index case of COVID-19 in Nigeria was through an Italian citizen working in Nigeria but had just returned to Lagos from Milan, Italy, on the 25th of February, 2020. The Federal Ministry of Health confirmed the novel COVID-19 case in Lagos State, Nigeria, on the 27th of February 2020, as the first case ever to be reported in Nigeria since the beginning of the outbreak in Wuhan, China, in January 2020. As of 25 May, Nigeria reported 7,839 confirmed cases of COVID-19 and 226 related deaths (WHO 25/05/2020). Since the discovery, several other new cases have also been reported, and more are being reported in different countries around the world almost daily.

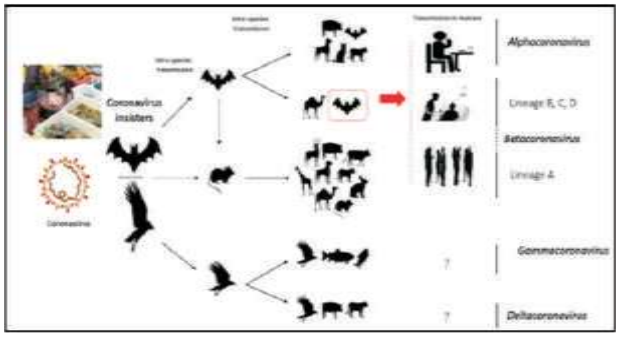

Figure 1: Types of Coronaviruses

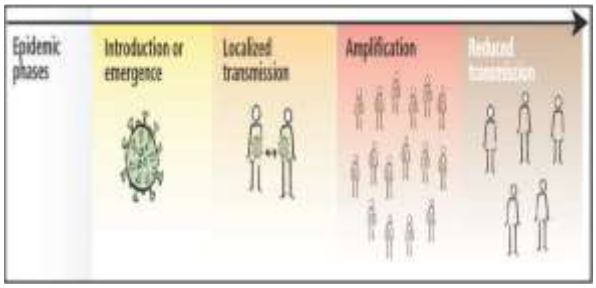

Figure 2: Epidemiological transmission phases of the coronavirus pandemic.

Bats have long been recognised as a natural reservoir for many viruses (Managreh et al., 2020). The viruses include the group of coronaviruses shown in Fig. 1. The outbreak of diseases and deaths among humans in the 21st Century was linked to bats (Hu, 2015; Cui et al., 2015). The virus is transmitted through person-to-person contact and congregational gatherings. Later, the transmission was curtailed through strict observation of protocol –social/physical distancing, as shown in Fig 2. The virus originated from animals, specifically bats, and transmitted to other animals like hawks, rats, and herds and later to man through eating these animals. Forest clearance/destruction through dynamics of urbanisation, mineral exploitation and the wildlife trade has led to risk exposure to wildlife habitats and eventual contact with the pandemic by humans. Experts have suggested that humans should, as much as possible, endeavour to break the chain of transmission by not allowing themselves to serve as primary, secondary or intermediate hosts for the disease. Thus, understanding man's connection with bats and other zoonotic animals helps us to reduce the risks of infection and transmission of the virus from bats to humans (Akinyoyenu, 2020).

Theoretical and Conceptual Underpinnings

Content reviews on the harmonious relationship with nature in safeguarding the global environment during the post-COVID-19 Pandemic are anchored on the following fundamental concepts and approaches:

a. Concept of Carrying Capacity

Carrying capacity is a multidimensional concept used as a framework around which man and environmental resources and planning and management systems are organised. The notion of the 'carrying capacity' concept can be traced to the works of Thomas Malthus in the year 1798, where he postulated that only a definite amount of human growth could be supported by the earth at a definite time (Voulellis & Serraos, 2017). The term can be referred to as the maximum population an ecosystem can support or sustain over time (Voulellis, 2009). It is a fundamental concept in resource management, having a biological origin and is strongly

linked with sustainable yield (Trakolis, 2003). Carrying capacity is the maximum pressure or load a system can conveniently carry before breaking down. A system breaks down on account of its inability to cope with the pressure of loads it carries. The breakdown could start from distortion of any part of the components and gradually spread to other parts until the whole system stops working or collapses.

In the like manner, when the earth's system lacks the capacity and support to continually sustain the pressure of increasing population, unsustainable production and consumption patterns, unexpected impacts occur, including climate change crisis, environmental degradation, loss of biodiversity and increasing frontiers of infectious and deadly diseases, like COVID-19. In other words, if an area's extreme limit is exceeded by its carrying capacity, there will be a natural imposition of resistance against such unprecedented growth and development (Voulellis & Serraos, 2017). When this extreme limit is crossed, the consequence is a distortion in the harmonious relationship that once existed between humanity and nature. For example, deforestation pushes some species of trees into extinction, while those that survive and thrive provide habitats for animals like rats and bats that are more likely to host potentially dangerous pathogens that can make the jump to humans (Tollefson, 2020). It is evident that unless and until nature is respected and treated as an inalienable component of the environment, sustainable development of a desirable future may not be guaranteed.

b. Concept of Ecological Footprint

Ecological footprint, as developed by the Global Footprint Network, refers to an accounting framework that measures the amount of biologically productive land and sea area humanity needs to produce the resources it consumes, provide room for its infrastructure, and absorb its wastes (ADB, 2012). The concept shows the difference between what Humanity takes from nature and what nature gives back, measured in global hectares. Suppose the resources taken from planet earth exceed the earth system's capacity to regenerate. In that case, there is a depletion of resources and high emission of carbon dioxide into the air, and by implication, there is an ecological deficit. Meanwhile, if the biocapacity exceeds the population's ecological footprint, the population will enjoy the ecological reserve.

Madhumitha (2021) observes that the earth system has been facing an ecological overshoot since the 1970s when it can no longer generate the demand for natural resources needed to sustain humanity. According to the author, if the world consumption patterns follow what is obtainable in the United States, as of the year 2021, that means humanity would need resources equivalent to five times what our Earth can regenerate to satisfy the global demand. However, since the earth's biocapacity cannot regenerate the resources the growing global population needs, humanity now depletes the earth's resources. It degrades the land, thus, bringing strain to the harmonious interaction between humans and nature. The consequences of these actions now result in over-exploitation of earth’s resources, deforestation, loss of biodiversity, illegal wildlife trade, and a host of others, exacerbating the spread of emerging infectious diseases like the COVID-19 pandemic.

Methodological Approach

The methodology utilised for this study was based on content review, analysis and synthesis of published literature, case studies, publication and data from different government and non-government organisations and agencies, and currently available official websites. Scientific journals, conference proceedings, newspaper reports, books of readings, and workshop materials were also collected through electronic means from various databases and information, which are relevant in exploring harmony with nature for urban sustainability in the post-COVID-19 pandemic era and beyond.

Findings and Discussion

The current crisis of sustainability that is evidenced in the relationship between humans and nature can be described by the relentless battle of supremacy of humans over nature vis-à-vis abuse, disrespect and continuous onslaught and distortions meted out on the earth and her resources. This unsavoury relationship that has orchestrated ecological imbalance and pushed the finite earth to its boundary limits has been

discovered and recognised as the root cause of the environmental crisis and sustainability (Folke et al., 2014; Dorninger et al., 2017). The following factors have contributed to the existence of disharmony between nature and humanity, according to the findings of this paper:

Factors of Disharmony between Humans and Nature

- **Urbanisation and Land Use Change**

Around 55% of people globally live in urban areas, a figure expected to rise to nearly 70% by 2050, according to the United Nations (UN-Habitat, 2020). Over the years, the massive expansion of the global urban fabric has demanded more space for housing, agriculture, road and dam construction, tourism and recreation with mining activities. Thus, urban growth and development are considered one of the most significant anthropogenic factors responsible for altering the earth's ecosystems, causing deterioration in social, economic and environmental landscapes over the years. This aligns with research outcomes that these urban areas consume most of the global energy resulting in the chronic degradation of ecosystems through pollution of air, water and land (Yan et al., 2016; Battista & de Lieto Vollaro, 2017).

Consequently, the driving factors of biodiversity loss and climate change have been widely attributed to land-use/cover change (LUCC) at both local, regional, and global scales (Harengeweyn et al., 2015). For example, Verburg et al. (2011) note that about 10-20% of the greenhouse gases (GHGs) from agricultural land use alone account for the total global anthropogenic emissions contributing to climate change. Urbanisation is an indispensable risk factor for emerging diseases like the COVID-19 pandemic. Urbanisation risk factors include poor housing, inadequate water supplies, sanitation and waste management. All these contribute to the conducive setting for rodents and insects carrying pathogens and soil-transmitted helminth infections (Neiderud, 2015). It has also been observed that major urban areas in the UK and USA have higher death rates than other types of settlements in the COVID-19 ravaging crisis (Tim Dixon, 2020).

- **Deforestation**

The term 'deforestation' refers to the reduction of forest areas across the world that is lost for other uses such as urbanisation, agricultural, exploration and mining activities. For several decades, the impact of deforestation on natural ecosystems has been devastating, affecting biodiversity and climate. Forests represent highly valued veritable hubs of biodiversity, but sadly, threats to biodiversity have been recognised as the most known consequence of deforestation. Forests shelter many animals, such as mammals, birds, rodents, insects, amphibians or plants, and even rare and fragile species (UNEP, 2021 b). It has been observed that forests serve as homes to over 80% of the earth's land animals and plants. Destroying the forest, therefore, implies endangering the ecosystem, putting plant species into extinction, and increasing the risks of disease pandemics such as COVID-19.

However, when trees are cut down, C02 that was already stored or kept is released into the atmosphere, and the ability of fewer trees available means the lesser ability for the planet to capture and store C02. By implication, this invariably results in building up greenhouse effects and climate change. Meanwhile, as forests are being cut down for agricultural purposes, constructions and building, topsoil is exposed to the vagrant of weather, making it vulnerable to erosion and flooding. Flooding is a natural disaster with a high magnitude of causalities. Deforestation diminishes biodiversity leading to the risks of contracting disease pandemics such as COVID-19 (OECD, 2020; Tollefson, 2020). Given the fact that some of the animal species are fast going into extinction, those that tend to survive and thrive-such as rats and bats, as Tollefson (2020) notes, are more likely to host potentially dangerous pathogens that can make the jump to humans. Corroborating this, Allen et al. (2016) submitted that land-use change can often result in environmental alterations, such as deforestation and expansion of agricultural lands which are the common drivers of emerging infectious diseases ravaging the present world.

- **Resource Exploitation**

Natural resource exploitation is imperative for human existence. Throughout the history of mankind, the manipulation of the earth system and its resources for

the production of materials needed for human sustenance and survival has been ongoing, unabatedly. The quest for survival and meeting all kinds of development needs, such as residential, industrial, educational, agricultural, social and recreational, has contributed to many negative impacts ranging from over-exploitation of resources, pollution and, sometimes, the destruction of the ecosystem. Often, the exploitation of natural resources, according to Babagana *et al*. (2019), has been carried out in a non-sustainable way, leading to growing concerns, as the current unsustainable practice of natural resource exploitation ultimately threatens human existence. Evidence-based research that ensures effective natural resource utilisation at the lowest possible environmental cost, with economic and social development assurance, is still available in developed and developing countries.

In Nigeria, like other developing countries, exploitation of natural resources has, in no small measure, stimulated economic growth and development over the years. However, the negative consequences of the exploitation have had severe adverse repercussions on the environment of the host communities, such as gas flaring, environmental degradation, oil spills, loss of farmlands, flooding and extensive deforestation, loss of soil fertility, erosion, contamination of streams and rivers, effluent discharge and disposal, ongoing disputes between oil companies and host communities (Babagana et al., 2019). Disruption of the ecosystem for exploitative activities exacerbates exposure to emergent disease events that involve a virus spreading from animal to human. Meanwhile, the people living around oil and gas production sites are prone to higher risks of exposure as air pollution results in respiratory and cardiovascular problems and other health-related complications that exacerbate COVID-19 infections (Ketyer & McKenzie, 2021). Clearing bushes for resource exploitation does not eliminate natural viruses; instead, it encourages the spread of contagious diseases.

- **Consumption and Production Patterns**

United Nations describes worldwide consumption and production pattern as the driving force that makes the natural environment and resources always have destructive impacts on the planet. That is, global unsustainable consumption and production patterns threaten humanity's life support on Earth. According to Global Footprint Network, as pointed out in the Academy of Science (AAS, 2019), "Today, humanity is said to be using the equivalent of 1.5 planets to be able to supply the resource requirements needed to sustain the current course of development, as well as to absorb the wastes generated. By implication, it now takes the Earth one and a half years to regenerate what we use in one year. The world is carrying out an unending onslaught to deplete natural resources to the tipping point towards an eventual collapse. Research has shown that an ecological footprint is not a function of population density (AAS, 2019). So, citizens of developed countries have, in general, a much bigger ecological footprint than their developing counterparts.

Table 1: Ecological Footprint of Developed and Developing Countries (2021)

S/N	Country	Population	Ecological footprint (per capita)	Biocapacity (per capita)
1	Australia	25,788,215	9,31	16.57
2	United States	332,915,073	8.22	3.76
3	Kuwait	4,328,550	8.13	0.55
4	United Kingdom	68,207,116	7.93	0.56
5	China	1,444,216,107	3.38	0.94
5	India	1,353,409,708	1.16	0.45
6	Indonesia	276,361,783	1.58	1.26
7	Pakistan	225,199,937	0.79	0.35
8	Nigeria	211,400,705	1.16	0.70

Source: Authors' compilation culled from World Population Review, 2021

Table 1 above depicts that citizens in developed countries consume more natural resources than those in developing worlds. The ecological footprint is a metric system that measures human demand on natural capital or the quantity of materials nature generates to support a given population or economy. The ecological footprint calculates the demand for and the supply of nature. The EF, therefore, relates a demand side to a supply side. The demand side measures the ecological assets a population needs to produce natural resources it consumes and absorb its carbon emissions and other wastes. On the other hand, the supply side of EF relates to the productive capacity (biocapacity) of ecological assets a population requires to generate a supply of

renewable resources and to accommodate or eliminate its wastes. It, therefore, follows that, in any given population, if the demand for natural capital exceeds what the biocapacity can support, a situation of ecological deficit occurs. That means that such a population is taking over and above the resources that nature can generate or supply, eventually leading to total ecological collapse. From the perspective of global consumption and production pattern, it is crystal clear that humanity has been raping and depleting nature and its natural resources beyond the physical and ecological limits imposed by the biosphere. Consequently, according to Prasad (2020), one important message COVID-19 passed to mankind is to give up the blind culture of consumerism and embrace the lifestyle of living in harmony with nature because the rising demand for earth resources would only lead to the over-exploitation of resources that compound pollution, emission of harmful gases to the atmosphere and transmission of infectious diseases, like COVID-19 pandemic. This suggests that giving up the luxury of extravagant lifestyle patterns for a lifestyle of harmony with nature is an essential drive towards achieving urban sustainability, even in the post-COVID-19 era.

- **Wildlife Trade**

Wildlife connotes the exchange or sale of wild animal resources, living animals, as well as their products. The complex and integral roles wildlife plays in the economies and ecologies of many countries across the globe, especially those of West and Central Africa, cannot be overemphasised. The magnitude of the wildlife trade is immense and alarming to the extent that the survival of animal species hangs in the balance due to over-exploitation associated with the wildlife trade. Increasing consumption and trading in wildlife have orchestrated a spotlight of illegal wildlife trade being placed on the potential risks of over-exploitation and shrinking natural habitats for the animal-to-human transmission of zoonotic disease pathogens. Research has shown that of the emerging diseases known today, about 75% are zoonotic and majorly originate from wildlife (Vanda, 2021). However, before the emergence of the novel COVID-19 outbreak, millions of human lives and a billion cases of human illness per year have been attributed to zoonotic diseases, including HIV/AIDS, Ebola, SAPS, flu, yellow fever, and others (Taylor et al., 2001). Several studies have traced the origin of contagious COVID-19 to the interaction of humans and wildlife (Jones et al., 2008; Wu et al., 2020; University of Gottingen, 2020).

Thus, the emergence and spread of the COVID-19 pandemic has directed the full beam of searchlight towards the unregulated exploitation of natural resources coupled with unsustainable food habits and consumption patterns as the fundamental factors driving humanity away from a harmonious relationship with nature. The environmental challenges such as flooding, degradation, loss of biodiversity, and global warming, resulting from human activities like land use change and urbanisation, resource exploitation, wildlife trade and a host of others, do threaten the very viability and sustainability of urban areas and more significantly, constituting the mechanisms driving the transmission and spread of COVID-19 infections that has plunged the whole world into deepening crisis of sustainability and its associated consequences.

Implications of the Effects of Human Activities on Nature for Urban Sustainability in the COVID-19 Era

The global economy today and the growing quest to meet the needs of the burgeoning global population are overwhelming the carrying capacity of the earth to maintain life's abundance. At this critical time in human history where COVID-19 has brought humanity's strained relationship into sharp focus, we need to re-orientate how we relate to each other and the earth's wonders to sustain us, not destroy us. Thus, giving up the blind culture of consumerism and adopting a lifestyle in harmony with nature is a fundamental message of the pandemic to mankind (Chandi, 2021). Succinctly, living in harmony with nature amidst the COVID-19 era and beyond requires exploring a new paradigm of measures and strategies in the area of agriculture, energy, transportation, behavioural or attitudinal change, and a host of them; that can bring back the world into a new normal and a rest mode to avoid the total collapse of the planet earth. Some of these strategies include, but are not limited to, the following:

Clean and Efficient Energy Transition

One of the biggest fights against climate change in the present and post-COVID-19 era is to prioritise investment in decarbonised energy solutions with universal energy access. According to the IEA (2016), fossil fuels dominate the global energy system, accounting for more than 80% of the total energy supply. The implication is that the emission of large volumes of carbon dioxide and other hazardous pollution like formaldehyde, asbestos and mercury are known or suspected to cause cancer, birth defects, impaired lung function and other serious health harms. A study by the American Lung Association (2021) established that increased exposure to hazardous air pollutants is associated with a 9% increase in death among patients with COVID-19. According to the study, these pollutants cause respiratory stress, thereby increasing vulnerability to severe illness from COVID-19. In another related study by ALA (2021), it is estimated that about 15% of the worldwide deaths from COVID-19 may be linked to chronic exposure to air pollution emanating from fossil fuel energy use.

To be able to ensure urban sustainability in the post-COVID-19 era, emphasis must be placed and invigorated towards moving away from the use of coal and fossil fuels to embracing clean and renewable energy systems; in the areas of constructing energy-efficient buildings, such as schools and hospitals hotels, event/civic centres, by retrofitting existing buildings, insulation and replacement of boilers, lightning and household appliances with energy-efficient substitutes and other interventions.

This strategy does not only create jobs; it reduces poverty and the health burden of air pollution. It minimises the emission of chlorofluorocarbon (CFC) that depletes the ozone layer. It subsequently minimises the infection of chronic respiratory disease, cardiovascular disease and even cancer, which are underlying medical conditions for COVID-19. The United Nations (2020) concurred, noting that the only way to ensure that our pursuits and efforts to achieve many SDGs goals are not jeopardised is to ensure universal access to affordable, reliable, and modern energy services, as energy is inextricably linked to progress on poverty eradication, gender inequality, and greenhouse gas emission reduction.

Ecosystem Network and Reconciliation Mitigation

Humanity's relationship with the natural environment inevitably includes interaction with zoonotic diseases. Overexploitation of ecosystem services beyond natural carrying capacities, especially where human activities have converted these into disservices, potentially heightens the risks of zoonotic diseases. This is an environmental conservation strategy aimed at seeking reconciliation between ecosystem conservation and urban development. According to the strategy, reconnecting divided and isolated natural environments by proper arrangement of greener and aquatic areas is imperative to facilitate the movement of living creatures to ensure the conservation and restoration of the unique ecosystem in the region.

Destruction and disruption of ecosystem habitats constantly expose them to disease vectors capable of transmitting viruses to their new hosts, which are eventually transmitted to humans, just as in the case of zoonosis in COVID-19. An ecosystem network and reconciliation mitigation strategy is a component of a nature-based solution where ecosystem restoration or green/hybrid infrastructure is critical to fighting climate change and its consequences. In addition, by reinstating the lost ecosystem processes, these nature and nature-based solutions may potentially rebuild barriers to disease organisms from animals to humans. In achieving this strategy, potential maps of the natural environment/habitats that are earmarked for urban development will be prepared and be used to implement compensation measures on lands that are acquired for public use, such as hospitals, parks and gardens, schools or green spaces of companies, to help restore, conserve and maintain the ecosystem. Under this framework, land use and development activities enhance ecosystem networking which ultimately helps increase the mass of biodiversity. It quickly reduces greenhouse emissions and makes it easier for vulnerable countries to adapt to climate change. This framework was developed decades ago by Europe and the US and was later domesticated in Aichi, Japan (UNU-IAS, 2019).

Regenerative Agriculture

This is a nature-based solution premised upon the umbrella of sustainable agriculture, which aims to work with nature to regenerate it. Regenerative agriculture paves the way for planetary revitalisation and resilience. The strategy proposes alternative food production with little or no environmental or social impact (Rhodes, 2017). Thus, this is an essential strategy that could mitigate climate change. For example, the same author affirms that the core intention of improving soil health or restoring highly degraded ones is central to regenerative agriculture. This, symbiotically, enhances the quality of water, vegetation and land productivity.

More so, food consumption and the provision of raw materials for industries are fundamentally and inextricably linked to the preservation and regeneration of natural environments. As biodiversity decreases and wild spaces vanish, pathogens race through plant rows like an electric current, putting humans and other species at risk (Jaqua, 2020). Thus, regenerative agriculture promotes collaboration and cooperation between agro-based industries and farmers to prioritise areas of agriculture regeneration through regenerating soil, protecting water, increasing biodiversity, and restoring enough stochastic friction to reduce the likelihood of future pandemics. The food industries would assist farmers in regenerating soil by supporting methods that minimise soil surface disturbances and prevent erosion by applying tillage practices and cover cropping. The core intention of this strategy is not only to bring back living creatures or biodiversity loss to the environment but also to rediscover and nourish the traditional landscape and culture of the region.

Investment in Biodiversity

One of the strategies to embrace harmony with nature and minimise the pandemic's future occurrence is to invest in and integrate biodiversity into the COVID-19 recovery plans. Biodiversity loss opens the way for emerging infectious diseases, especially zoonotic but investment in biodiversity helps minimise risks, provide jobs and propel economic and environmental stimulus. This can be achieved by maintaining and strengthening regulations on land use, wildlife trade and pollution. For this measure to be sustainable, there must be an active involvement of both indigenous people and local communities in the management of natural resources, biodiversity conservation and restoration, as well as ensuring women's right to access and control biodiversity and natural resources (Aguilar et al., 2007)

Reduction or Restriction in the form of "De-growth" or Green Growth"

In order to ensure a healthy ecosystem, human health and sustainable prosperity in the post-COVID-19 era, it is imperative to embrace and adopt "green" as a driver of economic growth that is ecologically sustainable as embedded in SDG 12 (Responsible Consumption and Production). This is essential not only for the High-Income Countries (HIC), which are contributing the highest per capita ecological footprint in the world, but also for the Middle and Low-Income Countries, which are always at the receiving end of the impacts of the ecological footprint of developed countries. Behavioural change can start from individuals and later coalesce into more significant movements. Though it is argued that it might be challenging to reduce consumption or make do with less due to surrounding infrastructure or economic circumstances that may be putting restrictions on what action could be taken (Peter Benjamin, 2019); the fact remains that if it was possible for certain lifestyles to be adjusted to and complied with the restrictions posed by COVID-19 measures, then, it should not be a problem to break the "iron law" by applying taxation-induced on highly ostentatious and non-essential goods, for the purpose of salvaging the planet earth from the looming danger of overshoot and eventual collapse as a result of exceeding planetary boundaries.

Adjusting or sacrificing economic growth to achieve environmentally sustainable development is necessary for both rich and less wealthy nations of the world. This is because whatever negative impact emanating from unsustainable consumption anywhere is easily transmitted across the world in just a twinkle of an eye due to international migration. The COVID-19 experience is still ongoing.

Mentality Re-orientation and Behavioural Change in Human Society

Fundamentally, our pervasive human supremacy over nature is the inevitable driver of the sustainability crisis. At the same time, it has led to an exploitative tendency and the consequent environmental degradation and decline in biodiversity (Peter Benjamin, 2019). According to the same author, it is not a gainsaying that our intelligence has not only equipped us with a considerable power to manipulate the environment but also has empowered us with the knowledge of the consequence of our actions. Our actions should not drive other species away into extinction just because of our belief that resources are there for us to use for our needs. That mentality of dominance must be dropped and embrace mutual cohabitation with nature.

For us to live in harmony with nature in this critical time of the COVID-19 pandemic and beyond, moral responsibility and a feeling of oneness with nature must be sustained as a transformative capacity that guarantees prosperity for humans and the entire biosphere. This can be achieved by having another perceived or imaginary series of global catastrophes looming, and all governments of the world should come together to collaborate, enlighten, sensitise and give mass awareness on the urgent need for the transformational change that cut across socio-cultural, political, economic and religious barriers. Thus, it can be handled the same way the World Health Organization (WHO) handled the awareness of the COVID-19 pandemic, where adherence to prescriptions was accepted by both developed and developing, rich and poor nations of the world.

Meanwhile, these efforts shall engage interdisciplinary bodies both in academic endeavours and non-academic backgrounds that will evolve a new societal model where human beings and other species are incorporated in equality and harmony. Policy instruments may be needed to persuasively ensure compliance to a clarion call to avert a massive calamity through mentality re-orientation and changes in behaviour.

Clean and Efficient Transport

The role of transport in our societies and economies cannot be overemphasized. It ensures the provision of jobs, access to education, services, amenities and leisure while contributing to economic growth and trade development. Sadly, it is observed that the transport sector contributes almost a quarter of energy-related CO_2 emissions globally (UNEP, 2021a). However, introducing low-carbon urban transport through improved urban planning and shifting to sustainable travel means is fundamentally helpful in engendering a harmonious relationship between humanity and nature. For example, the promotion of electric and hybrid vehicles, replacing short domestic flights with rail journeys (like in France and Germany), and promotion of cycling and facility-sharing in urban areas; will ultimately reduce emissions of harmful gases into the atmosphere with their associated diseases such as chronic respiratory and cardiovascular disease, cancer, and many others which form underlying disease conditions that exacerbate spread of COVID-19 pandemic. This will improve the health of cities and their inhabitants and ultimately promotes urban sustainability.

Regulation and Strict Enforcement of Illegal Wildlife Trade

Current studies affirm that wildlife trade, degradation of natural habitat, and the interaction and interface between humans and wildlife are traced to zoonotic origins, such as Ebola and the novel coronavirus disease 2019 (Murray et al., 2021). However, shifting away from current practices through enhanced and proactive regulations and strict enforcement against illegal wildlife trade would reduce the risks of zoonosis and transmission of the COVID-19 pandemic. In other words, there must be a well-regulated and monitored wildlife trade to ensure that what is sold for consumption minimises the risk of passing zoonotic diseases to humanity (CellPress, 2020).

Summary and Conclusion

Major achievements and breakthroughs of humans - globalisation, urbanisation, flourishing civilisation and technological advancement have been attributed mainly to the benevolence and support of Mother Earth and her resources. As the global population expands exponentially with unsustainable production and consumption styles, the environment is subjected to

undue pressure arising from manipulation, overexploitation, abuse and neglect, leading to environmental challenges such as biodiversity loss, climate change, the outbreak of contagious diseases (like SARS, Ebola, and flu) and the novel COVID-19. From the available literature, the paper observed that the emergence and spread of COVID-19 have been traced to zoonotic origin.

It was glaring from the conceptual and theoretical frameworks of carrying capacity, and ecological footprint utilised in the paper that the resources of the earth system have reached their limit of sustaining further pressure of population explosion, unsustainable production and consumption patterns. Thus, humanity is taking more resources far above that the earth's systems can generate or give back. This scenario, therefore, distorts the harmonious relationship that once existed between humanity and nature.

Meanwhile, the paper observes that the emergence and spread of the COVID-19 pandemic and its calamitous repercussions globally is an expression of the failure of the current civilisation's analytical capabilities and technological capacities; to eradicate the prevalence of global environmental challenges such as climate change, environmental degradation, and a host of others. The paper explores a fundamental shift from the current thinking and practice that led the entire world into a deepening crisis of disharmony between humans and nature in the 21st Century and offers alternative planning strategies on how to live in harmony with nature as a bailout against the eventual collapse of the Earth systems in the post COVID-19 era. The paper considered the implications of human activities' effect on achieving urban sustainability in the post COVID-19 era. For example, the current dependence on fossil fuels should be shifted to clean, energy-efficient use. In that case, there will be a reduction in the hazardous air pollutant that exacerbate respiratory stress and other cardiovascular diseases that complicate COVID-19 patients. More so, nature-based solutions (ecosystem network and reconciliation mitigation, rebuild barriers to disease organisms that transmit COVID-19 pandemics.

Meanwhile, regenerative agriculture, investment in biodiversity), mentality re-orientation, and behavioural change in human society are other non-medical strategies for achieving urban sustainability in the post-COVID-19 era. The paper concludes that achieving urban sustainability during the post-COVID-19 pandemic is a function of the implications of the effects of human activities on nature.

Recommendation

Based on the findings highlighted in the paper, it is recommended that all legal and regulatory frameworks in all countries should be strengthened and enforced in areas such as total adherence to planning standards, wildlife trade restrictions, investment in biodiversity and all nature-based solutions. In addition, adequate and effective waste management strategies must be vigorously pursued. For example, recycling waste reduces the exploitation of natural resources. Finally, if the strategies offered in this paper are implemented, not only would the Earth and its resources be rescued from the adverse environmental effects, but it would enable humanity to retrace its unsustainable pathways to embracing unity with the environment and, consequently, leading to the promotion of peace, health, resilience, livability and prosperous societies in the post COVID-19 era and beyond.

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