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From The Desk of the Editor-in-chief...

ईशा वास्यमिदं सर्वं यत्किञ्च जगत्यां जगत् ।
तेन त्यक्तेन भुञ्जीथा मा गृधः कस्यस्विद्धनम् ॥ (यजुर्वेद ४०.१)

O Human! The entire world – static as well as dynamic – is pervaded by Ishwar – the Supreme Lord. Hence enjoy the pleasures in a detached manner. Do not be greedy. This wealth does not belong to anyone.

Humans have evolved and changed the world from what it was to what it is now. Environment and ecology comprising air, earth, water, plants, and animals play a very significant role imperative in sustaining human life and civilisation. There were several activities that took place to transform everything, it is certain that human civilisation can flourish only if there is consistent harmony among various stakeholders in making optimum sustainable use of the world. The time of war and industrialisation changed and shook society but also affected the environment. Excessive use of fuels and Chemicals deteriorated environment and affected the human lives. Even in the present we are going through many situations of not only societal issues, but scarcity of natural resources which is leading to degradation and damage in a big way.

Today all nations suffer from the environmental crisis of pollution. We need to sit together and try to find a solution where life will be lived in peace and harmony . Contributions from various disciplines are needed to address the fast changing social and Environmental effects of energy supply, transport production and its usage at all levels. India is standing in front lines to work with everyone for the common good. Asserting that India's dedication to climate commitments is evident from its performance.

The broader policy implication of submitted research should be addressed and environmental implications not just emission quantities, be discussed with reference to scientific assumptions. Ancient India was famous as a society that made immense contribution to civilization with its education, knowledge power and spirituality. This awareness and understanding of ecological sustainability in solving specific environmental issues is what we unfortunately overlook today.

Wish a happy reading

Sanjeev Bansal

SUSTAINABLE DEVELOPMENT: A THEORY AND LITERATURE PERSPECTIVE IN SANITATION AND DOMESTIC SEWAGE MANAGEMENT

S.K. Habila*

Abstract

This paper discusses Sanitation and Sewage Management through the lens of Sustainable Development. Secondary data within the themes of Sustainability and or Sustainable Development, Sanitation, Sewage Management, and generic concept of Waste Management were explored and reviewed from relevant published electronic-online soft copy and hard copy of regulations/ laws, journals and books. All the information gathered were descriptively analyzed in prose, that provided insight on sustainability in Sanitation and Sewage Management. All findings of the extensive desktop review were descriptively discussed. The Paper revealed Sanitation and Sewage Management as terms that are mutually exclusive and not separated in context in generic waste Management. However, Sustainable Development being a human activity quests for use of present environmental resources and yet preserve same for future generation through its protection and conservation, within the interaction of tripod (3) factors of Environment, Society and Economy.

It further revealed the variables to consider in determining sustainable Sanitation along the sewage management chain, most especially within the context of the Sustainable Development Goal (SDG) Six (6) on environmental sustainability; access to Water, Sanitation and Hygiene (WASH); reducing by half release of untreated sewage and ending Open Defecation by Year 2030 in order to promote environmental aesthetics, public health and environmental Protection. The paper further provides a conceptual framework and the important pointers for sustainable surveillance of sanitation along the sewage management chain, which in tun will help Researchers conduct studies that would uncover reliable information for policy formulation and intervention towards achieving Sustainability in Sanitation practices.

Key Words: *Domestic Sewage, Household, Sanitation, Sustainable Development Goals, Sustainability and Toilets.*

Introduction

The mantra on Sustainable Development had been embraced by Scholars and professionals of various discipline, since the concept evolved from a German Scholar Hans Carl Von Colowitz on the need for balance between resource exploitation or use and regeneration of natural capital specifically in Mining activities in relation

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to income generation (Loske, 2014), and the 1970's Stockholm conference on Human Environment debate on 'a healthy and productive environment'. Due to relevance and acceptance, the concept was further discussed in the Brundtland Commission report 1987, titled 'World Conservation Strategy' by the United Nations Environment Programme (UNEP) and the International Union for the Conservation of Nature (IUCN). The outcome of the report undoubtedly convinced environmentalist the reality of Sustainable Development, by making it a frontier of knowledge needing attention for further studies (Eblen and Eblen, 1994 and Basiago, 1999).

By definition, Sustainable Development is that which meets the needs of the present without compromising the future generation's ability to meet their own needs (World Commission on Environment and Development, 1987). Gyuse (2011) views the term as enjoying the available benefits of today not at the expense of the environment and denying those coming after, the opportunity to enjoy same benefits. Spangenberg (2015) adds that, Sustainable Development is conceptualised within the spheres of two concepts. First, prioritising the 'needs' of the world's poor that overrides all other needs that are considered very essential. Secondly, the technological state and social organisation restrictions influence on environment's ability in meeting current and future needs. The immediate aforesaid purports social dimension of human needs and imperative to conserve environment's ability to cater for that need, which is an environmental dimension to sustainability.

Enders and Remig (2015) observed the presence of unsustainable anthropogenic activities around the world that have consequential effects on loss of biodiversity

and fertile soil, climate change, inequalities in resource use within and among generations and increasing poverty level. Therefore, a call to conceive ideas, inculcate durable development patterns and sustainable lifestyle within the limit of the carrying capacity of planet earth (ibid). This of course would provide an effective response and consciousness to the increasing impact of anthropogenic activities on the environment that may endanger the survival of Planet earth and its future generation potentials of use. In addition, encourage the use of biosphere in a manner that will benefit the present generation and meeting the needs of unborn generation (Klarin, 2018).

The core doctrines of Sustainable Development originate from Economics and has helped in laying the foundation for global societies social and economic development with bearing in mind ecological limitations (Dixon and Fallon 1989; Basiago, 1999; Lafferty and Meadow-Croft, 2000 and Klarin, 2018). In the same vein, Starik and Kanashiro (2013) views the term in relation to societal development that goes through economic growth. In consonance with the views of Klarin (2018), Ahammad opines that when all-human activities are viewed with the lens of sustainable development, guide to achieving a most desired future of human existence without compromising their environments integrity, stability and aesthetics is attainable. Habila, Atere, Muhammad, Dadan-Gaba and Mado (2021) further perceived the term as a phenomenon that is concerned with Environmental Protection. Jenkins (2008) earlier posits that, sustainability connotes the ability to control certain occurrences, in terms of their outcome and processes over time. With this generic understanding of the term, all forms of human activities including sewage related issues can be viewed from

the lens of sustainability. From the aforesaid premise, this paper therefore, pivots its focus and discusses Sanitation and Sewage Management through the lens of Sustainable Development. Interestingly, Sanitation and Sewage management was tagged under environmental sustainability in the Millennium Development Goal 7 and rolled over to the Sustainable Development Goals (SDG) 6 due to its relevance and significance in determining planetary health and environmental performance (Habila and Danjuma, 2022). Therefore, the need to explore several ways that provides insight and direction towards promoting the achievement of sustainable global public health, aesthetics and environmental protection.

Methodology

Secondary data within the themes of Sustainability and or Sustainable Development, Sanitation, Sewage Management and generic concept of Waste Management were explored and reviewed from relevant published electronic-online soft copy and hard copy of regulations/laws, journals and books. All the information gathered were descriptively analyzed in prose, that provided insight on sustainability in Sanitation and Sewage Management. Furtherance to the immediate aforementioned focus of the paper, the concept of sewage, sanitation and sewage management is subsequently discussed here, in order to shed light and clear the air on conceptual issues on one of the major components of this paper. All findings of the extensive desktop review were descriptively discussed.

Concept of Sewage, Sanitation and Sewage Management

Tchobanoglous, Burton and Stensel (2003), defined sewage as any water that has been

severely degraded in quality from human activities, and the degradation is as a result of the presence of varying contaminants such as soaps and detergents from bathrooms, food scraps and oil from kitchens. It is also viewed as a mixture of used water from all domestic purposes, human faeces and water used in flushing excreta from the toilet (World Health Organization, 2006). Zhou and Smith (2002) add that, sewage is a water supply that has been fouled by a variety of uses from a community that flows in open drains. Cheremisniff (2002) and Amador County Environmental Health Department (2016) opines that, it is a combination of liquid or water carrying wastes from residential, commercial and industrial establishments, together with ground, surface and storm water. However, Municipal sewage usually comprises of both black and grey water. The thirty percent (30%) portion of black water contains much of the pollution load in the sewage due to the presence of fecal matter, while the grey water constitutes 70% of the other domestic used water without urine and faeces (Centre for Environment and Development, 2011). Therefore, Sewage can be used interchangeably as 'wastewater' (Metcalf and Eddy, 1991 and Habila, 2022). By the views of the aforesaid authors, Domestic Sewage can be defined as the combination of both grey and black water including fecal sludge sourced from homes/ residences, institutions, and commercial areas without industrial activities (Habila, 2022).

Sanitation is the provision of access to and use of facilities/ services with the intention of achieving appropriate and safe disposal of human urine and faeces (World Health Organisation, WHO, 2018). It is also the safe handling and disposal of sewage and human excreta (Maharashtra Jeevan Pradhikaran (MJP), 2012). Peal *et al.*

(2010), also states that, Sanitation means the collection, transport, treatment and disposal or reuse of human faeces. These definitions reveal the mutuality and non-separateness of the two terms ‘sanitation’ and ‘sewage’.

Sanitation and Sewage Management considers wholly, the value chain from the experience of the generation (user) of black and grey water collection methods, transportation or conveyance of waste, treatment, and reused or disposal (Rosemarin *et al.*, 2008). Peal *et al.* (2010), sees it as a system that provides safety and disallows pollution of environment with appropriate and affordable options for households or community in operation and maintenance. By extension, it means the appropriate and proper handling of human excreta (*ibid*). Hence, Safe Sewage Management and Sanitation seeks to promote public health, toilet use privacy and control of social hazards (WHO, 2018). The lack of it can lead to transmission of some infectious diseases such as Diarrhoea, soil transmitted helminthic diseases (schistosomiasis and Trachoma), sewage vector borne diseases (west Nile virus/ lymphatic filiaris), Hepatitis A and B and proliferation of culex mosquitoes in stagnant sewages in open drains and environmental enteric dysfunction (UNICEF/ WHO, 2017; UNICEF, WHO and World Bank, 2018).

Sustainability Theory in Sewage Management

Sustainability theories are basic ideas and postulations with roots from social justice, conservatism, internationalism and other forms of historical movements that prioritize and integrate the responses of social spheres from environmental and cultural (traditional) problems (World Commission on Environment and Development (WCED), 1987 and Jenkins, 2008). The term ‘sustainability’ appears to be a term sourced from two key words ‘sustain’ and ‘ability’ which connotes the

‘capacity to maintain, adapt, endure, upgrade and promote’ existing situations that needs to be maintained (Smith and Sharcicz, 2011; Starik and Kanashiro, 2013). Though, different scholars have different opinion on the term.

Shiva (2010), perceives a generic view of the term sustainability in relation to human activities on its peculiar and consequential impact on the environment. The natural environment aids people to live and absorb the outcomes of their activities, which indicates that sustainability cannot be talked about without ecological elements (Jenkins, 2009; Sach, 2010 and Shiva, 2010). Therefore, the inclusion of environmental adaptive mechanisms from the imprints of human activities, such as sanitation and sewage management practice are fundamental in sustainable development discourse and consideration (Habila, 2021).

Originally, sustainability dwells more with the natural science, which studies the spatio-temporal ability of ecosystems existence, but a paradigm shift occurred when the term ‘development’ was added to become ‘sustainable development’, therefore, the inevitable transition from natural science to social science/ society (Baker, 2006). It can further be illustrated by the interaction between three (3) or tripod pillars of sustainability; the social-society, economy and environment-ecology and their associated areas of overlaps for fair, achievable and acceptable convergence toward a balance existence as shown in Figure 1 (Elkington, 1994; Klarin, 2018).

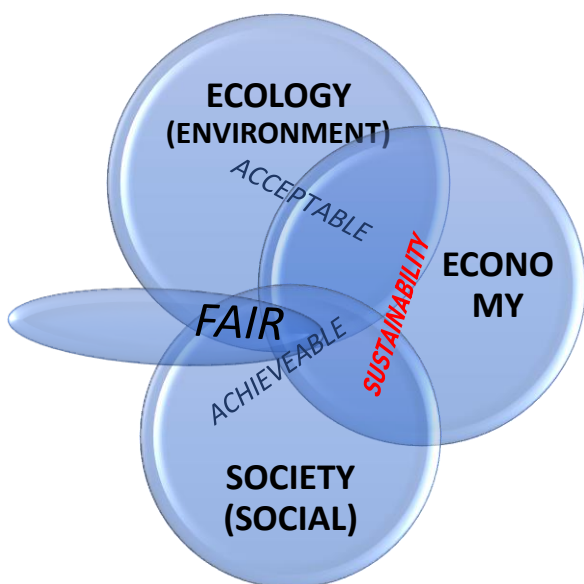
First, the social pillar promotes human norms and values expressed in terms of human rights, culture, race, religion and equity in access to education, health care and sewage services. Its overlap with

economy and environment is ‘fair’ and ‘acceptability’; Fair connotes the strive to achieve equity in employment, health care, sanitation/ sewage services, development and human rights and acceptability ensures the quality of appropriateness of services to society wards respectively (Elkington, 1994; Klarin, 2018).

Secondly, the economy pillar is profit driven, through allocation and distribution of resources to achieve human development and capital investment/ revenues for increased standard of living irrespective of environmental consequences. Its interaction with society and environment is ‘fairness’ and achievability, which connotes, aforesaid equity in access to resources by all society wards, while achievability ensures efficient use of environmental resources such as water, air, land, urban space, and energy to prosper economically with less impacts (Elkington, 1994; Korowitz, 2012; Klarin, 2018).

Figure 1: The Three (3) Pillars of Sustainability/ Sustainable Development
Source: Adapted from Elkington, 1994; OECD, 2000; and Klarin, 2018

Thirdly, environment pillar provides the



abode for both society and economy to

thrive, without it, they may cease to exist. However, its overlap of acceptable achievability is to ensure efficient use of all its resources with the aim of achieving and maintenance of a quality environment that is necessary to contain both economic activities and a habitable environment for society (people), through the prevention of emission of harmful gases and waste and yet progressing economically (Ahammad, 2015; Klarin, 2018).

Elkington *et al.* (1994) and Klarin (2018) posits that, sustainability can only be achieved through setting an equilibrium between the three (3) pillars of sustainable development. Klarin (2018) further buttress that, in a natural state, individual goals may be achieved at the detriment of other pillars, while, other pillars are becoming sustainable, others may be turning out unsustainable. For instance, the imprints of economic and social components often times leave their imprints on the environmental/ ecological component. Elkington (1994) also adds that the aforesaid concept is a representation of the inseparable interaction of the three fundamental pillars of sustainability that ensures a balanced relationship and mutuality. This theory therefore, provides a philosophy of meeting human needs in consonance with the provisions of the sustainability pillars. Duran *et.al.* (2015) and Klarin (2018) further asserted that, in meeting the needs of humans, sustainable development should be the one that would enable equity, social determination, recognition to cultural diversity and protection of the environment, without which no development can be sustained.

that, sustainability in sanitation and sewage management is linked to human rights access to sanitation and sewage services and inclusive development. He further explained that, social pillar means (cultural acceptance), economic (income level or ability to pay for sewage services), and environment (weather conditions/ suitable topography (water table) to contain sanitation option technology) are drivers that would enhance the realisation of

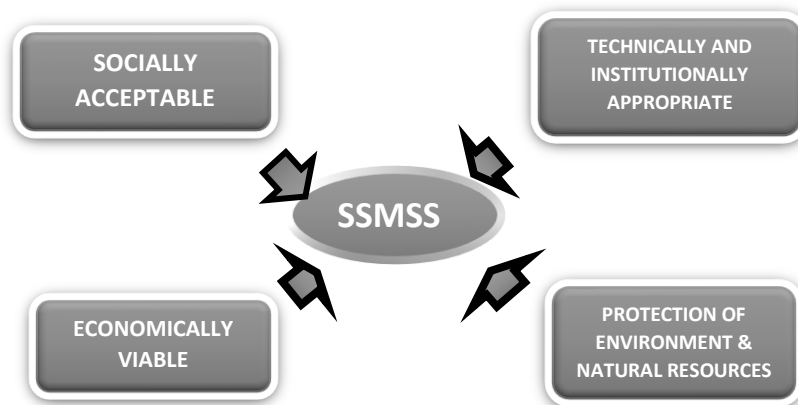


Figure 2.: Sustainable Sewage Management and Sanitation Services (SSMSS)Source: Adapted from UN-ESCAP, UN-HABITAT, AIT, (2015) and Habila, 2021

Ekins (2000), opines that the use of sustainability as a term is multifarious, and can be used in various subjects of interest within its three pillars. Sewage management is amongst the phenomena that sustainability can be used for its character of a human related activity with outcomes that require intervention. On this premise, Obani (2018), further revealed

However, WHO, UNICEF, JMP (2018), attests that Sustainability in Sewage Management and Sanitation is driven by the quest for equity, where all people would have access to safe and appropriate sanitation; promotion and protection of residents or users of options from sewage borne diseases and environmental protection (that is, it does not pollute or degrade the environment).

Therefore, the provision of frameworks guiding sustainable sewage management and sanitation practices must ensure social acceptance, economic viability, technical and institutional appropriate practices, that promotes environmental protection for the present and future generations not yet born (UN-ESCAP, UN-HABITAT, AIT, 2015) as shown in Figure 2. In the same vein, corroborated by Anderson *et al.*, (2016) that, a sustainable sanitation and sewage management are systems put in place to ensure minimization of resource degradation, protection and promotion of public health and minimization of environmental filth. It is usually technically and institutionally suitable, socially acceptable and economically viable in the present, functioning properly and sustained by the present target population for a considerable long term, as well disaster resilient and contributing hugely to a wide socio-economic and environmental sustainability.

Sustainable Development and Environmental Governance

As earlier mentioned in the introduction of this paper, the central focus of the Brundtland report of WCED (1987) is specifically on issues regarding meeting the needs of the 'now' without trading-off tomorrow's needs, therefore, the call for global environmental governance within the sphere of sustainability. It can be achieved through; the support of all activities and development that are economically and environmentally friendly (sustainable). It involves early identification and dealing with the effects of activities to ensure resource control management and environmental protection by all actors and stakeholders. This includes scientists, international NGO's and community's participation in taking decisions on valid choices and provision of

legal frameworks at all levels. In turn, would enhance effective monitoring and assessment of extent of development and its possible impacts on ecological components and soliciting International NGO's involvement in achieving the tenets of sustainable development.

Interestingly, the UN conference in 2015 at New York on Sustainable development agenda, designed a seventeen (17) point agenda. It focuses on how to help achieve a world that people would live prosperously, productively, vibrantly, and peacefully without harming the orphaned planet earth. This is to be achieved by year 2030, through the 'Sustainable Development Goals' (United Nations Development Programme, 2015; United Nations, 2019). Interestingly, the Sustainable Development Goals (SDG) 6 proposes the achievement of "access to adequate and equitable sanitation and hygiene for all, and end open defecation, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, and halving the proportion of untreated wastewater globally" (Sustainable Development Goals Centre for Africa and Sustainable Development Solutions Network, 2019).

In spite the aforementioned provision, little is achieved. Unfortunately, ninety percent (90%) causes of maternal deaths in low-income countries member states such as Asia and Sub-Saharan Africa are due to the lack of basic sanitation, proper sewage management and access to clean drinking water (United Nations, 2019). Therefore, the urgent need to fast track efforts towards achieving the aforesaid goals. Although, the proportion of global population that are safely managing their sewage within the sanitation services and chain rose from 28 per cent in 2000 to 45 per cent in 2017, those with basic sanitation from 28 per cent to 29 percent, limited sanitation 5 per cent to 8 percent, Unimproved 17 per cent to 9 percent, while 9 per cent are still practicing open defecation with majority from

southern Asia (ibid). Therefore, sewage management practices and sanitation services must ensure that, the environment at which they operate is cautiously protected from negative consequences.

However, the European Union (EU), laments that, in meeting the waste water directive for sustainable waste water management through the conventional treatments, the low in-come countries are confronted with challenges of installing treatment plants due to its high cost of construction and management (Braden and Van Ierland, 1999; and Asemota *et al.*, 2011). They further advocated for the adoption of localized systems that can socially be accepted by people, have access to, economically and environmentally friendly towards achieving sustainable management as also corroborated by the UN-ESCAP, UN-HABITAT, AIT, (2015) and WHO/ UNICEF JMP (2018).

Indicators and Measurable Variables for Sustainable Domestic Sewage Management and Sanitation Chain

Since Sanitation and Sewage Management require sustainability in order to promote good public health, environmental protection, aesthetics, that is, appropriate environmental performance and attaining the Goal 6 of the Sustainable Development Goals (SDG). WHO (2006), Strande *et al.* (2014), WHO (2016) and WHO/ UNICEF, JMP (2018a and 2018b) provided certain measurable variables for monitoring the safeness status and appropriateness of domestic sewage management practices along the sanitation chain. This starts from the user interface/ generation point, containment/storage/treatment, conveyance/ transportation, Treatment and disposal) on the hardware (facilities and their condition) and software (hygiene behaviours/ culture) practices of Households, Sewage Governance and

institutions. The aforesaid being the major stages of sewage management and major stakeholders in city sanitation, when carefully examined within the scheme of the under-mentioned indicators will help to establish the existing situation, that would further provide the direction of action. This could be appropriate intervention and policy formulation for bad situations and or policy strengthening and implementation strategies to achieve improvement. The following are variables and or criteria that could be used to monitor, assess and measure the domestic sewage management practices along the sanitation chain in cities.

- i. **User Interface or Generation point of Household**
 - a. **The toilet design and construction.** A sanitary toilet is the one that separates users direct contact with excreta and black water. Firstly, to be determined from the types of onsite sanitation options in use Simple-Unimproved Pit Latrines, Ventilated Improved Pit Latrines, Pour Flush Pit Latrine, Water Closets (WC) and shared/ not shared improved toilets with other households.

This will help to determine the proportion of Population in percent and further determining the Safely Managed, Basic, Limited, Unimproved or Open Defecation/No Service Sanitation status of the study area. Secondly, households with 50% (percent) proportion and above in relation to other varieties of sanitation/ toilet option or sharing status, would be considered the predominant quality of user interface and in turn establishing the sanitation status of

the sanitation and domestic sewage management practice of such a populace.

- b. **Physical Conditions of the toilet superstructure:** This involves ascertaining the presence of roof over the toilet superstructure that promotes comfort, type of building material (thatch/ grass, wood, mud blocks, or cement/ concrete) for durability and reliability and lockable doors that should discourage physical (storm water and rainwater), Social (presence of lockable doors) that promote user privacy and biological (animal, pests, and insects) intrusion. This will help establish the Affordability level of people based on their economic viability, which invariably expresses their purchasing economic status and willingness to possess appropriate sanitary conditions.
- c. **Culturally and socially accepted toilet design and sanitary material** (anal cleansing material (such as water, toilet tissue, stones or ash) that reveals the personal hygiene after toilet use of residents.

It is worthy of note that, item ‘b’ and ‘c’ would help to establish the level of acceptability of the predominant user interface or sanitation technology in item ‘a’ by the community and perhaps the promotion of local available systems that may promote comfortability, absence of foul/ odorous smell, discourage human affronts and share of toilet facilities.

- d. **Location/ siting of the toilet:** inside or outside the house and or compound or offsite. This to large extent would help to determine the accessibility for all households and physically challenged persons and social risk factor amongst for women and children (UNICEF/ WHO-JMP, 2018a).
- ii. **Containment –storage/ Treatment Household practice**
 - a. **Siting/ location of vault/ septic tank/ soak away** 15m horizontal safe distance/set-back away from underground water source (KEPA, 2010 and WHO, 2016). Black Water and Grey water outlets be collected via sewer into the soak way and not in open drains, water body or open ground to determined sewage that is contained in Septic tank or Pit Latrine (that is off-set or on-set pits containment) and sewage directly discharged into open drains.
 - b. **Whether black water and faecal sludge treatment is onsite containment technology,** and emptying when containment is full to determine the safeness in emptying in relation to the method employed by households and safe operating procedures (safety wares or PPEs by workers).
- iii. **Conveyance or Transportation practice by Sewage Service Providers**
 - a. **Type of emptying methods:** that is, if Manual (carts and wheel barrows) or Motorised methods (suction trucks) of emptying faecal sludge, black water and grey water. This

helps to ascertain the method that discourages workers and residents from contact with faecal sludge and fresh faeces. Well, Motorised method is more appropriate over the manual, due to lesser risks of infection and reduction of social stigma on workers.

- b. **Risk level** from the conveyance method in use (spillage of content, treatment status, end use and disposal points). Use of Safety wares by workers (hand gloves, masks, hats, full overalls and enclosed waterproof footwear)
- c. **Worker's knowledge** and training on standard operating procedures prior to sewage emptying activities.
- d. **Health status (vaccination)** against sewage borne diseases such as tetanus, polio, typhoid fever, hepatitis A and B and regular medical examination of workers.

Note that, items iii (a-d) would help in determining the Safely or not Safely transported/ conveyed and disposed sewage/ faecal sludge within health and safety plan. All these shall be revealed by the proportion of population in percent as expressed by respondents and the physical observations done via a checklist as recommended by WHO, UNICEF and JMP (2018a and 2018b)

iv. **End use or Disposal Practice by Sewage Service Providers**

- a. Final disposal points which include farm field, water body, landfills, open spaces and open drains.
- b. Use of Personal Protective Equipment (PPE) (such as safety goggles, rubber/ hard hand gloves, breathing respirators, foot wears and coverall dress), Standard Operating procedures (such as disinfectants etc.).

- c. Knowledge of workers on risks associated with emptying the motorised or manual septic tanks.

v. **Assessing the Regulatory roles Sewage Institutions and Governance**

This includes the existing:

- a. Organisational framework with liquid waste management units for effective monitoring and surveillance and clear roles of employees with adequate number and quality for sewage management (Strande, Ronteltap, and Brdjanovic, 2014).
- b. Effective laws and regulation with clearly defined roles for enforcement, monitoring, and penalties.
- c. Adequate staffing in number and quality with requisite Qualification and Training (Strande, Ronteltap, and Brdjanovic, 2014).
- d. Coordination of and with relevant stakeholders to ensure effective management along the sanitation service chain

Conclusion

This paper has established the pathway through literature and theoretical perspective on the way forward towards achieving the desired Sustainable Goal six (6) on environmental sustainability; Access to Water, Sanitation and Hygiene (WASH), reducing by half release of untreated sewage and ending Open Defecation by Year 2030. The study revealed that Sanitation and Sewage Management as terms that are mutually exclusive and not separated in context of generic waste Management. Therefore, Sanitation being a sub-theme and a Sustainable Development focus on human activity quests for use of

present environmental resources and yet preserve same for future generation through its protection and conservation, within the interaction of tripod (3) factors of Environment, Society and Economy. The paper finally suggested indicators as pointers for sustainable surveillance of sanitation along the sewage management chain, which in turn will help Researchers conduct studies that would uncover reliable information for policy formulation and intervention towards achieving Sustainability in Sanitation practices.

Originality of work and multiple submissions

I certify that this work is my original work and all cited works are duly acknowledge by way of referencing, the work has not been submitted for another publication elsewhere.

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Ukraine's war's global repercussions

ONLY THE DEAD HAVE SEEN THE END OF THE WAR

Mr. Aniket Chatterjee*

Ms. Mouli Pandey**

Every war is a tragedy for the people involved, and the crisis in Ukraine is no exception. Beyond its borders, the conflict's aftershocks are causing widespread human suffering. The battle has worsened in all of its manifestations an unprecedented worldwide problem in the expense of living, by 2030, endangering lives, means of support, and our dreams of a better society.

After two years of fighting COVID-19, the entire economy is now unstable. Developing countries miss out on \$1.2 trillion annually to close the social protection gap, 60% of workers now have real incomes that are lower than they were before the pandemic, 60% of the world's poorest nations are in debt distress or are very likely to enter it, and \$4.3 trillion annually is needed - more money than ever before - to achieve the Sustainable Development Goals (SDGs).

As a result, people's and countries' ability to endure adversity has been deteriorating. Since the beginning of the conflict, price increases in grain and wheat alone have resulted in a 1.5% real income loss for the average household, and worldwide average growth

projections have been revised downward as well. More people around the world have experienced acute food shortages and famine-like situations. It is anticipated that the number of people living in poverty will continue to increase as a result of the pandemic's ongoing effects, the conflict in Ukraine, and the consequences of climate change. The continuous cost-of-living dilemma mostly affects nations and populations with little adaptability. These consequences are produced by rising food prices, rising energy prices, and tightening financial conditions are the three main transmission pathways. Each of these elements has the capacity to create substantial effects on its own, but they may also feed into one another to create vicious cycles, which, regrettably, are already beginning. For example, high fuel and fertiliser costs increase farmers' production costs, which may result in higher food prices and lower agricultural yields. Budget constraints, poverty, declining living conditions, and societal instability could all

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result from this. After that, there is more pressure to raise interest rates, which pushes up the cost of borrowing for developing countries and weakens their currencies, driving up the price of food and energy. Food is a fundamental human right and should never be seen as an excess. But this issue might swiftly turn into a global food calamity.

The war has made many nations unable to bear this calamity, which has been years in the building. In 41 of the 53 nations where data are available, in 2021, it's expected that between 179 million and 181 million people would face a food crisis or worsening conditions. In addition, if the Russian Federation does not act, 19 million additional people worldwide are predicted to face chronic undernourishment in 2023 and Ukraine's reduced food exports lead to decreased food availability globally². Key factors include exchange rate devaluation, inflationary pressures, and record-high food prices. The FAO food price index had already reached a record high before the conflict began in February 2022, but since then, it has experienced some of the greatest one-month rises in its history, peaking in March 2022. Even while the situation is currently quite difficult, there are some indications that it might get worse during the coming growing seasons.

Due to rising energy costs, trade restrictions, and a reduction in fertiliser supplies from the Russian Federation and Belarus, fertiliser prices have risen even more swiftly than food prices. As a result, many farmers, particularly smallholders, are forced to cut back on production because the fertilisers they require now cost more than the grains they are selling.

Importantly, it takes at least two years for new fertiliser factories to start up, which

means that the majority of the existing supply of fertilisers is constrained.

The global food supply may not be able to keep up with the growing demand in 2023 as a result of this significant fertiliser issue. The most popular staple in the world, rice, which has historically had low pricing due to plentiful supplies, might be greatly impacted by this trend of decreased fertiliser affordability for the coming growing season.

There is not much time left to prevent a 2023 food crisis where there will be problems with both food availability and access. If the war continues and high grain and fertiliser prices persist during the following planting season, food supply will be reduced at the worst possible time and the current crisis in corn, wheat, and vegetable oil may expand to other staples, affecting billions more people.

Export restrictions on food and fertiliser have substantially increased since the start of the war. The current level of restrictions is greater than it was during the food price crisis of 2007–2008, which contributed significantly to the 40% increase in agricultural prices. Trade restrictions now have an impact on about a quarter of all calories traded internationally, which is a problem. There is always a distributional dilemma with food. This one is unremarkable. Export restrictions impede the trade required to transport essential food supplies and fertilisers to the regions where they are most needed.

The conflict's shockwaves have an impact on everyone in some way. The degree of susceptibility of a nation is determined by its amount of exposure and shock tolerance. And this is an issue in the developing countries. In cooperation with the United Nations Regional Economic Commissions, the UN Worldwide Crisis Response Group

undertook a global vulnerability assessment on the capacity of governments to handle each of the pathways of transmission and the vicious cycles they can produce.

The results confirm a widespread impression of vulnerability: 94 countries, with a combined population of over 1.6 billion, are extremely exposed to at least one component of the problem and powerless to deal with it. Out of the 1.6 billion people, 1.2 billion, or more than 75%, live in "perfect-storm" countries, which are those where the three components of finance, food, and energy are all present at the same time and are extremely vulnerable. The results confirm a widespread impression of vulnerability: 94 countries, with a combined population of over 1.6 billion, are extremely exposed to at least one component of the problem and powerless to deal with it. Out of the 1.6 billion people, 1.2 billion, or more than 75%, live in "perfect-storm" countries, which are those where the three components of finance, food to eat, and energy to sustain are all present at the same time and are extremely vulnerable.

Budget cuts for families and nations can make people and governments vulnerable by forcing them to make difficult but necessary trade-offs. Smallholders or micro entrepreneurs may stop operating due to rising energy costs, COVID-19-related temporary school absences in children may now result in permanent exclusion from the educational system, and hungry poor families in developing countries may cut back on health-related expenses if social protection systems and safety nets are not sufficiently expanded. Unless a coordinated global effort is made to address potential liquidity difficulties and boost fiscal flexibility, countries would struggle to pay their food and energy costs while servicing their debt and increasing expenditure on social protection as necessary.

There is still time to take action to stop the cost of living crisis and the ensuing human suffering, even though time is running out. Two primary, concurrent tactics are necessary:

- I. Bring about stability on the world market, lessen volatility, and deal with the erratic nature of commodities prices and the mounting debt burden. Without reintegrating the agricultural production of the Russian Federation, Ukraine, and other countries into global markets notwithstanding the conflict, there will not be a viable solution to the food problem.
- II. Increase the adaptability of individuals and nations. In order to develop social protection systems and safety nets and, as a result, improve people's capacity to cope with adversity, it is necessary to provide the most severely exposed countries with more budgetary room and access to liquidity.

Collectively, this shows that, as the Secretary-General of the United Nations has stated, "there is no solution to the cost of living problem without a solution to the financial crisis." It is necessary to revive all easily available rapid disbursement processes at international financial institutions and to pursue a new issuance of Special Drawing Rights. Making sure that resources are used wisely is nevertheless essential. Added targeted and/or time-bound emergency measures, which should be in line with needs for sustainable development and not distributed broadly, are one way that countries might respond to the crisis. This will aid in the development of social

protection programmes. Last but not least, it is crucial to stop a cascading debt crisis that is triggered by solvency concerns in developing nations.

The G7 and G20 must accept the task of presenting tools for debt restructuring that are appropriate for the situation.

Strong political will is required across the multilateral community for success. Piecemeal strategies won't be successful. What will work is a thorough strategy that considers the crises at hand while also keeping the future in mind. The vicious loops this crisis produces demonstrate that no single aspect of the dilemma can be resolved on its own.

Strong political will is required across the multilateral community for success. Piecemeal strategies won't be successful. What will work is a thorough strategy that considers the crises at hand while also keeping the future in mind. The vicious loops this crisis produces demonstrate that no single aspect of the dilemma can be resolved on its own.

The biggest housing market collapse of the twenty-first century

At a time when people and nations are less equipped to adapt, the largest cost of living issue of the twenty-first century has arisen. The Ukraine crisis has made life difficult for individuals all over the world. The main issue is the war's considerable price shocks in the food, oil, and fertilizer industries, given the significance of both the Russian Federation and Ukraine in these markets. The hard place is the incredibly unstable context from which this calamity arose—a globe coping with the spiralling crises of the COVID-19 epidemic and climate change.

A shock of this size would have been challenging regardless of the time; as it is, it has historic, century-defining proportions.

A difficulty with cost of living driven on by big price shocks.

The FAO food price index is up 20.8% from this time last year and has nearly hit record highs.

Volatility on the energy market has increased as a result of the realization that a protracted conflict will lead to higher energy costs in the medium to long term. Crude oil prices have now surpassed \$120 per barrel, and it is anticipated that overall energy expenses would rise by 50% in 2022 compared to 2021. 4 Since 2020, the price of natural gas has multiplied tenfold, especially in Europe. Numerous big gas customers have pledged to drastically reduce their reliance on Russian natural gas by importing more liquefied natural gas from other countries.

Between 2000 and 2020, the cost of fertilizer increased by more than twofold.

Maritime transport costs are more than triple the pre-pandemic average due to the COVID-19 crisis' lingering effects, the destruction of Ukraine's transportation infrastructure (and particularly its ports), a higher volume of traffic and congestion-related delays, as well as other factors like rising fuel prices (7). Total sea transport costs are expected to have climbed by 5 to 14% on North-South trade routes as a result of the past three months' cumulative increase in fuel prices.

The value of developing countries' currencies and their capacity to borrow on international markets have both decreased due to increased investor concern and rising interest rates. After the first 100 days of the conflict, the value of 142 developing countries' currencies relative to the US dollar fell by an average of 2.8% (2.7% YTD), and the interest rates on their bonds increased by an average of 77 basis points.

However, the story doesn't finish there. The vicious cycles of a cost-of-living issue can also lead to social and political discontent. The effects of rising inflation include greater living expenses as well as higher energy and food costs. As a result, families' real income decreases, which has a negative impact on their standard of life and prospects for the future. Some families start to make sacrifices like lowering the calibre or quantity of their meals, dropping out of school, or spending less on healthcare. Women and girls are frequently the ones who are most affected by these decisions. Long-term effects of these decisions include rising poverty, rising inequality, declining education, and declining production.

The capacity of people and nations to respond has been hampered by the twin crises of the epidemic and climate change.

The resilience of people is eroding.

- Starting from 2019, there have been 77 million more people living in extreme poverty. how many people are suffering from acute food 193

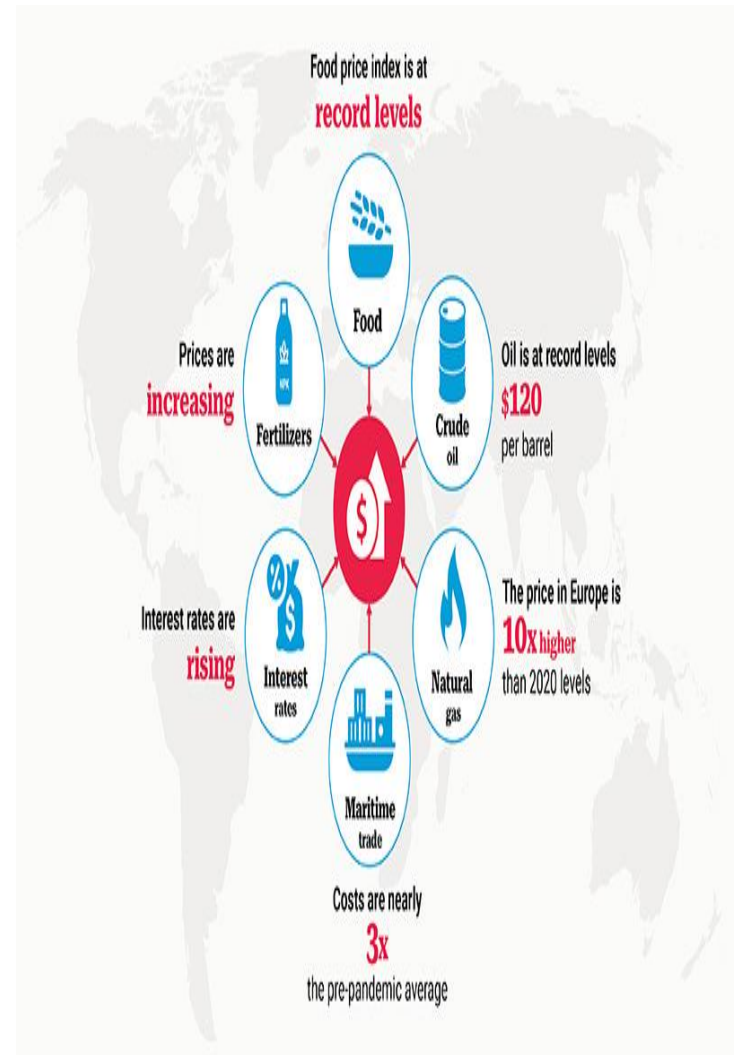
million people now experience insecurity.

- Three out of five workers worldwide, primarily in developing nations, now make less money in real terms than they did prior to the pandemic.
- 58 million Africans who are currently just above the poverty line are at risk of falling below it due to the combined effects of the pandemic and the war in Ukraine.
- There will be 2.4 billion fewer people worldwide with access to clean cooking fuel between 2019 and 2021.
- Sub-Saharan Africans who had recently gotten access to tier-1 electricity in 2020 would no longer be able to pay it and would once again live in energy poverty. In Sub-Saharan Africa, there were 568 million people without access into electric from 2020.

Additionally, nations are less equipped to handle this new crises.

- Since beginning of the war¹⁷, the UNCTAD has lowered its global gross domestic product (GDP) growth predictions downward by one full percentage point, while the IMF has not.
- Between 2019 and 2021, public debt levels in developing countries increased from 55.7 to 65.1% of GDP. By 2022, it is anticipated that these economies will require \$311 billion, or 13.6% of total government revenue, to service their public external debt.

- The annual finance gap for fulfilling the Sustainable Development Goals is now estimated by UNCTAD to be \$4.3 trillion, up from the previous estimate of \$2.5 trillion made 2015 saw the adoption of the 2030 Agenda for Sustainable Development.
- The global economy is negatively impacted by climate disasters to the tune of \$520 billion annually, with developing nations bearing a disproportionately large portion of the burden because they are compelled to divert domestic public funds from development spending to adaptation and loss and damage efforts.



Economies severely exposed to at least one dimension of the shock

107 economies

with a maximum exposure score in at least one of the Food, Energy and Finance dimensions



41 economies in Africa, 38 in Asia and the Pacific & 28 in Latin America and the Caribbean

Geographical distribution of economies



35 out of 46 Least Developed Countries & 40 of out 58 Small Island Developing States

UN country groups



1.7 billion people

Total population



553 million people already in poverty

Using a PPP poverty line of US\$ 3.20 per day



215 million already undernourished people

As classified by the UN at the end of 2020



Effects of the economic crisis on people

Budgets for households are being rapidly restricted by the crisis. Regarding poverty levels, actual incomes, educational achievement, and access to food and energy, this has significant ramifications. These effects are also very regressive because they disproportionately affect women and girls and the poorest households. In the current climate, its impacts on hunger, malnutrition, and food insecurity are particularly worrisome.

Effects of the war on incomes, energy access, and poverty.

According to the World Bank, accounting only for price hikes for grain and wheat, a figure that varies greatly by country, the typical household has lost 1.5% of real

income since the conflict began. Averages can conceal more information than they can provide when the impacts are broken down.

The most vulnerable members of society will suffer the most from high food prices.

- The most vulnerable members of society will be most negatively impacted by high food and energy prices, especially in developing nations when more than 50% of the income earned by the poorest households is spent on food.

However, many of the populations that are considered to be "not poor" are nonetheless severely vulnerable because they are so near to the poverty threshold. Engaging these groups in safety nets and social protection networks is essential to aiding the poor and preventing further poverty among these vulnerable groups. The crisis has

also severely affected these populations.

- These households' purchasing power decreases by more than 5% with a 10% increase in food prices, or roughly the same amount that poor families in developing nations spend on health on a yearly basis.
- Global poverty will expand as costs of life continue to climb sharply. Already, the epidemic has had a significant negative impact on efforts to combat poverty. The problem is made even more difficult by ongoing inflation increases brought on by the Ukrainian conflict.
- As a result of the increased cost of energy, more individuals will become energy poor and revert back to burning biomass, which can disproportionately harm women. When energy supplies are excessively expensive or scarce, women spend more time supplying the energy needs of the home. For women's small-scale income-generating activities in the unorganized sector, access to energy is also essential.

Impact of the war on food security

An exponential rise in the number of hungry people is the main cause of the cost-of-living problem.

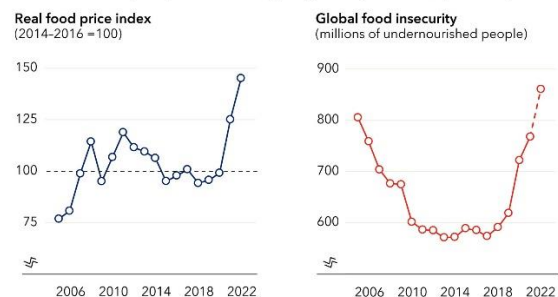


The Global Network Against Food Crises predicts that between 179 and 181 million people would endure a Crisis or worse conditions (IPC/CH Phase 3 or above) in 41 of the 53 countries where data are tracked.

There has probably been a higher and more widespread rise in hunger since the start of the war. The number of people experiencing acute food insecurity is expected to double in just two years, from 135 million pre-pandemic to 276 million at the start of 2022. This is done in order to get ready for its operations in 81 nations. In 2022, this number is projected to rise to 323 million as a result of the spillover effects of the conflict in Ukraine.

Going hungry

Millions more people face hunger globally as food prices spike.



Source: United Nations Food and Agriculture Organization.
Notes: Undernourishment means that a person is not able to acquire enough food to meet the daily minimum dietary energy requirements, over a period of one year.

- In 36 nations, 36 million people are anticipated to endure emergency conditions or worse in 2022, according to the Global Network Against Food Crises (IPC/CH Phase 4 or higher).²⁷ According to FAO, the shock of the violence and other factors are expected to contribute to an increase in the number of people who are chronically malnourished in 2022. A moderate shock scenario will result in a 7.6 million rise in the number of malnourished individuals worldwide in 2022. In the event of a major shock, 13.1 million more individuals will be undernourished.

By simulating the export shortfall anticipated from Ukraine and the Russian Federation in 2022 and 2023 and assuming no increase in global food availability as a result of increased food production elsewhere, the FAO projects that the number of undernourished people will increase by nearly 19 million by 2023.

A large portion of the reason why more than 2 billion small producers, agricultural labourers, rural employees, and their families are at risk of losing their jobs is that they already find it difficult to pay for a healthy diet.

- Two thirds of the 600 million impoverished livestock keepers worldwide are women, who make up 43% of the agricultural labour force in developing nations.
- Young informal farm labourers, home-based micro-level business owners, unskilled workers, at peril are the poor in both urban and rural areas, particularly those whose

income is based on the agri-food industry, which includes many displaced persons and refugees.

People are dealing with the crisis on a daily basis by making decisions that, in the long term, could have negative effects on nutrition and early childhood development. If quick action is not taken, this might transform what could otherwise be a short-term crisis into a long-term prolonged crisis with serious implications for future development, income distribution, and poverty trends. Some of the more alarming ones are included in this list:

- People may be eating less nutrient-dense foods, skipping meals, or eating smaller portions in addition to already decreasing their food purchases. Girls and women who frequently eat less and later are significantly impacted.
- Families are spending less on cooking fuel and medical appointments. Children are expelled from school and placed in the workforce.
- Families are buying more debt at greater interest rates and selling their working animals.

Trade restrictions and a dilemma with fertilizer production pose a potential to make things worse.

The problem could worsen into 2023 as a result of a crisis with fertilizer and an increase in trade restrictions.

The medium-term picture could worsen as a result of two factors: increasing export

restrictions and deteriorating fertilizer affordability. Both have the effect of upsetting markets and hastening the "distributional" aspect of this crisis: export restrictions may make it more difficult to get life-saving food supplies to the most vulnerable people, and fertilizer deliveries may not be made on schedule, in the proper quantities, or at the proper prices to the fields where they are needed. When combined, they pose a risk of turning the current access issue into a future availability crisis.

The possibility of a deeper and longer catastrophe is brought on by the shortage of fertilizer.

Every second person on the planet relies on agricultural products that contain fertilizers.

Due to greater energy costs, a loss of supply from the Russian Federation, and a decrease in supply from Belarus, fertilizer prices have risen more fast than food prices.

The scarcity of fertilizer raises the possibility of a more serious and protracted disaster.

- Every second person on the earth depends on agricultural products that use fertilizer. Due to greater energy costs, a reduction in supplies from the Russian Federation and Belarus, and these reasons together, fertilizer prices are rising more quickly than food prices.
- Instead, farmers use a lot less fertilizer, which leads to poorer yields and a general decline in the quantity and accessibility of food in upcoming seasons.
- When it comes to crops like rice, whose prices have not increased, the

loss in farmers' access to fertilizer is much more substantial.



The issue could get worse due to a shortage of fertilizer and trade restrictions.

The problem could worsen into 2023 as a result of a crisis with fertilizer and an increase in trade restrictions.

The medium-term picture could worsen as a result of two factors: increasing export restrictions and deteriorating fertilizer affordability. Both disrupt markets and hasten this crisis' "distributional" component: export restrictions may make it more difficult to get vital food supplies to the most vulnerable people, and fertilizers may not be delivered on time, in the right quantities, or at the right prices to the fields where they are required. When combined, they pose a risk of turning the current access issue into a future availability crisis.

The possibility of a deeper and longer catastrophe is brought on by the shortage of fertilizer.

Every second person on the planet relies on agricultural products that contain fertilizers.

- Fertilizer costs have increased more quickly than food increasing energy costs, a loss of supply from the

Russian Federation, and a decrease in supply from Belarus all contributed to price increases.

- When it comes to crops like rice, whose prices have not increased, the loss in farmers' access to fertilizer is much more substantial.
- With more than 3 billion consumers globally, rice is the most popular staple food. 32 Fertilizer procurement and availability for the upcoming planting seasons in developing nations are running out of time.

Since the beginning of the war, export restrictions on food and fertilizer have increased.

- With limits affecting 17.3% of all calories sold globally, currently, more limitations are in place than

There is a global issue at hand, not just a local one.

As a follow-up to the initial UN Global Crisis Response Group analysis, the United Nations regional economic commissions have looked at how well countries can adapt. They have confirmed that between 1.6 billion and 1.7 billion people live in countries that are extremely vulnerable to at least one of the three crisis transmission channels, namely rising food prices, rising energy prices, and tightening financial conditions. The fact that 1.2 billion people live in countries that are experiencing a "perfect storm" in all three dimensions is particularly alarming. However, not every region and subregion is

there were during the 2007–2008 food price crisis.

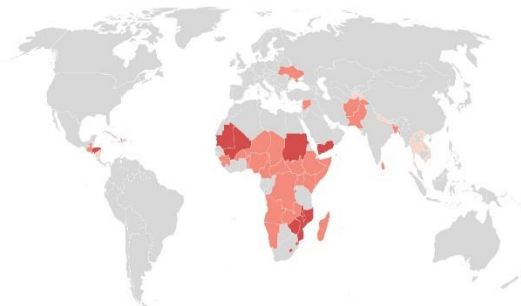
- This makes the situation worse; export limitations during the 2007–2008 food price crisis were a factor in 40% of the overall increase in agricultural prices during that time.
- More than 200 trade-related policy actions, including both trade-facilitating and trade-restricting actions, have been documented since February 24, 2022. About 80% of these regulations have an impact on fertilizers or agricultural products. Among these, 109 measures—taken by 63 countries—restrict exports in some way, such as by outlawing the export of particular foods and fertilizers.

exposed to the same amount of information.

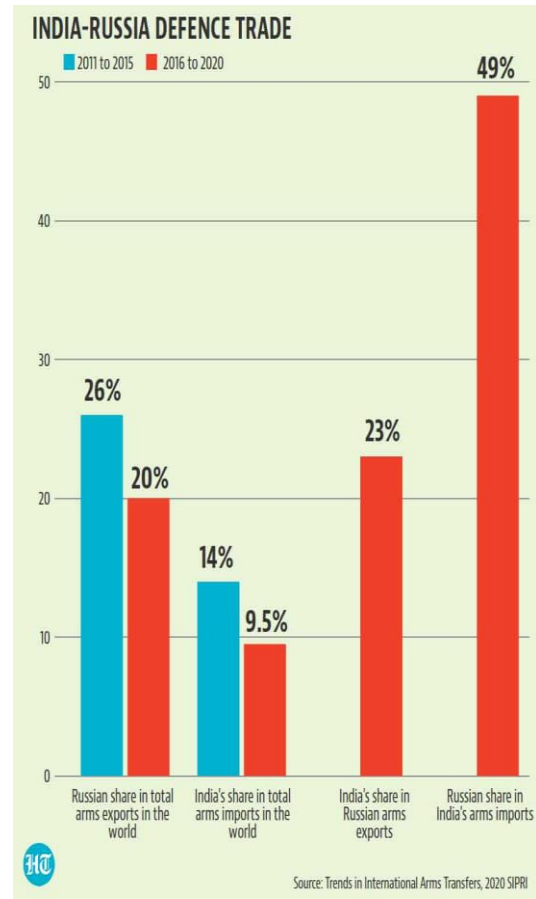
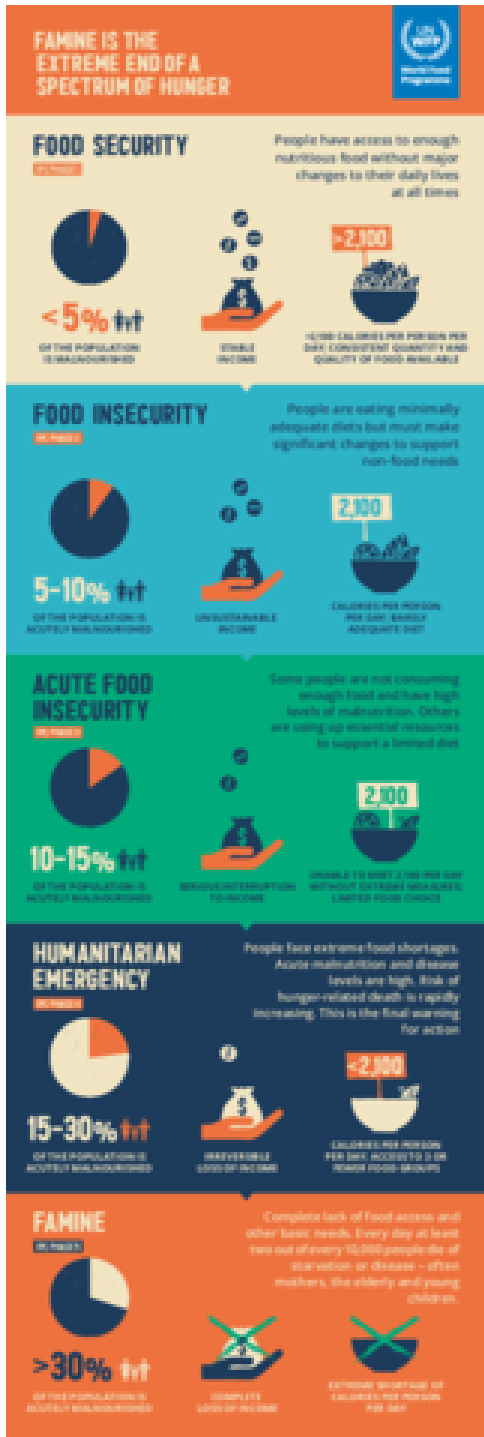
Hunger hotspots

Suffering is worst in 48 countries, many of which depend on food imports from Ukraine and Russia.
(countries highly exposed to food insecurity)

- FAO-WFP hunger hotspot or a major food crisis by the UNGRFC
- Cereal and fertilizer price impact of >0.3% of GDP
- Meets both criteria



Sources: WFP, FAO, UNGRFC, UN Comtrade, USDA, WEO, Staff calculations.
Note: Countries classified as (i) suffering from acute food insecurity by the FAO-WFP or in a major food crisis by the UNGRFC, or (ii) facing a negative impact on the current account of at least 0.3 percent of GDP from international food and fertilizer prices. The boundaries, colors, denominations, and any other information shown on the map do not imply, on the part of the International Monetary Fund, any judgement on the legal status of any territories or any endorsement or acceptance of such boundaries.



Policy recommendations

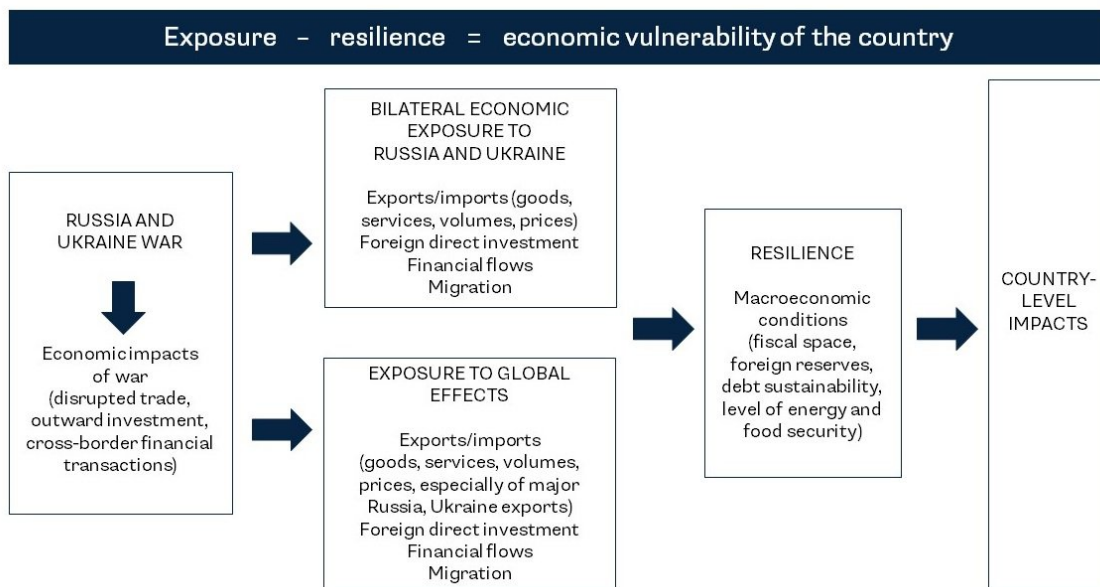
The structural character of this situation necessitates a strong political will. Piecemeal strategies won't be successful. The brief's discussion of the vicious cycle dynamics reveals that significant efforts in the fields of energy and finance will also be required to address the crisis's food-related component alone. Similar to how a family could forgo a meal to pay for the barest amount of power, a nation might be obliged to cut back on food imports if its currency depreciates or debt service costs rise. **The recent proposal for a Food Import Financing Facility from the FAO is an excellent illustration of the kind of comprehensive, multidimensional, multi-stakeholder, instantly implementable policy needed at this time.**

Policies should be structural and take the medium term into consideration in order to prevent a worsening of the crisis, especially in the food industry. The issue of fertilizer is significant in this situation. In the upcoming growing seasons, it will be essential to secure smallholder access to fertilizer and restore supply while closely monitoring fertilizer supplies globally for the next six to 18 months in order to prevent food prices from rising further and spreading to other essential commodities, including rice.

The humanitarian response is essential for those who are already in need, but preventing a bigger and more pervasive catastrophe is also necessary. The lives and livelihoods of

greater populations of marginalized people who are living in poverty must be supported by policymakers. This includes low-income households as well as other vulnerable populations who have already been harmed by the COVID-19 pandemic's socioeconomic effects and unfavorable climatic conditions, such as drought and excessive heat, such as smallholders, women, and girls. This also entails providing urgent, direct assistance to MSMEs in the agri-food industries that are closing their doors as a result of the crisis affecting the developing globe.

The future cost of humanitarian help for an at-risk population will increase if this larger group is not given prompt care.



The systematic impact of the war in Ukraine : A triple shock

- Two major strategies are necessary, namely reducing the shock's effects and boosting people's and nations' resilience, in order to break the vicious loops that fuel and intensify this cost of living issue.

To decrease the effects of the crisis, markets must be made more stable, and debt and commodity prices must be stabilized. It is crucial to quickly increase food availability so that all people and all nations can enjoy their right to food, with equitable and sufficient supply at prices they can afford. According to Antonio Guterres, secretary-general of the United Nations, "an effective solution to the food crisis cannot be found

without reintegrating food production in Ukraine, as well as food and fertilizer produced in the Russian Federation, into global markets." Other goals include committing to increased efficiency in the use, preventing excessive trade restrictions, managing hoarding and other speculative behavior, and maintaining the release of essential food and energy reserves into the market.

Adding more resources can be one way to increase availability while simultaneously strengthening resilience. local manufacture of various food products (promoting the use of foreign foods diversify the sources of imported foods; increase variety (obtaining assistance for higher education, if eligible) lowering food loss, paying for imported food, and waste; expanding access to; continuing the transition to sustainable farming as encouraged by the UN Food Systems Summit in 2021; and farmer access to fertilizers. Energy market demand management strategies should also be investigated. In order to get ready for the winter, energy demand management techniques and technologies should be tested in Europe in particular over the ensuing months.

Humanitarian help is also necessary and ought to be provided as soon as possible, in collaboration with development actors, with money as well as food and other requirements, in a way that increases local capacity and decreases reliance on outside parties. It is essential that states reconsider their plans to cut back on their promises to give formal development assistance in light of this.

The current issue cannot be handled by the current global debt system.

- At a time when debt levels are at an all-time high and interest rates are on the rise, the current crisis strikes. Debt levels were substantially lower at the beginning of the COVID-19 epidemic. Monetary policy was also far more accommodating during the crisis, as major central banks cut interest rates and significantly increased liquidity on global markets. The current tighter monetary circumstances enhance the likelihood of a systemic debt catastrophe.
- Renewing delaying maturities by two to five years and implementing the G20's Debt Service Suspension Initiative are both essential.

- It is necessary to enhance the Common Framework for Debt Treatment, which has only been requested by a small number of nations.
- To provide long-term in order to address the current problems, a comprehensive plan for international debt reduction and restructuring that takes vulnerable middle-income countries into account must be implemented.

Policymakers should take into account the distributional aspect of this crisis when pursuing this ambitious objective. There are very few market-driven options to the pressures facing the global food and energy markets. Price rises do not always lead to increased production, as the case of inexpensive fertiliser demonstrates, showing how the market may require more time to

react than is available. A significant amount of the recent price rises can be attributed to unheard-of supply chain interruptions, which are characterised by impassable transit routes and destroyed infrastructure in Ukraine. These problems can't be fixed in the near future.

Time is of the importance as the clock is ticking. This Brief aims to illustrate the vicious cycle and tradeoff dynamics that sustain and exacerbate this problem, which, if insufficient action is taken at this time, will develop into a more serious crisis. Before it's too late, there is still time to stop the majority of the crisis' damage and help countries find a solution. The cost will increase significantly from what it is presently in the future.

India's reaction to the Ukraine crisis

To prevent Russia from escalating hostilities in addition, a number of industrialised countries have sanctioned Russia, notably the US, UK, and European states. These have

included export prohibitions and sanctions against persons, banks, and other entities.

The conflict between Russia and Ukraine is probably going to affect the economy by driving up oil costs. The impacts of rising oil prices are expected to be felt not just on the trade deficit and the value of the rupee, but also on inflation and the fiscal situation, given that India consumes a lot of oil, much of it imported. It should be emphasised that the Union Budget and the RBI's statement of monetary policy both happened well before this crisis and did not take into account the shock created by the decline in the price of petroleum. As a result, both the Budget and RBI made the cautious assumption that crude prices would hover around US\$75 per barrel going forward, which is likely to be challenging.

Trade deficit : With almost 80% of its total oil requirements imported, India is the third-largest crude oil importer in the world and has a trade imbalance. India imported \$82.7 billion worth of oil during FY21. Oil imports rose to US\$ 125.5 billion in FYTD22 (Apr. 21–Jan.

22), in part due to economic growth and rising oil prices. Oil imports are likely to increase, though, as prices are currently at an 8-year high. Our projection for oil imports in FYTD22 is US\$155.5 billion. The boost in economic activity will probably result in larger oil imports throughout the upcoming year. We predict a little 5% rise in oil demand. *Ceteris paribus*, we project a trade imbalance of US\$ 165 billion.

- **Inflation:** The weight of items related to crude oil in the WPI basket is 7.3%. Therefore, it is anticipated that a 10% increase in oil prices would have a 0.7% direct effect on the WPI. When the indirect effects are taken into account, the overall effect may lead to a 1% increase in WPI inflation. The CPI inflation would be affected both directly and indirectly. First comes the immediate effect. Gasoline and related items make up 2.4% of the CPI basket's weight. The retail prices of gasoline and diesel at the pumps, which include taxes, VAT, and other fees, won't change. Even if the base rate of gasoline and diesel rises by 5%, the actual impact on retail prices is expected to be 5%.

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IMPACT OF PANDEMIC ON TOURISM

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Ritika Arora**

ABSTRACT

India, which is the second largest country of the world, had many encounters of pandemics and epidemics in its history. The outbreak of a disease is not new here, though the virus might be. This study objects to discuss the Covid-19 impact on the travel and leisure industry which holds a major place in the increase of international economy. COVID-19 has resulted in worldwide economic and healthcare crises. It has impacted the global industries, including tourism and travel which is one of the major contributors to the service industry worldwide. This industry has been hit greatly as due to the pandemic there has been no international movements. Complete shutdown of flights has been an adverse for many. Thus, the study is an examination of the impact of Covid on tourism based on the primary data. It also includes the factors affecting its decline.

Key Words:

Epidemics, Covid 19, Global economy, data, healthcare crises

INTRODUCTION

The human race has seen many infectious diseases in the past. The Great Plague, also known as the sleeping sickness or Spanish Flu are some well-known examples. The year 2020 has been the greatest time of recession for the world economy. If we talk only about the diseases that had hit in the past centuries, the names are as below (S, 2019):

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YEAR	EPIDEMIC/PANDEMIC
1817	I st Cholera Pandemic
1829	II nd Cholera Pandemic
1863	III rd Cholera Pandemic
1881	IV th Cholera Pandemic
1896	Bombay Plague Epidemic
1899	V th Cholera Pandemic
1918	Influenza Pandemic
1970-1990	Polio Epidemic
1974	Smallpox Epidemic
1994	Surat Plague Epidemic
2002	Plague of Northern India
2003	Dengue Epidemic
2003	SARS Epidemic
2005	Meningococcal Meningitis Epidemic
2006	Chikungunya Outbreak
2006	Dengue Epidemic
2009	Gujrat Jaundice Outbreak
2009	H1N1 Flu Pandemic
2014	Odisha Jaundice Epidemic
2015	Indian Swine Flu Outbreak
2018	Nipah Outbreak

The outbreak of Novel Coronavirus 19 affected and will affect economies in a way that will take years to recover from. The

sectors worst hit include tourism, FMCG, Garment industry, logistics etc. The pandemic started in Wuhan, China in 2019. The good news is that our medical science was able to identify the disease after just a few weeks of its outbreak. Just as science was able to crack vaccines and other preventive treatments for other infectious diseases. Our faith lies with medical science.

It is no difficulty to analyze the after effects the pandemic would have on the tourism sector. Gradually after affecting China in 2019, the pandemic created its next destination in Europe which included some of the most favorite tourist spots, i.e., Italy, Spain and France. The United Kingdom, one of the most favorite spots for the tourists, has imposed a 6 months' lockdown to control the growing numbers. Then the United States of America was hit and the figures still are devastating and growing each day. Whereas, on the other hand countries like India and Africa are not that badly hit and the situation remains under control. The governments of the following countries have taken strict rules to stop the spread which has caused sealing of borders, which will lead to a great impact on tourism and trade. According to the WHO data, it is seen that the patients are recovering and the numbers are getting better day by day. Although, it would take to come up with a vaccine/ medicine about 6-8 months after testing. In the light of a recent update, it has been said by the Director of WHO that Coronavirus might become endemic. That means we have to learn how to manage our lives with the presence of Coronavirus.

LITERATURE REVIEW

One may not be far away from saying that pandemics such as the COVID'19 or THE SPANISH FLU and many others in the past

years, have had a much more devastating effect on how human life functions. Such pandemics have shaken each and every aspect of our day to day lives, one of the worst affected aspects being the Tourism sector, in the fiscal year 2020-21.

According to, (Dissertori, 2017), “ the influenza pandemic negatively affected the tourism demand which, in turn, altered tourism supply.” The influenza virus was the sole reason for the spread of H1N1 virus, which shuddered the world beyond its imagination. One of the main reasons for a detrimental effect of this virus was the fact that the world had just encountered a global recession, due to the 2008 Financial crisis.

(Chung, 2010), argues that even though at the times of historic pandemics, the health sectors continued surveillance and limitation of those who were in direct contact to the infected chicken, yet (W.H.O, 2005), claims, “ there seems to be a little apprehension among the Asian nationals to visit other countries, even at the height of bird flu.” (Chung, 2010), concludes that even though tourism is a sensitive industry, yet the low fatality deaths of the historic pandemics, have not merit the cessation for tourists to travel.

(Movando, 2005) states, “perception of the disease are important indicators of altered travel patterns.” This indicates that until and unless, the psychology of the tourists will not be influenced by increasing numbers of fatalities, they will continue to travel “ Travelers might develop adaptive behaviors which prevent them from contracting the disease” (Reisinger, 2005). In addition to above, (Legget, 2010), showed “ even though more than half of the Queensland population showed some concern with the pandemic, they will still not continue to postpone their travel.”

The past pandemics have led the governments all around the globe to establish sustainable tourism development methods (Hall, 2011). It was necessary to realize the importance of sustainable development measures because it had become a concern for the social, economic, environmental and the formation of policy domains for the tourists. According to (Lane, 2011), sustainable tourism development can only be achieved by having effective governance which draws a diverse range of actors into tourism decision-making.

Tourism continues to be one of the major sources of economic development for some countries. In countries such as Taiwan, the aggregate tourism earnings for the country accounted for 3.36% of Taiwan’s GDP in the fiscal year 2007 and 2008 (Council, 2009). The foreign exchange earnings for the Taiwanese government in the year 2007, accounted for 5.1 Billion (Chen, 2009). Thus to protect and promote its tourism sector, the Taiwanese government came up with several tourism strategic plans, such as the Doubling Tourists Arrivals Plan (DTAP).

The natural disasters can be a rising risk to the human population and have an adverse effect on the upcoming generations. It is estimated that the global economic cost of natural hazards rose by 36.4% from US\$44 billion in 1991 to US\$60 billion in 1992 (World Meteorological Organization , 1998). (Nicolette, 2009), shares, “The impact on tourism of terrorist actions and disasters, such as the Bali bombings and the Severe Acute Respiratory Syndrome (SARS) outbreak, has highlighted the vulnerability and volatility of the sector. One of the worst affected sectors during this time is the tourism sector. After such disasters, the affected areas may take an

ample amount of time to regain growth in their tourism industry.

Thus, in order to keep the tourism sector competitive, it is suggested that regular monitoring of tourism trends and prompt action on the information received will keep the sector healthy, diversified and well regulated.

OBJECTIVES OF THE STUDY

To understand the impact of Pandemic on tourism sector

To understand the factors affecting the decline in the tourism

HYPOTHESIS

The following hypothesis were examined for this study:

H₀= Null Hypothesis; H₁= Alternative Hypothesis

H₀: The pandemic has no impact on the tourism sector

H₁: The pandemic has negative or positive impact on Tourism Sector

RESEARCH METHODOLOGY

TYPE OF RESEARCH

Research means a systematic investigation of facts and study material to establish new facts and conclusions. According to the American Sociologist Earl Robert Babbie, "Research is a systematic inquiry to describe, explain, predict, and control the observed phenomenon. Research involves inductive and deductive methods."

The groups that research is divided into are:
Exploratory research: As the name suggests, it means this type of research is conducted when a group of questions have to be explored. The results, conclusions and analytics drawn may not be final.

Descriptive research: This research deals in expanding knowledge of a known issue

through data collection. This study is done to understand the behavior of the population. This research uses one variable for the study.

In this research, researchers have used Exploratory research. Main aim of the researcher is to understand the effect that the pandemic has caused on the Tourism Sector. The variables in this research are Pandemic and Tourism Sector.

RESEARCH METHOD:

The procedures that describe the steps followed for the research are known as research methods. There are 2 types of research methods i.e., qualitative and quantitative methods.

Qualitative methods are those methods which require conversational methods like, interviews, text analysis, case study etc. Whereas, on the other hand Quantitative methods are those methods that deal with measurable forms and numbers.

In this study researchers have used both qualitative and quantitative methods to get a deeper knowledge of the study.

RESEARCH POPULATION:

The population used for the study comprises Private and Government Employees, Own business and some freelancer opinions based on their family opinions.

The sample size of the study is taken to be of 127 respondents. All the questionnaires were answered with complete information. Therefore, the response rate is 100%.

DATA COLLECTION:

In this study, the researcher has used both primary data as well as secondary data to collect information. A questionnaire was used to collect the primary data and other sources like newspapers, journals and research papers were used to collect the secondary data.

DATA ANALYSIS:

Microsoft Excel was used for the analysis:

Percentages to analyze the responses.

Correlation is the tool used for finding the relation between the variables.

DATA ANALYSIS

There are certain steps that have to followed for hypothesis testing, which are stated as under:

Formulation of Hypothesis

Significance Level

Test Statistics

Sample Data

Analysis of sample data

Decision Making

The correlational analysis tables are as below:

1.

		<i>Is psychological factor a prime factor affecting the tourism sector, even after the pandemic is over?</i>	
	<i>According to you, will the tourism sector be adversely hit due to this pandemic?</i>		1
<i>According to you, will the tourism sector be adversely hit due to this pandemic?</i>			1
<i>Is psychological factor a prime factor affecting the tourism sector, even after the pandemic is over?</i>		0.390561641	1

2.

1.

	<i>According to you, will the tourism sector be adversely hit due to this pandemic?</i>	<i>The fear of easy spreading nature of the disease will affect the tourism sector after the pandemic?</i>
<i>According to you, will the tourism sector be adversely hit due to this pandemic?</i>		1
<i>The fear of easy spreading nature of the disease will affect the tourism sector after the pandemic?</i>	0.567667391	1

1.

	<i>According to you, will the tourism sector be adversely hit due to this pandemic?</i>	<i>Will the airline industry be affected in terms of tourism?</i>
<i>According to you, will the tourism sector be adversely hit due to this pandemic?</i>		1
<i>Will the airline industry be affected in terms of tourism?</i>	0.625304165	1

1.

	<i>Will strict measures be taken by the governments across the world to promote tourism?</i>	<i>Do you think the decision of the students planning to study abroad will be affected?</i>
<i>Will strict measures be taken by the governments across the world to promote tourism?</i>		1
<i>Do you think the decision of the students planning to study abroad will be affected?</i>	0.205363053	1

2.

	<i>Will it be an easy task for the people to plan their vacations after the pandemic is over?</i>	<i>Do you think that easing the VISA approvals would promote tourism after the pandemic?</i>
<i>Will it be an easy task for the people to plan their vacations after the pandemic is over?</i>		1
<i>Do you think that easing the VISA approvals would promote tourism after the pandemic?</i>	0.443102943	1

Now, following the above steps, firstly the hypothesis is:

H₀= Null Hypothesis; H₁= Alternative Hypothesis

H₀: The pandemic has no impact on the tourism sector

H₁: The pandemic has negative impact on Tourism Sector

As the number of responses is high, I have summarized 135 responses in the following table:

DISCUSSION OF RESULTS

As we observe the 1st table, and after studying the correlational tables therefore, the null hypothesis (The pandemic has no impact on the tourism sector) is rejected and alternate hypothesis (The pandemic has negative or positive impact on Tourism Sector) is accepted.

After conducting the research, I have successfully obtained the objectives of my study:

To understand the impact of Pandemic on tourism sector

To understand the factors that would affect the decline in the tourism

On understanding the correlation tables, we see that in Table 1, the correlation between the questions: **“According to you, will the tourism sector be adversely hit due to this pandemic?”** , **“Is psychological factor a prime factor affecting the tourism sector, even after the pandemic is over?”**

The correlation is 0.39 that means they are neutrally correlated which states that the consumers may have a psychological fear yet they would travel.

In Table 2 we have the questions **“According to you will the tourism sector be adversely hit due to this pandemic?”**, **“The fear of easy spreading nature of the disease will affect the tourism sector after the pandemic?”**

The correlation came out to be 0.56 which means they are strongly correlated. This

stated that people will fear how easy this virus spreads and would be cautious all the time.

In Table 3 the questions studied are **“According to you will tourism sector be adversely hit due to this pandemic?”**, **“Will the airline industry be affected in terms of tourism?”**

The correlation is 0.62 which stated that they are strongly correlated, which shows us that due to a hit on the tourism sector, it will also hit the airways industry both domestic and international.

In Table 4 the questions studied are **“Will strict measures taken by the governments across the world to promote tourism?”**, **“Do you think the decision of the students planning to study abroad will be affected?”**

The correlation is 0.20 which states that they are not strongly correlated. This means that if the governments to attract the students come up with schemes it will not attract as many students/aspirants due to their fear of Novel COVID-19. Also the elders would be worried as their children would be alone, by themselves.

In Table 5 the questions studied are **“Will it be an easy task for the people to plan their vacations after the pandemic is over?”**, **“Do you think that easing the VISA approvals would promote tourism after the pandemic?”**

The correlation is 0.44 which is neutrally correlated, this means that consumers after taking all types of precautions may plan for a vacation.

CONCLUSION

Due to the spread of Novel COVID19 , many sectors of the economy had been badly hit due to this like tourism, logistics, entertainment etc.

Through this study researchers have concluded that due to this the economies saw a sharp decline in the share of Tourism sector in their GDP (9.2% in India). To help the tourism sector the governments have come up with a backup plan so that the economic stability can be maintained. Taking various measures to protect the people and tourists can be one of the possibilities.

Also due to the decline, many employees lost their jobs as there were many businesses that got affected. People who are fond of watching opera, ballet and other cultural events did not attend the events as it was always a threat sitting in the crowd. Therefore, cultural works saw a slowdown of their shows.

This pandemic had an adverse effect and might take years to recover.

FUTURE SCOPE OF THE STUDY

The above study tells on one aspect of that if the impact would be positive or negative. Also the psychology of the consumers.

The above study can be linked with other references:

Economic Impact due to hit on tourism sector

Financial difficulties faced by the companies

Other psychology impact on the consumers

Factors helping in developing the Tourism Sector

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SOCIAL INFLUENCE AND CHANGING ROLE OF WOMEN AND ITS EFFECT ON ENVIRONMENT

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ABSTRACT

Working women play an important role in human progress and have a significant place in society. In the past, men dominated society and provided the family with all the resources they needed, while women were in charge of household duties including childcare, child-rearing, and home management in India. However, as a result of socioeconomic advancements and greater education, women have entered a variety of areas to pursue successful careers on par with males. Regardless of these inspiring advances, women still have to face numerous work-related issues in professional settings. Social class influences women's experiences at work and at home, boosting gender identity for relatively upper-class women and class identification for relatively lower-class women. This could potentially mitigate or even reverse the class-based inequalities found in the previous study. The objective of this study is to identify how social influences affect a women's workplace culture. We used the Women Workplace Culture scale, and a Likert-type scale prepared by Akhtar (1966). For WWC the data was collected from 100 working women professionals belonging to the age bracket of 21 to 70 years, and for the second scale, the data was collected from 100 individuals belonging to the age bracket of 19 to 25 years.

Keywords: *WOMEN WORKPLACE CULTURE, WORKING WOMEN, SOCIAL INFLUENCE, WORKING WOMEN CHALLENGES*

INTRODUCTION

Women have had an equally important role in shaping history throughout the course of human civilization as have males. In reality, a country's success as a whole may be measured by how highly women are regarded in terms of employment and the work they do in society. Undoubtedly, a nation's social, economic, or political progress will degrade and stagnate without the active engagement of women in national activities. But strangely and regrettably, employers, co-workers, and society at large do not take women employees seriously in general.

Gender disparity has historically existed in many civilizations, including India, and has long been a recognized aspect of a male-dominated culture. The two main issues that Indian women face today are atrocities and discrimination. The conventional mentalities of India presuppose that women's roles are primarily concentrated on domestic tasks like cooking and raising children in seclusion and with limited mobility. The major causes of why so few women seek any kind of employment are frequently conservative/orthodox beliefs and discrimination against women. As a result, India has one of the lowest female labour force participation rates (LFPR).

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Social norms are the explicit or implicit social guidelines that establish our expectations of appropriate interpersonal interactions. They include of gestures like shaking hands, saying hello, keeping a specific amount of space between you and the person you are speaking to, and which way you face in a crowded elevator. Social norms are a subset of gender norms, which are the behavioural standards associated with a specific gender. Social gender roles have traditionally been essentially binary—masculine and feminine—in the workplace. Many well-established gender stereotypes about femininity and masculinity exist.

According to a LinkedIn Opportunity Index 2021, When compared to the APAC region, more women in India have seen the effect of gender on career growth. The report stated that working women in India have been more adversely affected by the COVID-19 pandemic than their counterparts worldwide in terms of both equal pay and opportunity.

Women's experiences at work and at home are influenced by social class, which heightens gender identity for relatively upper-class women and class identification for relatively lower-class women. This could potentially mitigate or even reverse the class-based inequalities found in studies.

Children develop a sense of respect for women when they observe them succeed and realise their goals while juggling between their professional and personal lives. They admire what they have accomplished without dismissing their family duties.

Their difficulties also serve as motivation for them to persevere and be steadfast in their efforts to realise their goals and aspirations.

Young women are eager to follow in the footsteps of older women who are leaving for better possibilities as they are much more aspirational and place greater value on working in a fair, encouraging, and inclusive environment.

To expand female engagement in the workforce, firms now need to rethink their diversity procedures and provide caregivers more discretion. Organisations may attract, hire, and retain more female talent by providing reduced and flexible scheduling, more sabbaticals, and additional opportunities to upskill and learn.

Women also must combat discriminatory work settings and attitudes by taking ownership of the situation and becoming informed of the laws and rights they are entitled to. When subjected to unfair treatment, they must be outspoken and assertive in order to stand up for their rights with the same vigour as their male co-workers.

ISSUES FACED BY WORKING WOMEN

It has long been believed that women are less capable and effective workers than males. Women are constrained by the mindset that says they aren't qualified for certain positions. Despite the constitutional protections, gender bias makes it difficult for them to get hired. Additionally, the same mentality also influences the unfairness of different remuneration for the same job. Even after 75 years, the country has yet not attained

full equality. Women believe they must outperform their male coworkers in order to gain the same respect at work and home as men. Women are inevitably more stressed out while working in such conditions than men are, which reduces their interest in pursuing careers. There are other more restrictions that working women encounter, similar to this:

- 1) **Job Location:** Job proximity is a significant limitation in situations when travelling is challenging, expensive, or restricted by mobility-related conventions. In a research study, women in Bangladesh who lived close to garment manufacturers had a 6.5 to 15.4 percentage point higher chance of being employed than women who lived far from them (Heath and Mobarak, 2014).
- 2) **Peer Role:** Role models or peer impacts can have an influence on women's involvement, just like information. Self-employment may offer women the chance and flexibility to enter the workforce in places where the occupations they like are not accessible, and having contacts and role models may inspire women to take action to expand their enterprises. Business training enhances the chance that women will take out loans for self-employment on its own (Field et al., 2013, 2014), but inviting a friend to business training alone has a positive differential impact in encouraging women to take out loans above and beyond business

training itself, especially for women who are most bound by norms.

- 3) **Work-Life Balance:** In the past, there were two major divisions that separated gender roles and duties (Singh & Singhal, 2016). Men were expected to support the family by working outside the home, while women were generally in charge of household chores and obligations such as caring for children, nursing infants, cooking, etc (Singh and Singhal, 2016). However, a significant number of women have entered the profession thanks to greater education and globalization. The lives of women have undergone a tremendous transformation as a result. It has offered them chances to forge their own identities and pursue occupations outside of domestic duties (Revathy & Geetha, 2013). According to Eagly & Carli (2007), the considerable obligations of family life are to blame for there being fewer women leaders in companies. Sherwani (1984) examined how Indian working women cope with the various demands of work and home by juggling a variety of roles in an effort to strike a balance between the two spheres of their lives. Meeting competing demands from work and home, particularly for married women employees, can be mentally and physically taxing, which can lead to illness and absenteeism and harm an organization's productivity, growth, and development.

4) **Discriminatory practises at workplace:**

A (Lens, 2003; Roscigno et al. 2007) study found that organizational policies and practices are heavily impacted by socially and culturally enforced frameworks that call into question women's talents, capacities, and aptitude for organizational labor, resulting in an unconscious bias against them. Research performed by Arulampalam et al. (2007) on gender wage disparity in both the public and private sectors indicated that there is a gender wage gap and those female employees are underpaid compared to their male colleagues.

Women employees are underpaid in comparison to their male counterparts, according to research studies conducted across various sectors in both international and national workplace contexts, because organizational policies and practices are frequently influenced by gender stereotypic beliefs that consider women folk to be less competent than their male counterparts.

According to Tlaiss and Kauser (2010), women managers describe their working environments as being characterized by the presence of negative perceptions and stereotypes about women's professional abilities and commitment to work, and as a result, they face discrimination in moving up the organizational ladder. According to studies conducted throughout the world, preconceptions

are frequently offered as justifications for why female employees face discrimination in terms of job progression.

WOMEN WORKPLACE CULTURE

Women's employment discrimination has received a great deal of attention from researchers all around the world. It is characterized by researchers as the practice of making employment judgments concerning women based on their gender rather than their productivity, performance, or qualification (Neiva and Gutek, 1980; Blanchard and Crosby, 1989).

The Glass Ceiling

The glass ceiling can be characterized as subtle but persistent barriers/obstacles supported by discriminatory, conscious, and unconscious practices and attitudes that prevent capable women from advancing to top/senior management positions (Jackson and O'Callaghan, 2009; Bendl and Schmidt, 2010; Zeng, 2011). Thus, the term "glass ceiling" refers to unfair obstacles that stop women from achieving positions of authority or responsibility or moving up the corporate ladder merely because they are female (Li and Leung, 2001).

The glass ceiling phenomenon is based on a number of assumptions. The glass ceiling is, in fact, a unique and specific form of inequality due to a number of factors as compared to other types of discrimination and inequality (Cotter et al., 2001). First and foremost, discrimination against women in management lies at the heart of the "glass ceiling." Therefore, regardless of their level of education, experience, or skills, women

would still be subject to the glass ceiling. The glass ceiling is observed diachronically, which means that developments in women's careers and promotions to managerial positions should be considered instead of the proportion of women holding those positions at a given moment (Cotter et al., 2001). The widening disparities between men and women as their professional careers progress inside the organization are also referred to as the "glass ceiling." Second, because open discrimination against these populations is prohibited by the present equal opportunity laws, it is challenging to detect this bias. Additionally, this encompasses norms/stereotypes that are frequently imperceptibly exposed through behaviors, deeds, facts, processes, or attitudes. Finally, there are obstacles that prevent people from rising up the ranks (Cotter et al., 2001).

Interpersonal Factors

These authors contend that certain interpersonal interactions can affect how men and women are treated differently within the workplace. Elacqua et al. focused on three elements that are all related to career progression in their study: (a) mentoring, (b) the existence of an informal network of senior managers, and (c) cordial relations with company decision-makers. In fact, research has shown that the first of these three factors—the absence of high-level organizational mentors—had a negative impact on women's professional advancement, particularly because mentoring is a crucial informational resource (Ibarra et al., 2010).

The existence of an informal social network of senior males within the company is the

second interpersonal component that the authors look into. Networking is the process of creating and utilizing contacts for your career in which individuals share contacts, recommendations, and strategic information (about open positions, ongoing projects, and managerial decisions (Burke, 1984). According to numerous studies, women are frequently given lower-profile jobs, which limits their ability to network and engage with influential people (Ragins et al., 1998).

The third part of interpersonal factors is good relationships with company decision-makers. People frequently prefer to develop connections with others who have same sex and who have gone through comparable situations. Consequently, the "queen bee syndrome" could present another challenge for women managers (Keeton, 1996).

Situational Factors

Lyness and Heilman (2006) have demonstrated that, as compared to their male counterparts, the promotion requirements for female line managers are more stringent and closely tied to work performance. Women are especially accepting of and sensitive to being promoted based on performance (Beehr et al., 2004). Employees who believe their employer uses objective performance and skill-related criteria for promotions consider the process fairer and do not see employee discrimination (Beehr et al., 2004).

According to (Elacqua et al., 2009) a woman manager is a serious candidate for a promotion if she already holds a managerial position and takes part in the company's development initiatives. However, women

encounter these two circumstances less frequently than men.

Perception of Differential treatment of women

In the workplace, men and women frequently receive distinct treatment (Blau and Kahn, 2007; Kochan, 2007). When hiring decisions are made based on an individual's qualifications or job performance rather than on their gender, an ascribed attribute, these inequities occur (Guttek et al., 1996; Ngo et al., 2002). While there may not be much of a difference between men and women holding the highest positions in the firm, there is a gender disparity when considering factors such as advancement at each level of the hierarchy (Agars, 2004).

Organizational Culture in Relation to Gender

Senior managers, who are predominantly men, define a "gendered" culture that excludes and marginalises women. The norms and organisational practices that make up this culture encourage and define values, stereotypes, behaviours, and a "masculine" perspective of management and leadership (van Vianen and Fisher, 2002; Broadbridge and Hearn, 2008; Koenig et al., 2011)

According to the social role theory (Eagly, 1987), the idea of a manager is frequently linked to a man with traits that are considered to be "male," such as authority, independence, competitiveness, and aggression.

According to Weyer, (2007) women, who have long been associated with diametrically opposed attributes (e.g., teamwork, listening, sensitivity, and sympathy), would be less

dedicated to their occupations and incapable of managing them. Women's perceptions and judgments are harmed by gender stereotypes (Lyness and Thompson, 1997; van Vianen and Fisher, 2002). As a result, women managers are assigned different duties than males early in their careers. Therefore, female managers are constrained in two ways: (a) if they don't act in a way that conforms to male norms, they run the risk of being judged and evaluated poorly; and (b) if they act in a way that is perceived as "masculine," their coworkers may retaliate against them (Oakley, 2000; Eagly and Karau, 2002; Mavin, 2008; Kumra and Vinnicombe, 2010).

ROLE OF ORGANISATION IN SOCIAL INFLUENCE:

Previous studies have identified corporate culture as a key impediment to women's struggles to succeed in the business sector as one of the causes of the man-woman divide globally.

Organisational culture is a system of shared values, beliefs, and standards that influence how individuals of an organisation think and act in connection to others both inside and outside the company, according to work and organisational psychology. The relationship between this construct and how women are perceived within organisational contexts is direct, and it also manifests itself when women hold management positions and have a significant amount of influence over others. This is because organisational culture affects how members of the organisation treat one another.

Not surprisingly, research has revealed that, regardless of a woman's talents, her management style frequently tends to be portrayed negatively due to assumptions and biases about women. In contrast, women who adopt a "feminine" management style (e.g., caring, empathetic, relation-oriented) are instead seen as ineffective, insufficient, or inefficient. Women who adopt a "masculine" management style (e.g., authoritative, directive, task-oriented) are likely to be criticised for being aggressive and bossy.

According to Locke (1976), an emotional state that is pleasant or good as a result of evaluating one's employment constitutes overall job satisfaction. According to Brooke et al. (1988) and Hirschfeld (2000), work satisfaction is a reflection of one's sentiments about one's employment, whereas Brooke et al. (1988) asserted that job satisfaction represents an individual's general attitude toward the job and results from the satisfying of needs and desires.

Employee attitudes regarding the company are often observed to be influenced by the working environment (Aiken et al., 2000). According to Verplanken (2004), values are crucial components of an individual's psychology of their workplace, influencing how they perceive organisational aspects. The adopted culture shapes how organisational reality is interpreted by creating a shared frame of reference (Ott, 1989), which in turn shapes employee attitudes and behaviours (Cameron and Quinn, 1999).

The functionalist perspective has been used in empirical research on organisational culture in other management fields, and the

results have provided compelling proof of the importance of organisational culture in raising performance. Management must be aware of an organisational culture's underlying components and how they affect factors related to employees, such as job satisfaction, organisational commitment, and performance.

PURPOSE:

The purpose of this study was to identify how social influences affect a women's workplace culture.

METHODOLOGY

In this investigation, we used a 30-item Persian version of the Women Workplace Culture (WWC) Questionnaire, and we used a modified version of the Likert-type scale prepared by Akhtar (1966).

For the WWC scale, the data was collected from 100 working women (21- 70 years) employed in sectors like science, technology, mathematics, education, art and design, management, media, and entertainment.

For the modified version of the Likert-type scale, the data were collected from 100 individuals who belonged to the age bracket of 19-25 years. This scale was divided into three main categories: work and efficiency, personal and social relationships, and home and family.

DESCRIPTION OF THE SCALES USED

WWC Scale was divided into three main categories: perceived societal barriers to career development, perceived organizational barriers, and sexual harassment.

For the WWC scale, the data was collected from 100 working women (21-70 years) employed in sectors like science, technology, mathematics, education, art and design, management, media, and entertainment.

The Likert-type scale was prepared by Akhtar (1966), this scale was divided into three main categories: work and efficiency, personal and social relationships, and home and family.

The data were collected from 100 individuals who belonged to the age bracket of 19-25 years. This scale was divided into three main categories: work and efficiency, personal and social relationships, and home and family.

HYPOTHESIS: Social influence should have a positive impact on workplace culture.

PROCEDURE

The goal of the research was explained to the participants, and they were assured of the confidentiality of the material in order to elicit sincere replies without fear or hesitation. Responses were gathered via a Google form, and responders were thanked for their participation, cooperation and assistance.

RESULTS:

TABLE 1 – Shows the correlation matrix between the variables.

Correlation Matrix

	SOCIAL INFLUENCE	WORKPLACE CULTURE
SOCIAL INFLUENCE	–	
WORKPLACE CULTURE	0.452 ***	–

Note. * p < .05, ** p < .01, *** p < .001

DISCUSSION

The results found out that there is a positive correlation between the social influence and workplace culture.

A strong culture is a set of norms that govern how individuals should act. According to a multitude of reports, any organisation's workplace culture shows that a company with a strong culture has shared values and norms of conduct for its personnel, which should assist them achieve their missions and goals.

According to social identity theory, social groups have a sense of belonging and view their group culture as a source of pride and self-esteem (Hogg, 2001; Ryan, Alexander Haslam, & Postmes, 2007).

CONCLUSION:

An organisation's culture plays an important role to any employee whether it be a man or a woman. Every organisation is made up of employees, and the conduct of those employees influence the consequences similarly. If a woman employee has a positive and encouraging workplace and social environment, she would reach new heights and contribute to the country's economic and social structure more efficiently. The study revealed that if there were more possibilities for women, both in the profession and in society, there would be a significant elevation in both. The study was conducted on 100 Women and 100 youth to understand the effect of the workplace culture of women on their work-life balance.

We used the Working Women Culture scale, and a Likert- type scale prepared by Akhtar (1966), to assess these. The findings revealed a favourable relationship between social influence and workplace culture. Essential steps are required for better upliftment of women in our society because effective results from working women will transform

the status of women in the nation and the future of the nation. Furthermore, a working woman will influence the attitudes of her family and the following generation. More women will be inspired to follow these steps, completing a positive cycle towards gender equality.

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Negative Effects of 5G and RF - EMF on Environment and Humans

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Abstract

Disruptive technologies are the most popular way of changing our lives for the better, however, like everything, disruptive technologies have their own pros and cons. In this review research paper, we have analyzed the negative effects of the 5G on our Humans and Environment. Our observation after analyzing 20 research is that 5G does have a negative and harmful impact on our Environment.

Keywords: 5G, Disruptive Technologies, Radiofrequency Radiation, RF – EMF

Introduction

5G as a disruption is assuring a transformational communication with high speed and high volume of data. Small-cell and Internet of Everything device adoption has significantly raised traffic volumes. This expansion has transformed today's network into 5G technology, which requires more capacity, high data rates, and ultra-low latency. (Ahmad et.al., 2020)

At the moment, information and communications technology accounts for around 4% of world power consumption and 1.4 percent of global carbon emissions. According to an Ericsson estimate, 5G will have 2.6 billion customers by the end of 2025, with total worldwide mobile subscriptions anticipated to reach 5.8 billion by then. By 2030, there might be 125 billion IoT devices on the planet. At that point, information technology is predicted to account for one-fifth of global power consumption, and by 2040, it might account for 14% of global greenhouse gas emissions. 5G will not be viable until the entire system is energy efficient. (Cunliff, 2020)

Virtual reality, augmented reality, and cloud-based services have arisen in recent years and have become a vital part of the current generation's lifestyle. As part of the Internet of Things (IoT) development, the ambition of linking 50 billion gadgets by

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2030 is predicted to be realised. Sensors, actuators, electronic appliances, streetlights, and other equipment will be wirelessly linked to the Internet and to one another through device-to-device (D2D) communication, also known as huge Machine Type Communication (mMTC). URLLC will be required for further improvements, such as linked and autonomous automobiles, aerial vehicles, remote control of robots in severe hazardous circumstances, industry automation, and so on, remote surgery, and smart grid applications. With the implementation of 5G technology, ultra-fast ultra-reliable and ultra-low latency application services can be achieved, as compactly. (Shafique et.al., 2020)

Wireless communications have grown at an exponential rate throughout the world. The 4G and 5G version of mobile networking technology real-world circumstances. Surprisingly, several research done in more benign circumstances demonstrate that this radiation has negative consequences. (Kostoff et.al., 2019). According to individual data points, the average global exposure to tower radiation is as low as 0.73 milliwatts per square metre, which is more than 5,000 times lower than the WHO-recommended radiation standard for mobile towers for the frequency range under consideration (4 watts per square metre at 800 MHz).

Literature Reviews

Russel (2018) reviewed the implications of 5G wireless telecommunications on the environment and public health. It was

concluded that Radiofrequency Radiation is now being recognized as a form of environmental pollution whose effect will be evident in the coming years as the wavelengths of the present radiofrequency radiation acts as a biological toxin.

Al-Tae et. al (2016) investigated how male fertility was associated with occupational and mobile phone towards hazards. For the participants, 100 sub-fertile men (experimental group) and 100 fertile men (control group) were there. It was concluded that the exposure to the electromagnetic radiations from the mobile phone towers, impacted the semen quality negatively.

Hardell and Carlberg (2020) gave their comment regarding the health risks from the radiofrequency radiation including the 5G Network. Evidence have been found regarding the effect on human cancer, prenatal and fetal development, global warming and tissue heating.

Ciaula (2018) examined the health implications of 5G Communication Systems. It can be concluded that Radiofrequency electromagnetic fields leads to an increase in oxidative stress which is connected with the cancer and vascular homeostasis. The millimeter waves raise skin temperature, modify gene expression, enhance cellular proliferation and protein synthesis associated with oxidative stress, inflammatory and metabolic processes, may cause eye damage, and disrupt neuromuscular dynamics etc.

Simko and Mattsson (2019) reviewed the various effect of 5G on the human health. For this study, 6 – 100 GHz millimeter

waves were considered and 94 publications were analysed. It was found that 5G does have a negative impact on health.

Kostoff et.al. (2019) investigated the adverse health effects of the 5G Networking. It was found that the radiation can cause cancer, neurodegeneration, infertility, neurobehavioral issues and cardiovascular issues.

Frank (2021) researched how the health is being impacted by the Electromagnetic fields of 5G. It was discovered that there has been strong adverse evidence of the radio frequency electromagnetic field (RF-EMF) exposures.

Kumar (2021) studied the adverse effects of 5G on Flora and Fauna. The pulse EMF causes excessive stress, DNA Damage, loss of sperm count, memory loss, reduces the steroid hormone level, thyroid and cancer. It has also been found that the population of the sparrows have decreased due to them not being to breed.

Wu et.al. (2015) researched the interaction of the human body and millimeter waves. The skin is Dielectric in nature and due to this, it absorbs the radiation at the dermis and epidermis level leading to the tissue heating and cause various skin diseases.

Navarro (2009) researched the Microwave Syndrome. The people who lived near the electromagnetic fields are more prone to developing the various issues like depression, sleep issues, memory loss, loss of appetite, loss of vision etc.

Richard and Becky (2019) studied the health Impacts of 5G Technology. The exposure to

EMF reduces the sperm quality and affects the fertility of the females by remodeling the ovary and oocyte loss. A lot of studies conclude that 50 percent of the fertility decreases of the people who were excessively exposed to the RF – EMF.

Kordas (2017) examined how the population declines due to the 4G Technology. It was noted that the population decreased of the birds of North Greece due to the cell tower radiation. The EMF has long term effects on the crow, owl, sparrows etc. The population of birds were more in the areas where the 3G Network was being used. It has also been observed that the radio frequency waves destroy the magnetic field that the birds navigate through.

Lakhera (2015) studied how the sparrows are being affected due to the electromagnetic radiation. It was concluded that the great number of the cell towers and the radiation were the reason behind the declining population of sparrows in Delhi.

Dyvig (2012) examined how the plants are affected due to the electromagnetic radiation. The plants' growth has seen a decline due to the electromagnetic exposure. The exposure of 2.4 GHz led to 16.5 percent height reduction in radish plants and 5.1 percent lower mean in the wheatgrass plants. The color of the leaves turned from green to yellow which damage their growth. The radiation created by 5G mobile cells employs millimetre waves with a higher frequency range, hence in the case of 5G, a strong RF-EMF would be developed, affecting plant development and reducing plant longevity. Research conducted in the United States discovered that millimetre

waves cause peroxidase, a kind of plant stress protein. This stress protein is responsible for plant leaf damage, altering the colour of plant leaves from green to yellow, and ultimately causing plant damage.

Kaur et.al. (2020) studied the energy efficient transmissions towards the future green cognitive radio networks of 5G. Nearly 8 billion mobile subscribers will be added by 2030 which will require an extra spectrum to handle the traffic. Due to all this, there has been an increase on the emissions of Carbon Dioxide, high exposure of radiations which further increases the energy consumptions and the scarcity of resources.

The International Agency for Research on Cancer in 2011 gave evidence on the fact that the electromagnetic fields do have an adverse effect on the onset of cancer and the electromagnetic fields are carcinogenic.

Karimi et.al. (2020) had reviewed a good number of the researches on the literature on the effects of RF – EMF on the childhood cancer incidence, Alzheimer's disease (AD), and miscarriage.

Kivrak et. al. (2017) also pointed out the detrimental consequences of non-ionizing radiation heating include cancerous effects on the brain and immune system deficiencies, oxidative stress caused by free radical production, and tissue oxidative damage. They determined that electromagnetic fields (EMF) have negative effects on the hippocampus and cerebellum since these effects are accompanied by

symptoms such as weariness, headaches, and hypertension.

Mastorakou and Mastronikolis (2020) researched the health risks of radiation, and it was concluded that the radiation can cause cancer onset, tissue heating and childhood leukaemia. Epidemiological studies with 15-year follow-up of individuals suggest a slight increase in statistical risk for brain cancer (acoustic neuroma, meningioma, glioma) with heavy usage of mobile phone. Because of the physical weakening of the exposure on a factor of distance, the dangers from all equipment within houses are larger than the risks from radiation originating from a source outside the home. According to analytical study, a 30cm distance from all electrical or mobile phone gadgets results in a decreased exposure ratio.

Guzey & Onal (2016) examined the effects of the chronic exposure to the 2G/3G cell phone radiation on in vitro maturation of bovine oocytes. In vitro maturation of 224 bovine cumulus oocyte complexes divided into two groups, with the treatment group being the only one to receive mobile phone signals for 100 minutes at a pace of 5 minutes per hour. Oocytes were dyed with fluorescent dye after maturation to gauge rates of maturation. According to the findings, the percentage of oocytes in the treatment group that reached the Metaphase I and Metaphase II stages, respectively, was 35.22.24% and 48.22.21%, compared to 11.91.45% and 73.84.60% for the control group (P 0.01). In conclusion, cell phone signals have dramatically slowed the development of bovine oocytes.

Tanvir et.al. (2016) studied the effects of the 3G cell phones exposure on the structure and function of the cytochrome P450 reductase. Human CPR was exposed to the 1966-MHz RF inside a transverse electromagnetic cell for 60 minutes. The results concluded that the structure of the cytochrome and it was narrowed as well leading to a change in the functioning of the research.

Leung et. al. (2011) researched the effect of 2G & 3G on the electrophysiology and performance of adolescents, young adults, and older adults. This study basically examined sensory and cognitive processing of the participants. It was found that the performance and the electro physiological responses were delayed and decreased due to the exposure.

Gultekin & Siegal (2020) examined the absorption of the 4G/5G radiation in brain tissue as a function of frequency, power and time. The absorption of the ex vivo bovine brain tissue and a brain stimulating gel was compared at 3 frequencies: 1.9 GHz, 4 GHz, and 39 GHz. It was found that due to a decrease in RF source wavelength and an increase in power density with the same incident power and exposure period, RF heating increases fast with frequency. Additionally, we demonstrate the impact of continuous waves, quick pulse sequences, and single pulses with various pulse durations on temperature.

Özdemir et. al. (2021) researched the effect of 4.5 G LTE radiation on the optic nerve. 32 rats were divided into experimental and control group. The experimental group was exposed for 2 hours for 6 weeks continuously. It was found that the

condition, structure and the performance of the optic nerve had deteriorated.

Research Methodology

This was secondary research wherein 24 research papers were analyzed from the year range from 2009 to 2021 from around the globe are analyzed. The research ranged from the longitudinal research, experimental studies, comparative studies and secondary research.

This research will give an insight as to how the people around the globe have been adversely affected by the radiations of the various versions of the wireless communications and how the intensity of those effects has increased with the positive effects and ease of usage of the wireless communications.

Research Findings

Initially, only a few were there who were making use of the mobile phone facility, however, nowadays everyone is stuck on their phones the whole day, whether for work or for their own personal usage. Due to which, the scientists have looked for ways to improve the technologies and have made the required changes. With all the positive aspects of the mobile technologies and the wireless communication, comes adverse effects too (Nath, 2018)

As the number of the base stations must be increased in order to bring in the changes made to the wireless communication, there has been an increase in the negative effects of it as well. The microwave frequencies use in the thermal and the non-thermal effects

leaves a negative impact on the biology of the human. The cell structure of living things is affected by the electromagnetic radiation (EMR) that is released by mobile antennas used at base stations and mobile phones used by users. Over time, prolonged exposure to this radiation can have a harmful effect on a person's biological system. EMR interacts with materials and releases wave energy into the medium, which is then absorbed. Human tissue absorbs RF-EMW radiation to varying degrees depending on the frequency, intensity, polarization, and length of exposure. The EMR are also acknowledged as the primary cancer-causing factor. According to studies, people who live close to mobile phone base stations report experiencing generalized health problems such as headaches and sleep difficulties. (Sharma et.al. 2017).

Rowley and Joyner (2012) compiled tower electromagnetic field (EMF) radiation data from measurement programs conducted over several years in 21 different nations. The collection includes over 173,000. To give consumers strong mobile phone coverage, the majority of these towers are placed close to homes and office buildings. In metropolitan locations, cell phone base stations may be free-standing towers or attached to already-existing objects like trees, water tanks, or towering buildings (residential). For the best coverage, the antennas must be mounted high enough. Cell towers often reach heights of 50 to 200 feet. In urban and suburban regions, sector antennas are utilised for 2G and 3G transmission, wider sector antennas for 4G transmission, and parabolic microwave antennas for point-to-point communications.

More bandwidth is used by 4G technologies than by 2G or 3G networks (means more exposure to radiation). Smartphone makers are adding many antennas to one device so that the most recent handsets (smartphones) are capable of receiving the full bandwidth potential of 4G networks. This increases the chance of being exposed to more radiation, say health experts. As a result, 4G phones have a greater radiation emission capacity since a handset's array of antennas may receive and send signals from several sources and it has increased in the case of 5G. People who live within a radius of a few metres of one of these cell towers will receive a signal that is 10,000 to 10,000,000 times stronger than what is needed for mobile connectivity (Girish, 2010). Exposure to low intensity microwave radiation over an extended period of time can harm a person's biological system. (Sharma et.al., 2017)

In this research, we have referred to various research on the effects of the 2G, 3G, 4G & 5G on the humans and the environment. As we can see from the different research conducted, the negative effects are increasing with the new advancements coming in. The intensity of the radiation for the different versions of the wireless communication has to be increased which is leading to more detrimental effects on the environment like skin cancer, low sperm count, memory loss, thyroid, decrease in fertility of humans, Alzheimer's disease, miscarriage, decrease in bird population and plant growth etc.

Conclusion

As a disruption, 5G ensures transformative communication at high speed and amount of data. Adoption of small-cell and Internet of Everything devices has considerably increased traffic volumes. This growth has changed today's network into 5G technology, which demands increased capacity, high data speeds, and ultra-low latency. However, after studying multiple research publications, we can infer that RF - EMF can be extremely hazardous to both the environment and individuals.

Suggestions and Recommendations

1. Steve Cohen, head of Columbia University's School of International and Public Affairs' Master of Public Administration Program in Environmental Science and Policy, emphasised that because 5G would utilise a significant amount of power, decarbonizing our electrical system is vital. This includes replacing fossil fuels with renewable energy, increasing grid flexibility and storage, and implementing carbon-capture technologies for any remaining fossil fuel power plants.
2. Efficient cooling techniques are being implemented to reduce the consumptions of the energy networks. In Finland, Nokia installed a liquid-cooled base station; utilising water to cool the station instead of air required 10% of the energy of standard air cooling. With water cooling, waste heat from base stations might potentially be used for water or space heating in buildings next to the base stations.

Furthermore, data centres cooled with liquid lowered carbon emissions by 90%.

3. Some businesses are pooling 5G network infrastructure in an effort to reduce expenses by up to 30%. The management consulting company McKinsey discovered that sharing the network among three users might cut the cost of installing small cell base stations in half. Two businesses have decided to jointly develop a 5G network in China and share the network infrastructure. Vodafone, Telecom Italia, and three mobile network carriers in South Korea all share a network. By avoiding overlapping dense small cell networks and lowering the requirement for infrastructure and building in cities, network sharing can lessen environmental consequences in addition to lowering costs.

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