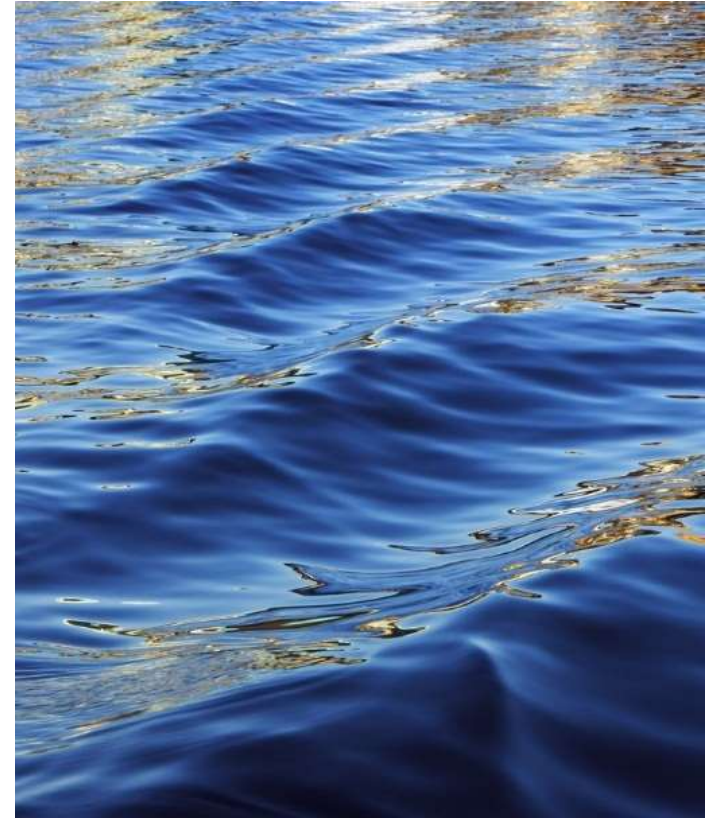


CLIMATE CHANGE AFFECTING GLOBAL HEALTH: POLICIES AND REGULATIONS.

Presentation on the behalf of
Group2 – by:-

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CLIMATE CHANGE AND ITS IMPACT ON GLOBAL LIVES

Climate change is a change in the average temperature and cycles of weather over a long period of time.

Because of climate change, humans and wild animals have to confront new survival problems contributing to a threat to global health.

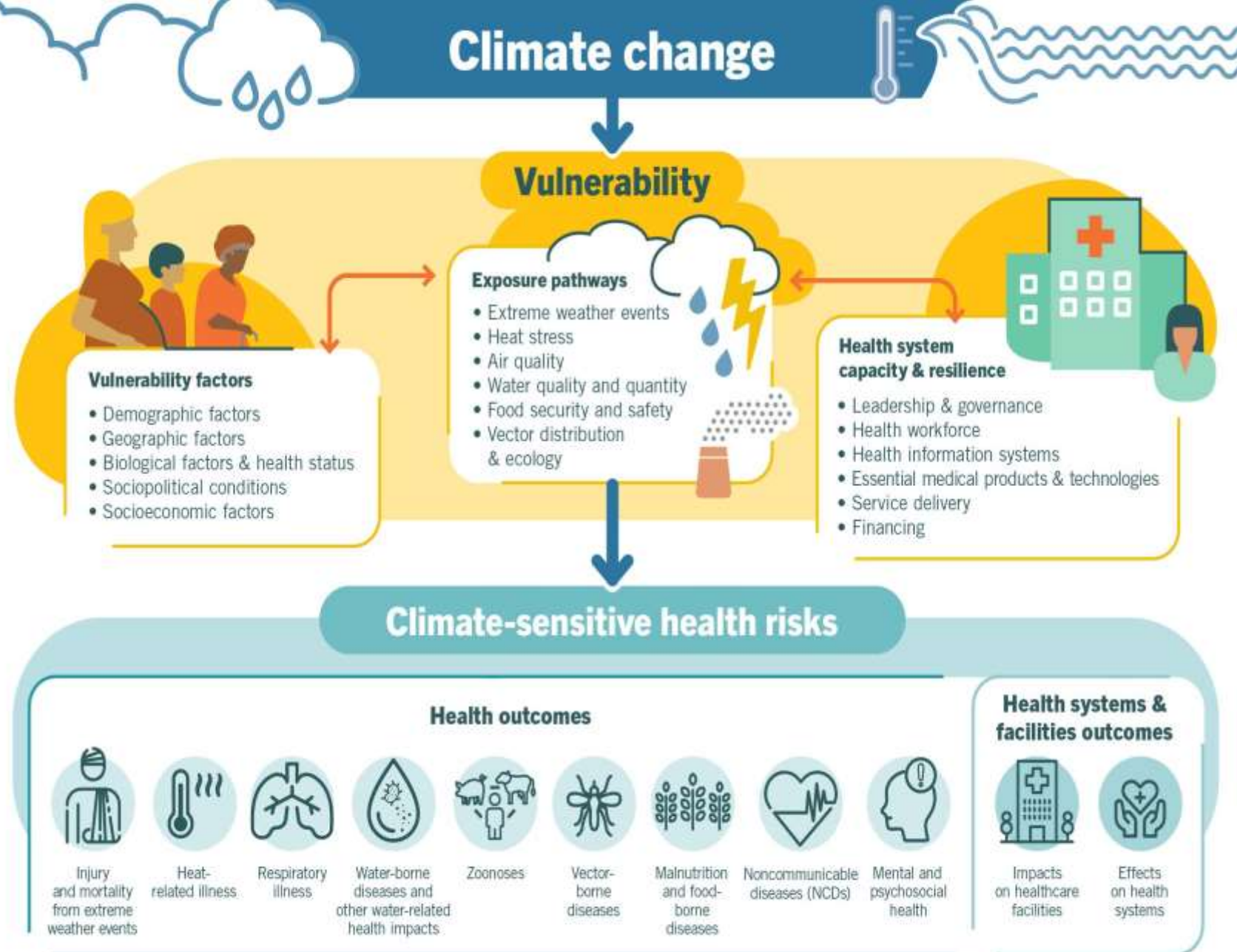
Looking from the human rights perspective, it causes a significant risks which directly endangers an individuals' fundamental and human rights to :-

1. Life,
2. Health, and
3. Quality requirement of environment needed to sustain living in the world.

Many national and international organisations such as the UN are actively addressing rights of an individual in a multispectral array of global health threat due to climatic changes particularly due to:-

1. **Plastic Waste Pollution ;**
2. **Carbon Emission.**

FACTORS



OUR PRIME AREA OF FOCUS FOR THIS
REASERCH IS:-

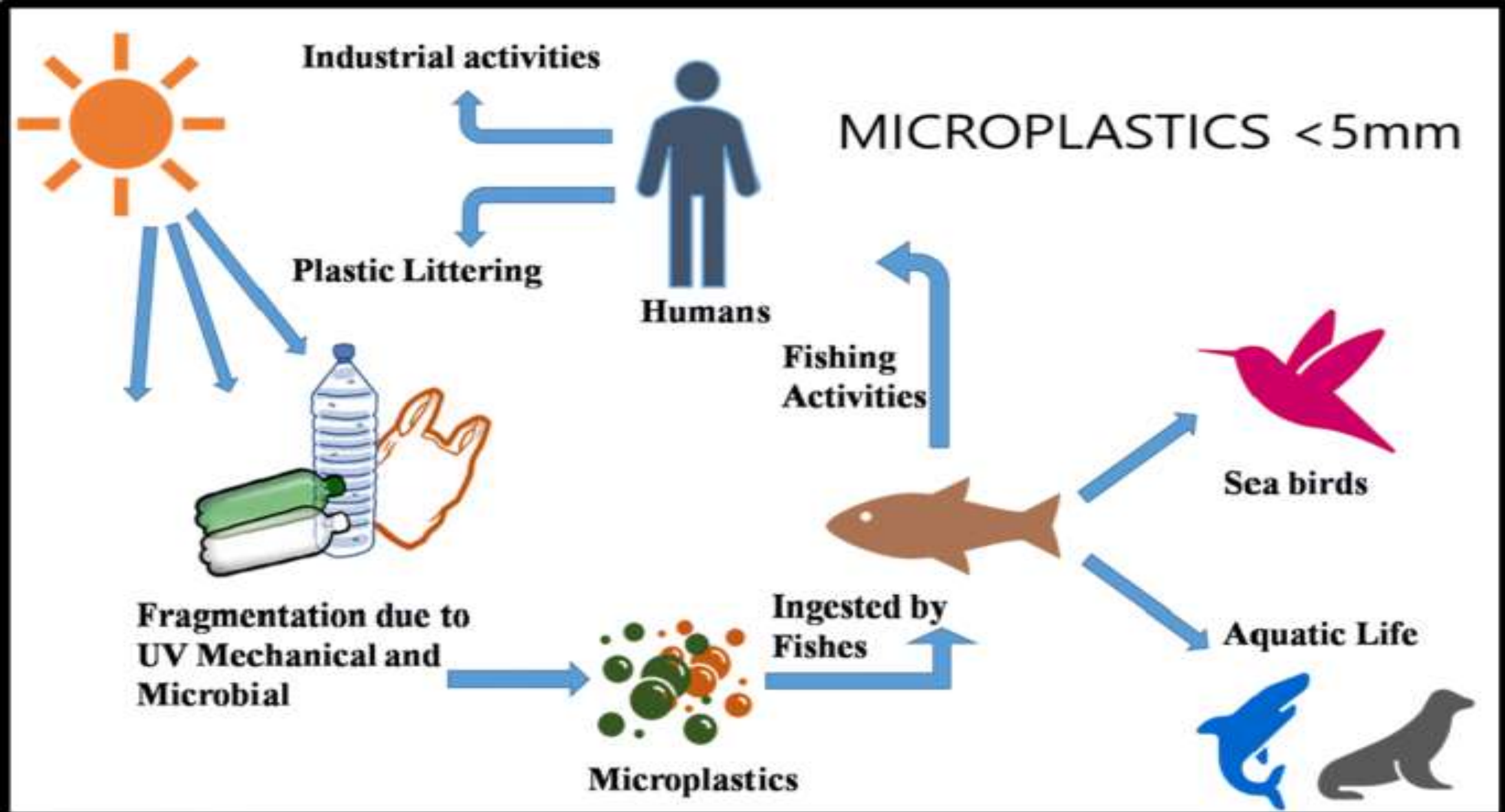
***'MICROCONTAMINATION –
IMPACT OF MICROPLASTIC
ON FOOD CHAIN,
AFFECTING GLOBAL HEALTH'***



WHAT IS MICRO-PLASTIC CONTAMINATION?



- Often, doctors suggest that food should not be reheated in plastic containers in a microwave. It is basically because plastic food containers, when used for reheating our food in a microwave, shed huge numbers of tiny specks — called MICROPLASTICS — into the food we consume.
- Similarly, when parents prepare baby formula by shaking it up in hot water inside a plastic bottle. By doing this, the infant might end up swallowing more than ONE MILLION MICROPLASTIC PARTICLES each day.





Objectives-

- 1.) To Understand the Concept of Climate Change and Accessing its Impact on Global Health.
- 2.) Identifying factors affecting global health due to climate change and analyzing the impact of micro contamination pollution on terrestrial, aquatic and atmospheric systems of Indian geography.
- 3.) Accessing the impact of microcontaminants on food chain, thereby affecting global health.
- 4.) Identifying the gaps between the present policy decisions and giving suggestions.



Objective 1-

- **Understanding Climate Change**

Long-term changes in temperature and weather patterns are referred to as climate change. These changes are natural, such as fluctuations in the solar cycle and human activities like use of fossil fuels.

- **Implications on Global Health**

Because of climate change, humans and wild animals confront new survival problems contributing to a threat to global health.

- **Exposure of Microplastics to Animals**

Over 800 animal species were found to have been contaminated with plastic through ingestion or entanglement, according to a 2016 UN report. This number is 69 percent more than that of a 1977 review, which estimated only 247 infected species.

Objective 2-

- **Factors Leading to Micro-contamination**

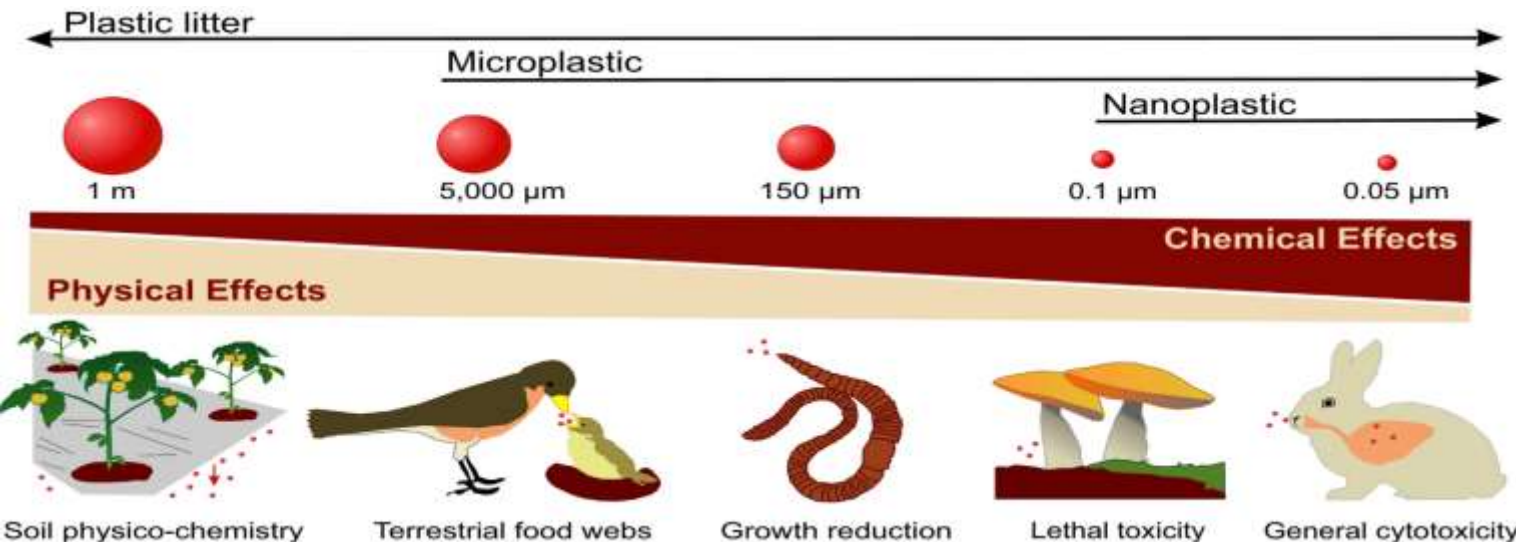
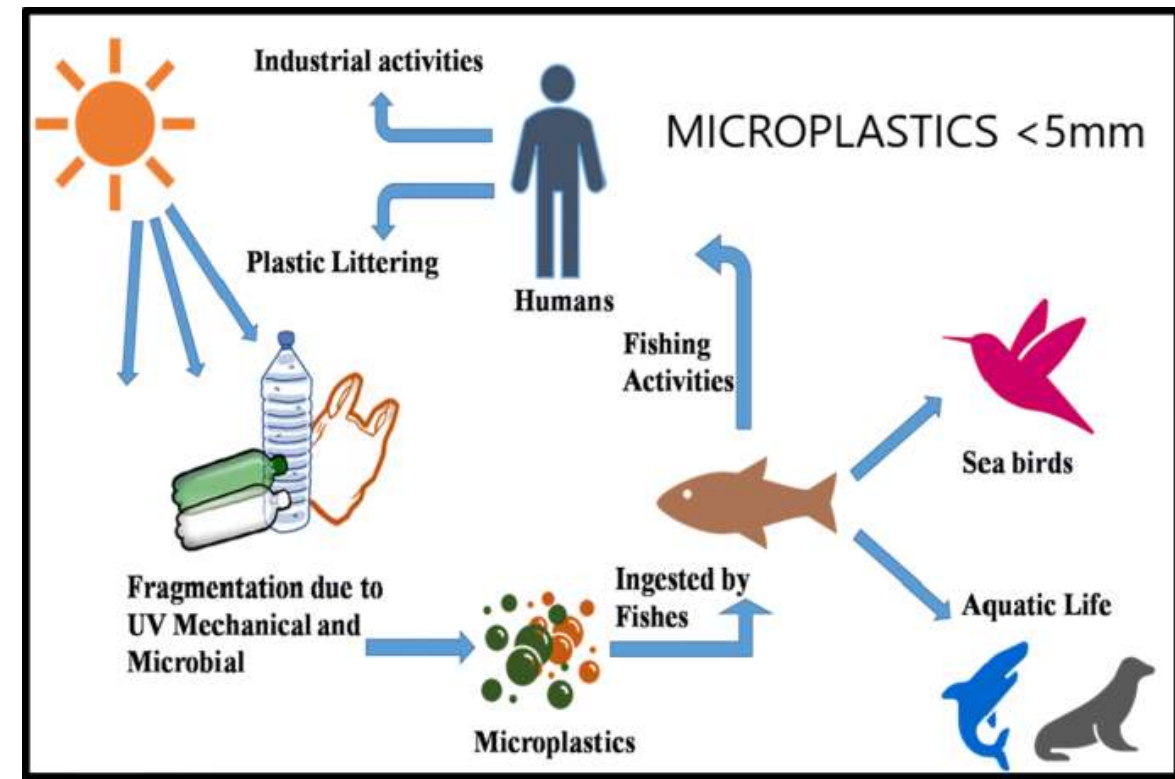
1. Organic pollutants
2. Industrial waste
3. Marine waste
4. Sewage and wastewater
5. Oil leaks and spills

- **Indian Scenario**

1. Terrestrial
2. Atmospheric
3. Aquatic

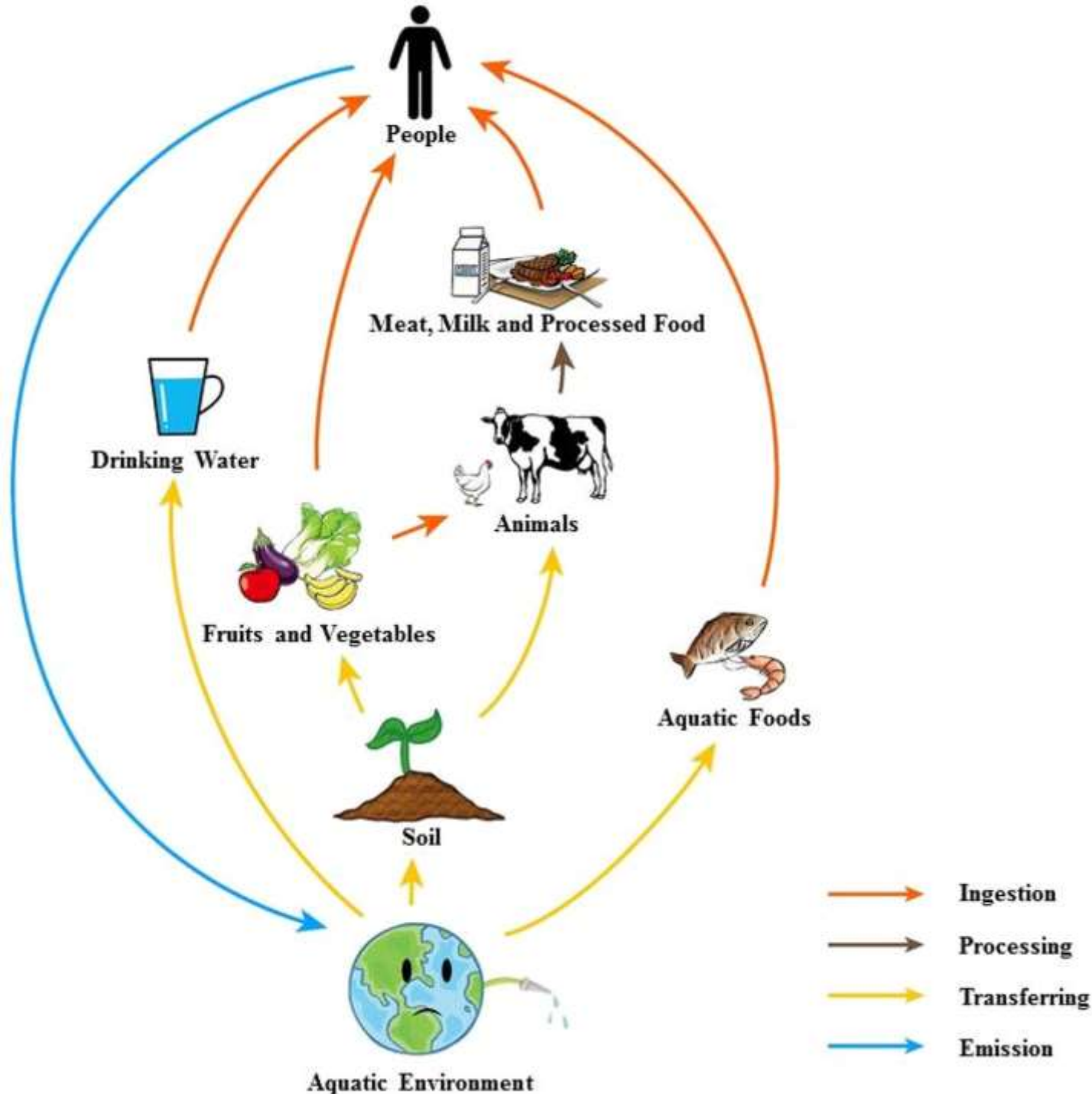
Objective 3-

One of the major nano and microplastic entry points into the human system is represented by the ingestion of food from contaminated sources-namely soil i.e land and water.



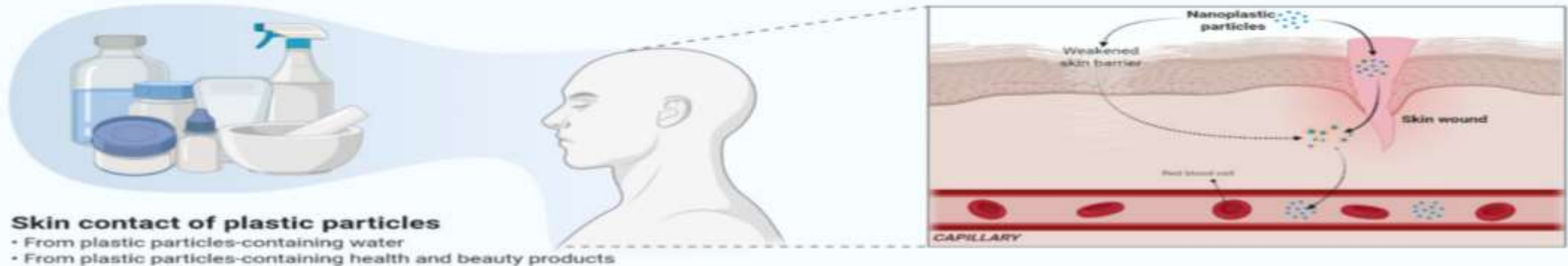
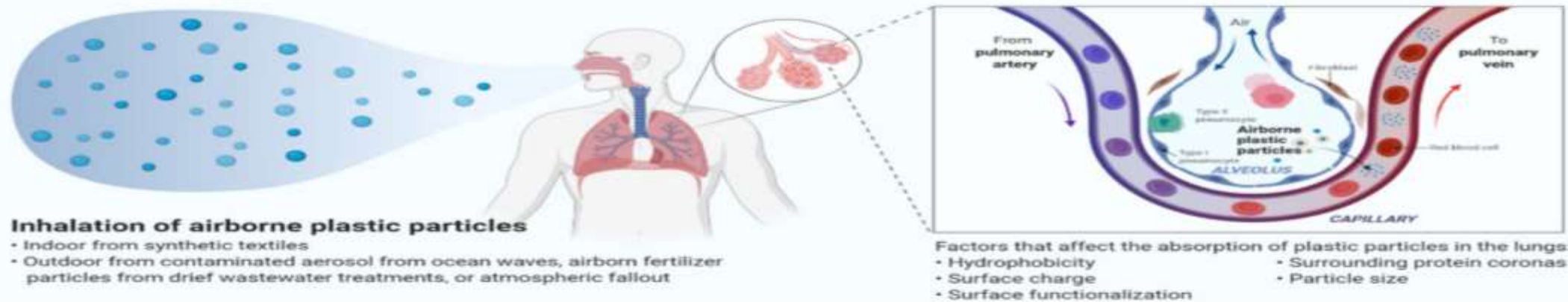
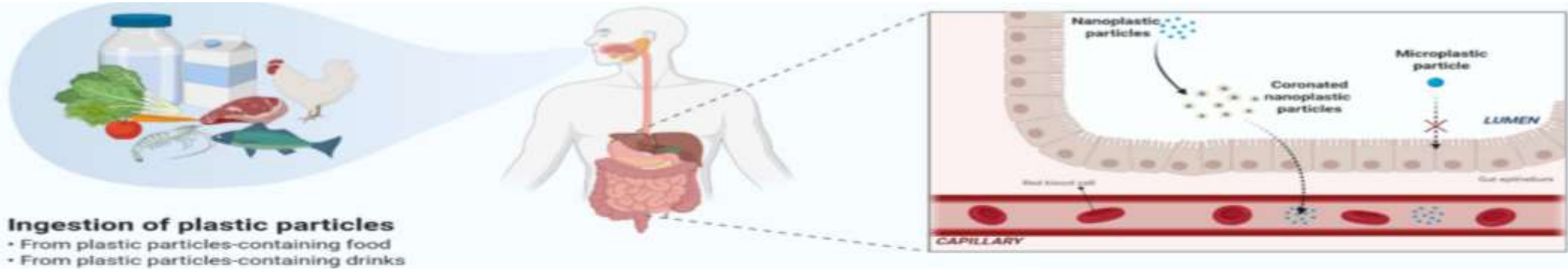
The presence of microplastics in marine species for human consumption most commonly like fish, bivalves and crustaceans is known as BIOMAGNIFICATION.

STUDY: Relevant Field evidence for transfer of Micro-Plastic Debris along a Terrestrial Food Chain



RESULT OF THE STUDY: Microplastic concentrations increased from: soil (0.87 ± 1.9 particles g^{-1}), to earthworm casts (14.8 ± 28.8 particles g^{-1}), to chicken feces (129.8 ± 82.3 particles g^{-1}). The size of the plastic debris found in chickens followed the order: crop > gizzard > chicken feces. Chicken gizzards contained 10.2 ± 13.8 microplastic particles, while no microplastic was found in crops.

IMPACT



Objective 4-

SDGs

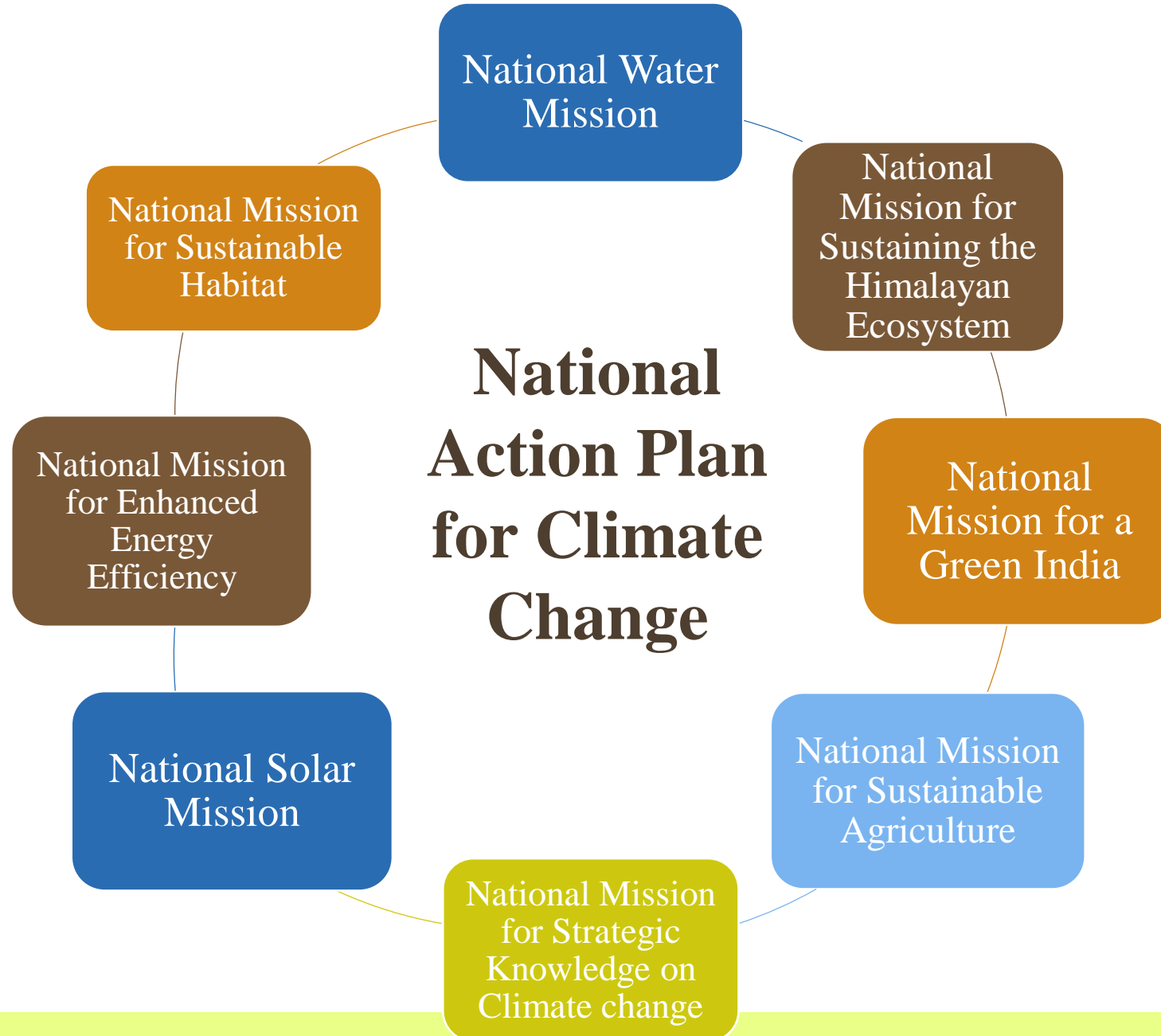
SDG 13 states to take action to combat the problems of climate change. (NAPCC)

**INTERNATIONAL
LEVEL**

COP 26- Lifestyle for Environment (LIFE) and International Solar Alliance (ISA) 'One Sun One World One Grid Initiative'



POLICIES ADOPTED BY INDIA



POLICIES AND GAPS

SDG 13 mentions to take urgent action in order to combat climate change and its impact

The three of the four targets in SDG 13 focus on awareness raising and capacity building. The target on integrating climate measures into national governance is so broad that it loses meaning and application in practice.

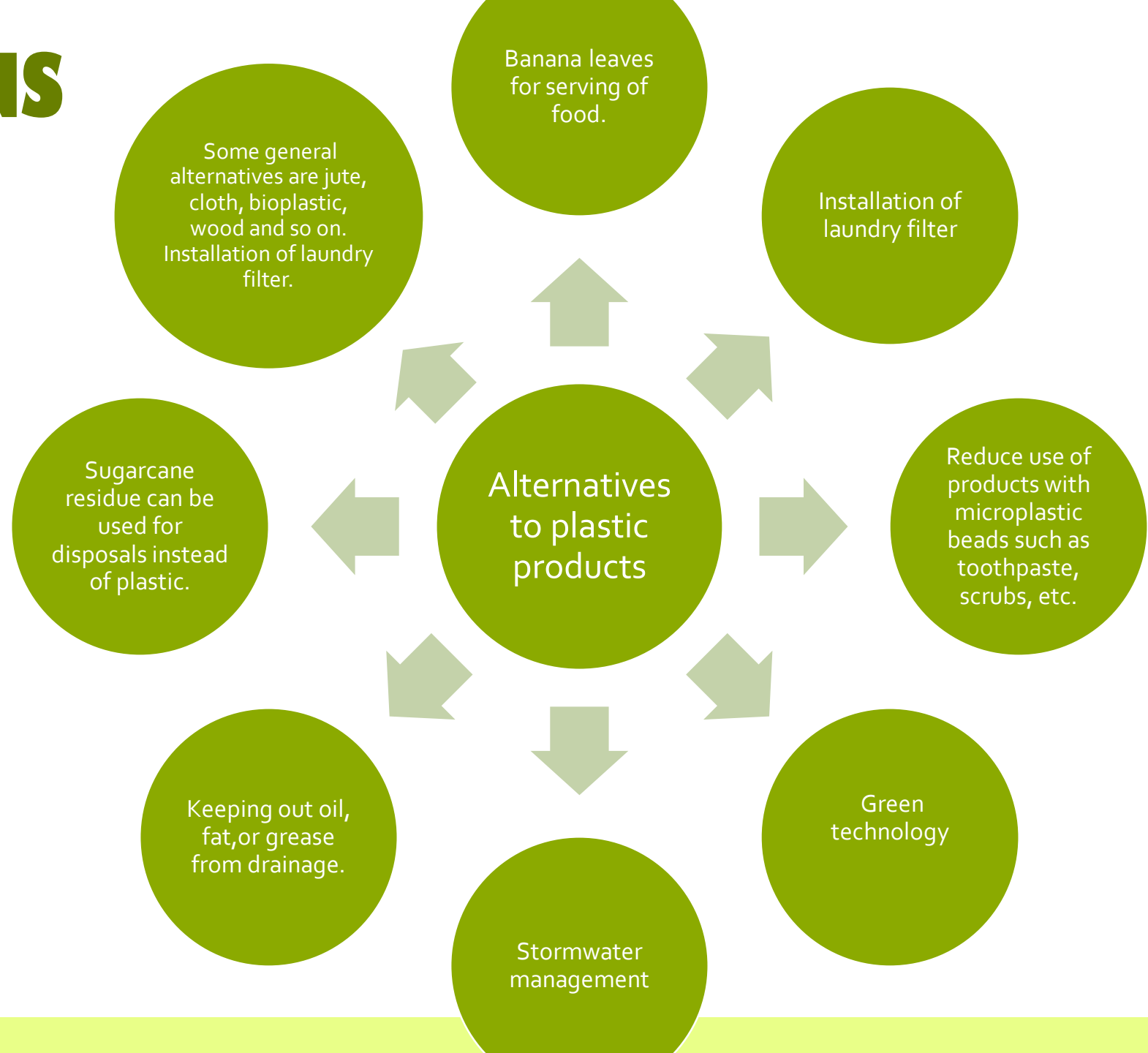
the Paris Agreement was signed under the United Nations Framework Convention on Climate Change (UNFCCC)

It remains unclear how the SDGs will add to or tie in with agreements like The Paris Agreement and other related global policies such as the Sendai Framework for Disaster Risk Reduction.

The Union government on July 28, 2020, launched the Green-Ag Project in Mizoram. The aim is to reduce emissions from agriculture and ensure sustainable agricultural practices.

Not only are institutional capacities and resources limited but also complex.

RECOMMENDATIONS



CONCLUSION

- The fact can't be denied that human health depends upon climate and change in it is affecting the global health.
- The factors causing the climate change such as micro contamination, pollution are directly responsible for affecting the food web.
- Through our research we just tried to analyse what all climate change is, the things responsible for climate change and how the climate change has impacted the health in all.
- The climate change impact not only human health but other aquatic, territorial lives too.
- The efforts make by government and steps that should be taken to combat the situation has been explained.
- Climate Change and its impact on global health is a high rising issue efforts to cope up at every end is really required.

THANK YOU

*“We are the **first generation** to feel the effect of climate change and the **last generation** who can do something about it.”*

- Barack Obama, Former US President



CLIMATE CHANGE AND GLOBAL HEALTH

MICROCONTAMINATION WITH SPECIFIC APPROACH TOWARDS MICRO PLASTIC CONTAMINATION THEREBY AFFECTING GLOBAL HEALTH



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A. INTRODUCTION

Climate change is one of the most significant risks to human rights in our time, endangering individuals' and communities' fundamental rights to life, health, food, and quality requirements of living across the world. Long-term changes in temperature and weather patterns are referred to as climate change. These changes might be natural, such as fluctuations in the solar cycle. However, since the 1800s, human activities have been the primary cause of climate change, owing mainly to the use of fossil fuels such as coal, oil, and gas. The combustion of fossil fuels produces greenhouse gas emissions, which operate like a blanket wrapped over the Earth, trapping heat from the sun and rising temperatures.

IMPLICATIONS OF CLIMATE CHANGE

Because of climate change, humans and wild animals confront new survival problems. Droughts that are more frequent and extreme, storms, heat waves, rising sea levels, melting glaciers, and warmer oceans may directly harm animals, ruin their habitats, and disrupt people's livelihoods and communities. Human health is also being impacted by climate change. Weather and climatic changes can endanger people's lives. One of the most harmful climatic situations is extreme heat. Hurricanes get stronger and wetter as ocean temperatures increase, causing both direct and indirect casualties. Dry conditions fuel more wildfires, which pose several health dangers. Increased flooding can result in the spread of waterborne infections, accidents, and chemical risks.

GLOBAL HEALTH AND HUMAN RIGHTS

Global health refers to an area for study, research, and practice that places a prime concern on improving health and attaining the health equity for all people worldwide. The WHO Constitution declared that enjoyment of achieving the highest standard of health is one of the fundamental rights of every individual for the first time on 1946. It is important to establish government responsibilities to ensure a state of complete physical, mental, and social and emotional well-being and not merely the absence of disease. Through this holistic vision, the UDHR placed health under the right to an adequate standard of living. Everyone has the right to dignity, equity and a standard of living for their health and well-being including safety, social

support, positive environment, opportunities, food, shelter, medical facilities, social care and the right to security and survival. The human right to health encompassed both individual health services and national health systems including social measures for public health.

COMPARATIVE ANALYSIS BETWEEN INDIA AND OTHER NATIONS REGARDING INITIATIVES TAKEN BY THEM

In response to the Kyoto Protocol, the EU established the European Climate Change Programme (ECCP) in June 2000 to develop Europe-wide climate change policies. The ECCP's mission is to identify, develop, and implement all parts of an EU strategy to implement the Kyoto Protocol.

The “African Climate Services Adaptation Programme” is the first multi-agency effort launched under the Global Framework for Climate Services (GFCS) which aims to strengthen the adaptability of vulnerable individuals to the effects of weather and climate-related hazards such as droughts and flooding, as well as associated health problems like malnutrition, cholera, etc.

As we all know, greenhouse gases and global warming have a direct impact on one's health. In order to develop a comprehensive programme to reduce greenhouse gas emissions from all sources across the state, California enacted the "Global Warming Solutions Act of 2006," also known as Assembly Bill (AB) 32.

The United States' climate change policy has a significant impact on global climate change and mitigation. This is because the United States is the world's second largest emitter of greenhouse gases after China, and one of the countries with the highest greenhouse gas emissions per person. In total, the United States has emitted more than 400 billion metric tons of greenhouse gases than any other country on the planet. This policy was developed at the local, state and federal levels of government.

In the Paris Agreement, all countries pledged to work together to keep global temperature rise below 2 degrees Celsius in order to meet the Sustainable Development Goals. With its contribution to the Paris Agreement, India has promised to reduce its GDP emission intensity by 33-35 percent by 2030 as compared to previous 2005 levels.

B. OBJECTIVES

1. To Understand the Concept of Climate Change and Assess its Impact on Global Health.
2. Identifying factors affecting global health as a result of climate change and analysing the impact of micro-contamination pollution on Indian geography's terrestrial, aquatic, and atmospheric systems
3. assessing the impact of microcontaminants on the food chain, thereby affecting global health.
4. Identifying the gaps between the present policy decisions and giving suggestions

C. LITERATURE REVIEW

C. a Litigations -

Since the Paris Agreement was reached, climate litigation has spread throughout the world, making courts significant players in multidimensional climate governance. However, the majority of literature on climate litigation concentrates on legal cases in the Global North. Despite the rise of climate litigation in numerous countries around the world, the majority of academic and professional discussion of the subject still focuses on court cases in developed nations of the "Global North," such as claims in the United States, the United Kingdom (UK), Europe, New Zealand, and Australia (Burns and Osofsky, 2008). Cases like the ongoing U.S. litigation in *Juliana v. United States*, the Hague Court of Appeal's decision in *Urgenda v. Netherlands*, and the U.S. Supreme Court's ruling in *Massachusetts v. EPA* have attracted—and continue to attract—considerable interest. In contrast, research on climate justice in the "Global South" has been scant. Though they are among the most exposed to the effects of climate change, these nations—located in Asia, the Pacific, Africa, and Latin America—are also among the least developed. With over a thousand lawsuits, the United States continues to be the core of the world's climate change law. However, outside of the US, there are currently and over three hundred climate litigation filed in 32 states.

The Leghari case is a well-known example of how litigation concerning climate change issues has grown and become more influential globally over the past ten years, notably in the run-up to

and after the Paris discussions (Khan, 2017). Mr. Ashgar Leghari, a Pakistani farmer, petitioned the Lahore High Court in August 2015, just some few months well before multilateral agreements that resulted in the Paris Agreement, alleging that the Pakistani government was infringing his fundamental democratic rights by failing to "address the challenges and to meet the vulnerabilities associated with Climate Change." With the Pakistani government releasing a National Climate Change Policy and a Framework for its execution, Mr. Leghari claimed that "no progress on the ground" had been made. Judge Syed Mansoor Ali Shah sided with the petitioners in a ruling that was delivered on September 4, 2015. Judge Shah declared that the issue of climate change was "a defining challenge of our time" and that it was a "clarion cry for the protection of fundamental rights of the inhabitants of Pakistan" on a legal and constitutional plane. In a second ruling issued just ten days later, Judge Shah ruled that a combined government-expert Climate Change Commission must be established "to accelerate the proceedings and to efficiently enforce the fundamental rights of the people of Punjab." The Pakistan Climate Change Act 2017, which was passed in order to "fast-track steps needed to implement [climate] activities on the ground," has since replaced the Commission with a new Climate Change Council. The assertions of a transnational climate justice movement, which portrays courts as significant players in forming multilevel climate policy, are given weight by the global development of climate litigation. It also emphasises the significant role that domestic litigation is playing in trying to advance the objectives of international law instruments, like the Paris Agreement, by wanting to hold state parties responsible for their "self-differentiated" nationally determined contributions (NDCs) to the international effort to combat climate change. With the exception of a handful of high-profile cases, such as the Carbon Majors Petition in the Philippines, the Leghari case in Pakistan, and, more recently, the Colombian Youths case, in which a group of 25 youth successfully contested the sufficiency of the government's efforts to reduce deforestation, climate litigation in the Global South has largely gone unnoticed. According to the majority of observers, there don't seem to be many noteworthy developments about climate litigation in these regions of the world. One of the main points we want to make in this article is that changing the "lens" through which we view climate litigation can reveal important advances in case law in the Global South (Peel and Lin, 2019)

Latin America, after Europe and North America, is one of the regions of the world where most of its lodged claims address climate issues on the basis of human rights breaches, despite the fact

that the majority of climate litigation cases are based in Global North countries (as the Grantham Research Institute on Climate Change and the Environment shows). Observers have contended that, in contrast to climate litigation in high-income nations, the characterization of climate assertions as human rights issues in the so-called emerging nations, including Latin American countries, is due to these population densities' high vulnerability to risks brought on by climate change (Uehara, 2022). Latin America is a striking example of how inequalities and climate change interact to determine people's health vulnerability. It is regarded as having a very high levels of social and health inequality among any regions of the world, making poor and socially excluded populations even more susceptible to climate change. For instance, the region's highly unequal health care access and quality worsen its already real health hazards associated to the environment since illnesses of individuals who lack such a crucial service frequently go undetected or untreated (as the Intergovernmental Panel on Climate Change observes). Future Generations v. Ministry of the Environment and Others in Colombia and Greenpeace Mexico v. Ministry of Energy and Others in Mexico are specific climatic lawsuits that have made headlines. Right to health has been specifically mentioned in both cases. Additionally, Colombia and Mexico have ratified the International Covenant on Economic, Social, and Cultural Rights and included legal recognition of the right to health in their national constitutions (ICESCR). Additionally, they have ratified the Paris Agreement (Uehara, 2022).

In order to better protect healthcare systems from the negative effects of climate change on health, India drafted the National Action Plan on Climate Change and Human Health (NAPCCHH) in October 2018. The NPCCHH was subsequently approved by the National Health Mission in February 2019 by the Ministry of Health and Family Welfare (The NPCCHH focuses on prevalent illnesses that are aggravated by the climate, such as those brought on by air pollution, heat, waterborne illnesses, vector-borne illnesses, and cardiovascular illnesses, as well as on mental health, food-borne illnesses, and disorders related to nutrition (Kumar, Sorokhaibam, Mahajan, Sunthlia, Babu, Vardhan, 2019). Air pollution, heat-related ailments, and the construction of environmentally friendly and climatically resilient healthcare facilities are currently the NPCCHH's focus areas. Plans for comprehensive health adaptation are in the works; for instance, the national government is collaborating with 23 states and more than 100 cities and districts in 2020. The Kerala Health Minister signed the state's Department of Health and Family Welfare on to the UN-backed global campaign Race to Zero in October 2021,

marking the subnational level of aggressive climate and health engagement. By doing this, Kerala's department of health joins the famous programme as the first sub-national government in Asia and declares its objective of having net-zero carbon emissions in order to meet the goals of the Paris Agreement. This decision also complies with the health sector's duty to "first, do no harm" and establishes a science-based goal for reducing greenhouse gas emissions to lessen the effects of climate change (ET Health world, 2021).

C. b Global Health and Human Rights

Global health refers to an area for study, research, and practice that places a prime concern on improving health and attaining the health equity for all people worldwide. In 1948, The Universal Declaration of Human Rights, adopted a human rights foundation that has mentioned global health, central to public health policies, practices and programmes. WHO Constitution declared that enjoyment of achieving the highest standard of health is one of the fundamental rights of every individual for the first time on 1946. It is important to establish government responsibilities to ensure a state of complete physical, mental, and social and emotional well-being and not merely the absence of disease.

Through this holistic vision, the UDHR placed health under the right to an adequate standard of living. Everyone has the right to dignity, equity and a standard of living for their health and well-being including safety, social support, positive environment, opportunities, food, shelter, medical facilities, social care and the right to security and survival. The human right to health encompassed both individual health services and national health systems including social measures for public health.

Human rights have brought the world together by recognizing the dignity of every person as crucial for global health. The human rights highlight the importance of sustained political engagement to realize the right to health. Health practitioners have a vital role in political engagement, advancing rights-based public health policies and programmes that are essential to secure the future of human rights in global health.

C. c Policies/ Initiatives India has adopted on sustainable development

The 2030 Agenda for Sustainable Development with 17 Sustainable Development Goals (SDGs) encapsulates India's broader development agenda by integrating social, economic, and

environmental dimensions. FY 2020-21 Economic Survey, presented to Parliament by Union Minister for Finance and Corporate Affairs, Smt. Nirmala Sitharaman, emphasizes this approach and calls for the achievement of equality not only across nations and within nation but also across and within the generations, thus preventing the negative impact of the COVID-19 pandemic as well.

The Climate Change Action program (CCAP) is a central sector program, launched in 2014, with a total outlay of `290 crores for a period of five years. The program is now expanded to 2025-26 and consists of eight broad sections covering the integration of National Action Plan on Climate Change (NAPCC), State Action Plan on Climate Change (SAPCC), National Institute on Climate Change Studies & Actions., National Carbonaceous Aerosols Program (NCAP), Long Term Ecological Observations (LTEO), international dialogue and capacity building. One of the SDG out of 17 is related to climate change, as SDG 13 states to take action to combat the problems of climate change. The UN designated the 17 interconnected SDGs as a "blueprint to build a brighter and more sustainable future for all" by 2030.

Stefano Bertuzzi, the CEO of the American College of Microbiology, was one of many eminent speakers who addressed Summit delegates on September 14 in the inaugural plenary. Understanding the world of microbes is extremely necessary, he said, "whether to prevent harmful consequences or to harness their power for healthier life, for sustainable energy sources, for biodiversity, for confronting climate change, for alleviating hunger problems, etc."

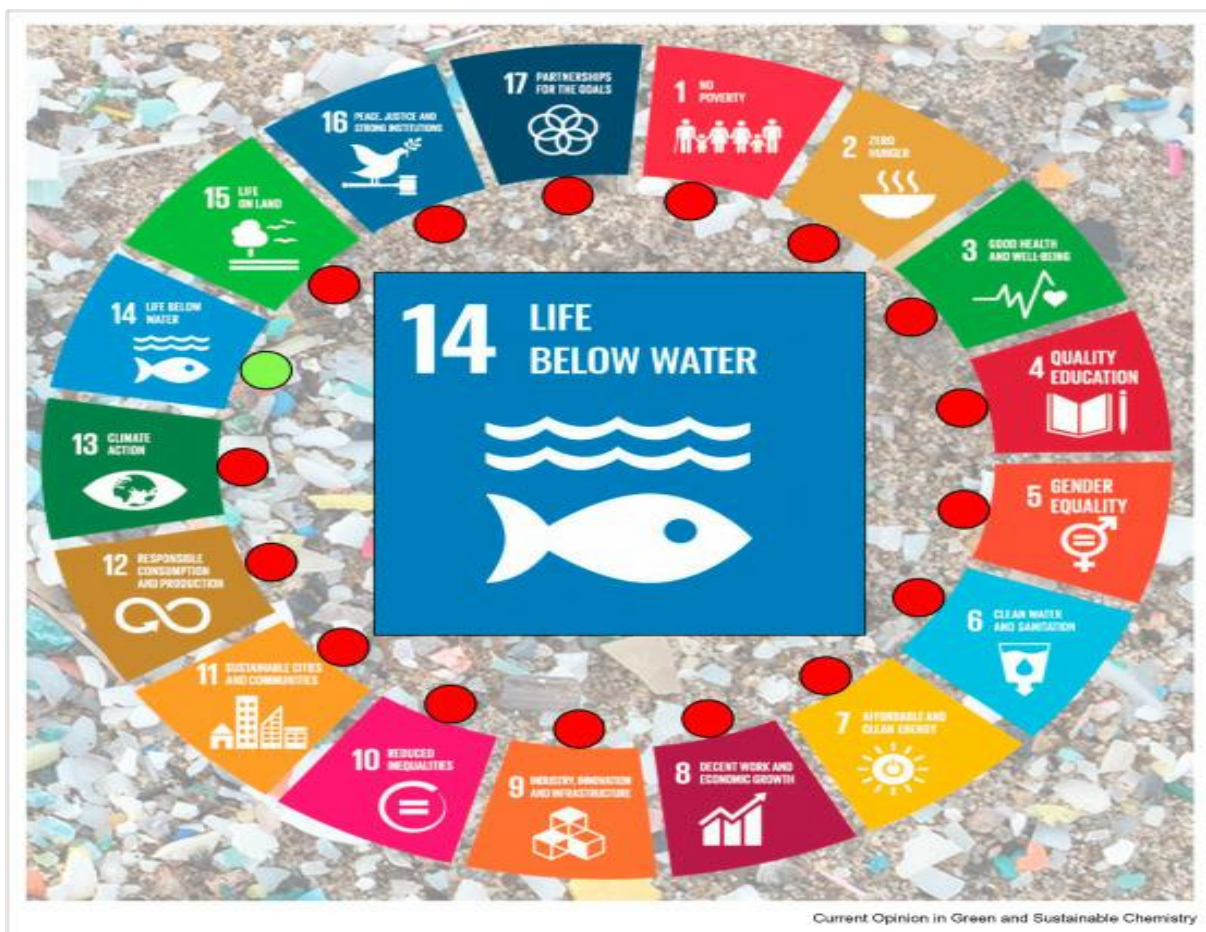
C. d Microcontamination and the UN sustainable development goals

Globally, marine, freshwater, and terrestrial ecosystems are all impacted by plastic pollution. After entering the environment, plastics continuously degrade into microplastics (MPs; 5 mm), which are ever-smaller particles. Plastics and microplastics (hereinafter referred to as (micro)plastics have evolved into a serious trans-boundary danger to natural ecosystems and human health due to poor degradation and unsustainable manufacture, usage, and disposal. The amount of plastic produced globally in 2019 was 368 million metric tonnes (Mt), but in 20 years that amount is expected to treble (Lebreton&Andrady, 2019). The number of national and international agreements to reduce (micro) plastic pollution is increasing along with global plastic manufacturing. National governments are increasingly outlawing or taxing single-use plastic products. The United Nations (UN) has pledged to lessen the amount of plastic that leaks

into the environment on a global scale. These commitments, for instance, include the UN Sustainable Development Goals, the UN Environment Assembly Resolutions on Marine Litter and Microplastics, and Addressing Single-Use Plastic Products Pollution (SDGs) (sdgn.org, 2015). The UN and several nations at national, subnational, and supranational levels, including regional ones, are addressing the problems associated with marine plastics on a global scale. The UN Sustainable Development Goals (SDGs) recognise the problem of marine (micro)plastics under Goal 14: Conserve and sustainably use the oceans, seas, and marine resources for sustainable development. Target 14.1 in particular states: By 2025, prevent and drastically reduce all forms of marine pollution, including that resulting from land-based activities, such as marine debris and nutrient pollution. The indicator 14.1.1: Index of Coastal Eutrophication and Floating Plastic Debris Density will be used to measure this. Therefore, the world community views a decrease in the density of floating plastic garbage as being essential to the sustainable use of the oceans. However, there is currently no widely used indicator for the density of floating plastic waste.

The United Nations Environment Program (UNEP) has taken the initiative in organising UN system-wide efforts to reduce marine plastics. Of particular significance, UNEP is coordinating the Joint Group of Experts on Scientific Aspects of Marine Environmental Protection with a wide range of UN agencies (GESAMP) (Kershaw, Turra, Galgani, 2019). To eliminate marine plastics litter, GESAMP is actively working toward coordinated, scientific solutions. UNEP is working on subindicators for reporting on marine plastics in the context of SDG Indicator 14.1.1b, among other significant projects. Potential subindicators created by GESAMP include beach litter monitoring and reporting, floating plastics, water column plastics, microplastics, ingestion of plastics, and seabed plastic.

There are just one indication (14.1.1b) under Goal 14 which is directly dedicated to decreasing impacts in the marine environment from plastics despite there being 17 SDGs, 169 targets, and 247 unique indicators. There is no particular reference to targets for reducing (micro)plastics or metrics to quantify their reduction in any other SDG. Because of the widespread nature of (micro)plastic pollution and its negative effects on the environment, society, and economy, this poses enormous hurdles for governments and organisations trying to implement accurate reporting and monitoring of other SDGs.



Summary of UN SDGs. The single green circle indicates Goal 14, the only SDG with indicators directly related to (micro) plastics. Red circles indicate SDGs lacking indicators related to (micro) plastics.













Table 1	
Summary of UN SDGs directly impacted by (micro)plastics.	
Goal	(Micro)plastic challenges to implementing UN SDGs
	Negative impacts on ecosystem services and economic impacts on communities [16].
	Presence of (micro)plastics in food packaging, agricultural soils, fruits and vegetables, fish and shellfish posing potential risks to human health through ingestion [17,18,20–22,24,25].
	Presence of (micro)plastics in humans and fetus via ingestion, inhalation, and dermal exposure of microplastics in packed food products, foodstuff, and air [25–30].
	Presence of (micro)plastics in drinking water and treated wastewater effluent [33–35].
	Incineration of (micro)plastic waste used in waste-to-energy systems contributes to greenhouse gas emissions, release of atmospheric pollution, and is unsustainable [37–39].
	Innovation is required for sustainable bio-based alternatives to fossil fuel-based plastics to help contributing to a circular economy [37,40].
	Exports of plastic waste from developed to developing countries have been considered waste pollution transfer [43–45].
	Indiscriminate disposal of plastics in countries with inadequate waste management systems is choking critical urban infrastructure [1,8,49].
	Unsustainable global plastic production and plastic waste mismanagement [1,6,37,45,51].
	Greenhouse gases are emitted at every step of the plastic life cycle, from production to transportation to waste disposal [52,53].
	Extraordinary efforts are required to reduce emissions of (micro)plastics to marine and freshwater ecosystems [1,45,51].
	Mismanagement of (micro)plastic waste causing widespread terrestrial pollution of (micro)plastics in landfills, urban and rural areas, protected areas, and agricultural soils [4,28,37,59,60,61].

Figure- Walker, R, Tony. 2021. (Micro) plastics and the UN Sustainable Development Goals.

Even though there are 17 SDGs that target the greatest environmental problems, only one of them, Goal 14, directly addresses mitigating the negative effects of plastics. Indicators to track the reduction of (micro) plastics, provided any baseline data exists, are not specifically mentioned for any other SDG. Due to the pervasiveness of (micro) plastic pollution and its negative effects on the environment, society, and economy, this poses significant hurdles for governments and organisations trying to implement accurate reporting and monitoring of other SDGs. It is found that (micro) plastic pollution has an effect on at least 12 UN SDGs either directly or indirectly.

C. e National Action on the SDGs in India

The declarations made by the Prime Minister and other senior Ministers at national and international forums show that the Indian Government is firmly committed to the 2030 Agenda, including the SDGs. The responsibility for organising the SDGs has been given to NITI Ayog, the top think tank of the Indian government. The SDGs and its targets have been mapped out by NITI Aayog, which has also selected the lead and supporting ministries for each aim. A government-wide strategy for sustainable development has been approved, highlighting the interconnectedness of the SDGs across the social, economic, and environmental pillars. States have been urged to lay out all of their programmes, including those that are sponsored centrally. As they are best equipped to "put people first" and to guarantee that "no one is left behind," state governments are crucial to India's development on the SDG Agenda. The SDGs are at the heart of several of the government's marquee initiatives, including Swachh Bharat, Make in India, Skill India, and Digital India. Many of these programmes heavily rely on state and municipal governments. Local governments play an equally significant role; 15 of the 17 SDGs have direct connections to the work done by local governments around the nation. The strategic planning, management, budgeting, development of implementation and monitoring systems, and SDGs are all very important to state governments. UN SDGs do not have direct mentions of micro-contaminants or micro plastics and their negative effects. This indirectly has an impact on the steps India takes to combat the same.

C. f Micro Plastic Pollution in India

India, which is located in southern Asia, is bordered by the Indian Ocean in the south, the Arabian Sea in the south-west, and the Bay of Bengal in the south-east. In the maritime environment, microplastic contamination (MP) is seen as a severe problem. These tiny polymers are found in abundance throughout the world's seas and oceans, from the Caribbean to the Mediterranean Sea and from the Atlantic to the Pacific Ocean. MPs have also recently been found in distant mountain ranges, the Antarctic, the Arctic, and deep ocean trenches. MPs are widely distributed throughout the world's marine systems, and their presence has been particularly notable in the benthic, pelagic, and coastal regions of these ecosystems (Wagner et al. 2014; Barletta et al. 2019). Most of the inland sources from which marine plastic trash comes, 80 percent, is transferred to the oceans via rivers (Mani et al. 2016). MP contamination in marine

ecosystems depends on a number of both natural and man-made sources. Anthropogenic ones include poorly managed plastic trash releases, unregulated industry discharges, etc., while natural ones include wind currents, shoreline geology, etc. Even the water treatment plant processes can't stop these MPs.

A Delhi-based NGO Toxics Link published a research titled "Quantitative investigation of Microplastics along River Ganga" that revealed the river is significantly contaminated with microplastics. The Ganga travels through five states over 2,500 kilometres before emptying into the Bay of Bengal (Indian Express, 2021). The study also points out that a large amount of pollutants are added to the river by untreated sewage from highly populated communities along the river's path, industrial garbage, and religious gifts that are wrapped in non-biodegradable plastic. These trash and plastic materials degrade further as they go down the river, eventually entering the Bay of Bengal and finally the ocean, which serves as the "ultimate sink" for all human-made plastics. The Ganga River Basin, which makes up around 26 percent of India's landmass and is distributed across 11 states and sustains 43 percent of the country's population, is the largest river basin in terms of catchment area. It has been known for more than 40 years that the sacred river Ganga is polluted, and cleanup operations have been going on throughout that time. The majority of them have concentrated on building sewage treatment facilities in the major riverside cities. The government approved the NamamiGangeprogramme to clean and safeguard the river in May 2015. This programme is funded entirely by the national government. Earlier initiatives include the National Mission for Clean Ganga in 2011, the IIT Consortium (2011) for water diversion and effective treatment, and the Ganga Action Plan (GAP) in 1985. Although millions of rupees have been spent on these projects and programmes over the past few decades, the Toxics Link report claims that they have had "limited success" and that none of them specifically address the contamination caused by microplastics.

5. Thus, as their origin is connected to these matrices, the contamination of many environmental compartments with MPs has expanded their range to include human consumable goods. In India, only salt, drinking water, tap water, and seafood have been examined for MP contamination, despite the fact that MPs have been found in a wide variety of food and beverage products around the world. The toxicity of these MPs has not received much attention, and it is currently unclear how common MPs are in Indian

food and drink products (Gupta, Mehra, & Vaid, 2021). Given the prevalence of plastic products in our daily lives, it is crucial to investigate the mechanisms underlying MP-associated toxicity to humans and other species. Additionally, it is crucial to investigate the potential interactions between MPs and other contaminants found in Indian habitats as well as the potential for heightened health effects on the interacting biota following ingestion or inhalation. With the increasing demand and production of plastics, MP contamination will continue to rise and may therefore cause serious damage to our environment.

D. RESEARCH QUESTIONS

- 1.) Is there any link between climate change and global health?
- 2.) Whether microplastics are causing harm to the various ecosystems by causing pollution?
- 3.) Is there any link between microcontamination levels and global health?
- 4.) Whether current policies are at par with the climate change crisis?

E. RESEARCH METHODOLOGIES

Our research topic is exploratory in nature and for this purpose, we have used qualitative data in our study. We used secondary data that was collected by other researchers on the same topic. This study includes a literature review in related disciplines, interviews and reports. The results are statistically combined into a meta-analysis in which the data is weighted and pooled to produce an estimate of effect. Meta-analysis refers to the statistical analysis of the data from independent primary studies focused on the same question, which aims to generate a quantitative estimate of the studied phenomenon. The research method used in this paper on climate change is based on theoretical research. It is used when the research is primarily focused to just gather relevant information about a particular topic, in this case, climate change and its impact on global health. Deductive research focuses on explaining the reality with the help of general laws referring to certain conclusions which are addressed under recommendations in this paper. Secondary research is carried out and the available materials like research papers as a source of data and information is collected in this research in order to answer the research questions.

E. a Scope and Limitations

The scope of this paper is limited to the impact of climate change on health due to the presence of microcontaminants (especially micro and nano plastics) at various levels of the food chain. The geography targeted to carry out the analysis is India. Indian as well as International policies and regulations are analysed and the gaps are identified. Suggestions and recommendations are made majorly in the Indian context and the scope is limited to the practicability according to the prevalent conditions.

F. ANALYSIS

OBJECTIVE 1: UNDERSTAND THE CONCEPT OF CLIMATE CHANGE AND ITS IMPACT ON GLOBAL HEALTH.

1.1 What Is Climate Change, Exactly?

Climate change is one of the most significant risks to human rights in our time, endangering individuals' and communities' fundamental rights to life, health, food, and the quality of life across the world. Long-term changes in temperature and weather patterns are referred to as "climate change." These changes might be natural, such as fluctuations in the solar cycle. However, since the 1800s, human activities have been the primary cause of climate change, owing mainly to the use of fossil fuels such as coal, oil, and gas. Because of climate change, humans and wild animals alike confront new threats to global health.

Since the Universal Declaration of Human Rights (1948) adopted a human rights foundation that has placed global health, central to public health policies, under the right to an adequate standard of living, it is pertinent to mention that such acts leading to climate change also pose a threat to the human rights of individuals to a healthy and safe environment.

Climate Change's Impact on Global Health. 1.2 The Impact of Climate Change on Global Health, which has been significantly impacted by climate change.

1.2 The Impact of Climate Change on Global Health:

Climate change has an influence on a variety of established international human rights, both directly and indirectly. States have a proactive obligation to take effective actions to avoid and mitigate these climatic consequences, and therefore to mitigate climate change, as well as to guarantee that all human beings have the required capacity to adapt to the climate change issue.

Many national and international organisations such as the UN various Apex Courts of the nations are actively addressing rights of an individual in a multispectral array of global health threats due to climatic changes and reflecting the interconnections between Climate change, health and human rights.

1.3.Exposure of Microplastics to Animals:

Over 800 animal species were found to have been contaminated with plastic through ingestion or entanglement, according to a 2016 UN report. This number is 69 percent more than that of a 1977 review, which estimated only 247 infected species. 220 of these 800 species have been discovered to consume micro-plastic waste in the wild. Different trophic levels and taxa, such as marine mammals, fish, invertebrates, and fish-eating birds, exhibit plastic ingestion. During the dissection of carcasses and laboratory studies, plastic debris is frequently discovered concentrated in the gastrointestinal tract of an organism. Micro- and nano-plastics, which prefer smaller particles, might linger in an animal's body and go from the intestine to the circulatory system or nearby tissue (UNEP, 2016).

OBJECTIVE 2: IDENTIFYING FACTORS AFFECTING GLOBAL HEALTH DUE TO CLIMATE CHANGE AND ANALYSING THE IMPACT OF MICROCONTAMINATION POLLUTION ON TERRESTRIAL, AQUATIC AND ATMOSPHERIC SYSTEMS OF INDIAN GEOGRAPHY.

2.1 FACTORS LEADING TO MICROCONTAMINATION

Climate change is real and is largely a result of human activities. As ocean and air temperatures rise, stability of climate, weather and health events are disrupted. As a result, human health is deteriorating. Contaminated water creates health problems and leads to water-borne diseases that can be prevented by taking action even at home level. There are many important factors that lead to micro contamination :

2.1.1 Organic Pollutants

Organic Pollutants are very wide-ranging in a variety of highly toxic species. Dyes are large chemical solubles that are widely used in many industries namely, fabrics, leather and tanning, food, paper, etc. having an influence of colour in products. Aquatic organisms, plants, and humans are greatly affected by the presence of dyes in the water. They incumber sunlight from entering the water bodies and reduce dissolved oxygen, thus leading to the death of photosynthetic organisms and other organisms within the aquatic environment. Humans may be exposed to dye noxiousness by eating vegetables and fish which bioaccumulate dyes. The presence of pharmaceuticals in water is known to cause harmful and chronic toxicity in aquatic organisms and endocrine disruptive chemicals that create abnormal endocrine functions and increase the risk of cancer in humans.

2.1.2 Industrial Waste

Industries and industrial sites across the world are a major contributor to water pollution. Many industrial sites produce waste in the form of toxic chemicals and pollutants, and though regulated, some still do not have proper waste management systems in place. When industrial waste is not treated properly (or worse, not treated at all), it can very easily pollute the freshwater systems that it comes into contact with.

Industrial waste from agricultural sites, mines and manufacturing plants can make its way into rivers, streams and other bodies of water that lead directly to the sea. The toxic chemicals in the waste produced by these industries not only have the potential to make water unsafe for human consumption, they can also cause the temperature in freshwater systems to change, making them dangerous for many water dwelling organisms.

2.1.3 Marine Waste

Marine Dumping has been defined as the deliberate disposal at sea of wastes or other matter from vessels, aircraft, platforms, or other man-made structures, as well as the deliberate disposal of these vessels or platforms themselves. Marine dumping can destroy or degrade important habitats for aquatic species and cause coastal erosion and salutation, which affect the health and productivity of the marine environment.

The most toxic waste material dumped into the ocean includes dredged material, industrial waste, sewage sludge, and radioactive waste.

2.1.4 Sewage and wastewater

Harmful chemicals, bacteria and pathogens can be found in sewage and wastewater even when it's been treated. Sewage and wastewater from each household is released into the sea with fresh water. The pathogens and bacteria found in that wastewater breed disease, and therefore are a cause of health-related issues in humans and animals alike.

2.1.5 Oil Leaks and Spills

Large oil spills and oil leaks, while often accidental, are a major cause of water contamination. Leaks and spills often are caused by oil drilling operations in the ocean or ships that transport oil. It begins to move and weather, breaking down and changing its physical and chemical properties. As these processes occur, the oil threatens surface resources and a wide range of subsurface aquatic organisms linked in a complex food chain. Many different types of aquatic habitats exist, with varied sensitivities to the harmful effects of oil contamination and different abilities to recuperate from oil spills. When this occurs, human health and environmental quality are put at risk.

2.2. MICRO CONTAMINANT POLLUTION IN INDIA

Micro contaminant pollution is a major concern globally. This section will present the current understanding of Micro contaminant pollution in aquatic systems, terrestrial systems and atmospheric systems of Indian geography.

Plastic production leads to various emerging risks to the environment and human health. For instance, in the recent COVID pandemic, inadequate use of plastic items has generated massive problems to our environment. In Indian geography, the wider reach of these Micro plastics have resulted in contamination of air, soil and water. Further due to ingestion or inhalation, they are known to be consumed by humans.

2.2.1. Microcontaminants in terrestrial systems

The increased consumption of plastics in our daily lives and their ageing and fragmentation lead to Micro contaminants in terrestrial systems. The sources of these contaminants include mismanage of plastic waste material, tyre wear and tear, Aeolian transport, building materials and construction fragmentation. Micro contaminants are invading every part of our environment but the studies conducted in India to evaluate the situation in terrestrial system, is very limited. Although Micro plastics enter the terrestrial systems, there are extremely few data on micro contaminants concentration in this system. Gap areas in the micro contaminants research in Indian Terrestrial environment:

- The estimation of micro contaminants abundance in different terrestrial systems.
- The Estimation of these contaminants release to nearby water resources from water waste treatment plants.
- Source apportionment studies.
- Risk assessment of micro contaminants exposure to terrestrial organisms.
- Innovations for the effective management of plastic waste.

2.2.2. Microcontaminants in atmospheric environment in context of Indian geography

Air is one of the most vital things that living beings need to survive and exist. Airborne MPs have lately surfaced as contaminants of concern among the various pollutants prevalent in the environment. MPs in the air can enter the human body directly and constitute a serious risk to human health. The primary source of MPs in the atmosphere is synthetic textiles, although slow emissions from landfills, roadways, and incomplete debris incineration must also be addressed. Several investigations were carried out to assess the dangers of airborne MP to human health. For example, Vianello et al. (2019) studied the effect of indoor air exposure (24-h duration) on people using a breathing thermal manikin (BTM) and discovered that an average individual may inhale up to 272 MP particles from indoor air during 24 hours. Inhalation of airborne fibres is far more common than other forms. India, being one of the most polluted areas in terms of air pollution, is also vulnerable to airborne MP contamination. According to a recent IQ Air (2020) assessment, India ranks 22 of the world's 30 most polluted cities, notably in terms of PM 2.5 (particulate matter smaller than 25 µm in size).

MPs, in combination with other pollutants in the Indian atmosphere, can cause a variety of health problems, but the severity of the crisis is unknown due to a substantial paucity of study in this area. During the current literature search, two papers indicating the presence of MPs in Indian air were discovered in databases. According to these investigations, synthetic textiles are the main source of MP fibres in the sample areas, whereas the presence of fragments, films, and spheres has been connected to releases from macro-plastic debris fragmentation and disintegration. MPs transported by Aeolian processes can contribute significantly to the pollution of land and aquatic habitats. Given the importance of a healthy environment in our life, it is critical to do regressive research on MP prevalence, transport, and fate in this sector. The amount of studies undertaken in India to justify the problem of atmospheric MP is quite small, necessitating the engagement of scientists and researchers.

2.2.3 Microcontaminants in aquatic environment in context of Indian geography

The marine and coastal environment is a highly productive zone that contains several subsystems such as coral reefs and sea-grasses. It is a complex ecosystem with a diverse variety that ranges from primitive (horseshoe crab) to advanced creatures (dolphins). The marine environment is the huge body of water that encompasses 71% of the earth's surface. The marine environment's continental shelf is a mixing point for seawater and freshwater, resulting in a distinct coastal ecology. Because aquatic ecosystems are interconnected with the terrestrial environment, changes in one system have a consequence on the other. Plastics accumulating in ocean basins may be generically categorized into four sizes: mega-plastics, macro-plastics, meso-plastics, and micro-plastics. Micro-plastics can be found in widely made commercial items such as personal care and cosmetics, or they can be produced by in-situ environmental degradation and subsequent fragmentation of larger size plastics by physical, chemical, and biological processes. Micro-plastics are widespread in marine and coastal systems, and synthetic pollutants interact chemically with organic contaminants and metals. The density of micro-plastics impacts their dissemination in the water column. Polypropylene (PP) and polyethylene (PE) float in water because to their low density, but higher density plastics such as polystyrene (PS), polyvinyl chloride (PVC), polyamide (PA), and polyethylene terephthalate (PET) do not float but deposit by inclination through the water column.

OBJECTIVE 3 : ACCESSING THE IMPACT OF MICROCONTAMINANTS ON FOOD CHAIN, THEREBY AFFECTING GLOBAL HEALTH.

Often, doctors suggest that food should not be reheated in plastic containers in a microwave. It is basically because plastic food containers, when used for reheating our food in a microwave, shed huge numbers of tiny specks — called microplastics — into the food we consume. Similarly, when parents prepare baby formula by shaking it up in hot water inside a plastic bottle. By doing this, the infant might end up swallowing more than one million microplastic particles each day.

3.1. HOW DO MICRO CONTAMINANTS ENTER THE FOOD CHAIN?

One of the major nano and microplastic entry points into the human system is represented by the ingestion of food from contaminated sources—namely soil i.e land and also water. Humans could also assume an estimated intake of 80g per day of microplastics via plants (fruits and vegetable) that accumulate Microcontaminants through uptake from polluted soil ¹.

The presence of microplastics in marine species for human consumption most commonly like fish, bivalves and crustaceans is a very well known concept of BIOMAGNIFICATION. To support this contention of biomagnification, recent studies have found MPs in human feces, suggesting that humans are exposed to MNPs through the food chain or food web.

3.1.1 Human Exposure Pathways of Microcontamination in the Food Chain.

Consuming seafood is one way that people can be exposed to microplastics. Global protein intake from seafood in 2015 made up 6.7 percent of total protein intake and roughly 17 percent of animal protein intake. Numerous marine organisms can consume microplastics because of their microscopic size. Explicitly or implicitly ingestion via trophic transfer is possible (e.g., up the food web). Planktonic organisms, larvae at the base of the food chain, big and small invertebrates, and fish have all been found to consume microplastic. Microplastics were found in the predatory Crucian carps through trophic transfer. Invertebrates, crabs, and fish are only a few of the species that include microplastics and are

¹Enyoh C.E., Verla A.W., Verla E.N. Uptake of Microplastics by Plant: A Reason to Worry or to be Happy? *World Sci. News*. 2019

intended for human food. Because plastic particles are frequently found concentrated in an organism's digestive system, eating whole bivalves and small fish increases the likelihood that a person would swallow microplastics.

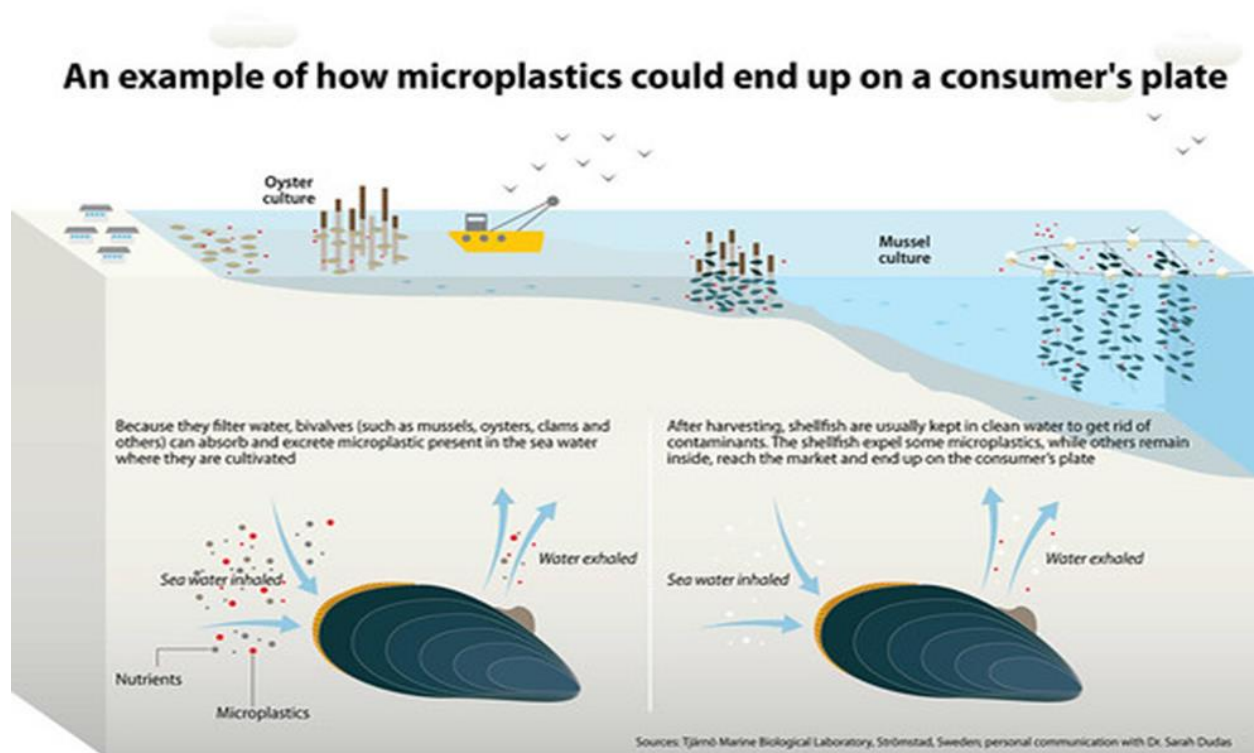


Fig. 1: An example of how microplastics could end up on a consumer's plate (Reproduced with permission from Maphoto/Riccardo Pravettoni; originally published by Marine Litter GRID-ADRENAL, available at www.grida.no/resources/6915)

According to research, each person can only consume a maximum of 37 particles of microplastic annually through salts, and proteins in Fish, meat, and dairy which contribute the most to dietary exposure to microcontamination.. The total daily dietary Microplastic and Nanoplastic consumption was found to range from 1 to 83 ng PCB/kg bodyweight (bw). Using benzo[a]pyrene as the reference marker, the range of the daily average food intake of PAHs was between 4 and 10 ng/kg b.w (WHO Technical Report Series. 2016 ;(995):I). Today, there is growing data to suggest marine species may be at risk from ingesting microplastic or the poisons it may contain. Standardized and repeatable sampling, exposure characterisation, ecological evaluation, and human health assessment techniques are necessary to determine whether

microplastic exposures have an influence on human health. For sampling that takes place on beaches, in subtidal sediments, in biota, or in the water column, there is no established standard protocol.

A recent study was carried out in Mexico to find - ***Relevant Field evidence for transfer of Micro-Plastic Debris along a Terrestrial Food Chain***², the findings for which are entailed below:-

This study assessed micro- and macro plastic in soil, earthworm casts, chicken feces, crops and gizzards used for human consumption. Samples were taken from soil, earthworms (who ingest soil), and chickens feces and chicken crop and gizzard (who ingest earthworms and soil).

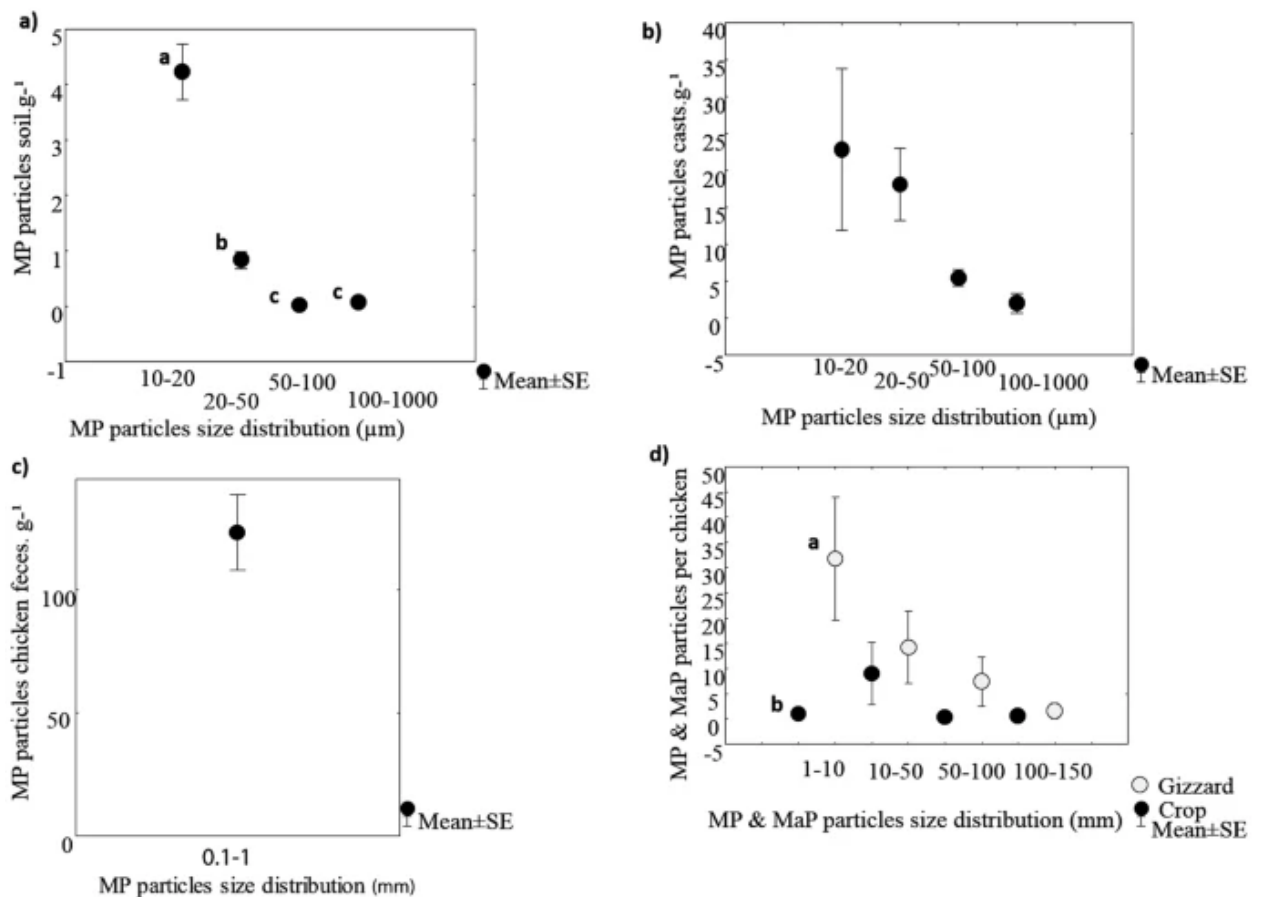


FIGURE :Microplastics (MPs) and Macroplastics (MaPs) size distribution per gram of soil (a); gram of earthworm casts (b); gram of chicken feces (c); per chicken (d) (crop and gizzard).

²Huerta Lwanga E, Mendoza Vega J, Ku Quej V, Chi JLA, Sanchez Del Cid L, Chi C, et al. Field evidence for transfer of plastic debris along a terrestrial food chain. Sci Rep. 2017;7:14071. Available Online at : <https://doi.org/10.1038/s41598-017-14588-2>.

Different letters indicate significant differences among the concentration of microplastics per gram at different sizes, presented in each plot.

RESULT OF THE STUDY: Microplastic concentrations increased from: soil (0.87 ± 1.9 particles g^{-1}), to earthworm casts (14.8 ± 28.8 particles g^{-1}), to chicken feces (129.8 ± 82.3 particles g^{-1}). The size of the plastic debris found in chickens followed the order: crop > gizzard > chicken feces. Chicken gizzards contained 10.2 ± 13.8 microplastic particles, while no microplastic was found in crops.

3.1.2: A key concern of microcontaminants and nanoplastics pollution is- Whether they represent a risk to ecosystems and human health?.

For this lets focus on what exactly is a microcontaminants and how it is harmful to a living creature if at all it enters the bloodstream, thereby affecting global health.

Microplastics (MPs) are defined as “*synthetic solid particles or polymeric matrices, with regular or irregular shape and with size ranging from 1 μm to 5 mm, of either primary or secondary manufacturing origin, which are insoluble in water.*”³

The adverse effects on organisms that are exposed to microcontaminants can be separated into two categories: Physical effects -This is related to the particle size, shape, and concentration of microplastics. AND, chemical effects: hazardous chemicals that are associated with microplastics.

3.1.3 IMPACT : A recent report from the ‘World Health Organization’⁴ emphasized the ubiquitous microplastics presence in the environment and aroused great concern regarding the exposition and effects of nano and microplastics on human health. In one study⁵, for instance, mice fed large quantities of microplastics showed inflammation in their small intestines. Mice exposed to microplastics in two studies had a lowered sperm

³Frias J., Nash R. Microplastics: Finding a consensus on the definition. *Mar. Pollut. Bull.* 2018;**138**:145–147.

⁴*Microplastics in Drinking-Water*. World Health Organization; Geneva, Switzerland: 2019. Available online: <https://apps.who.int/iris/bitstream/handle/10665/326499/9789241516198-eng.pdf?ua=1>

⁵Li, B. *et al.* *Chemosphere* 244, 125492 (2020).

count⁶ and fewer, smaller pups⁷, compared with control groups. Some of the in vitro studies on human cells or tissues also suggest toxicity.

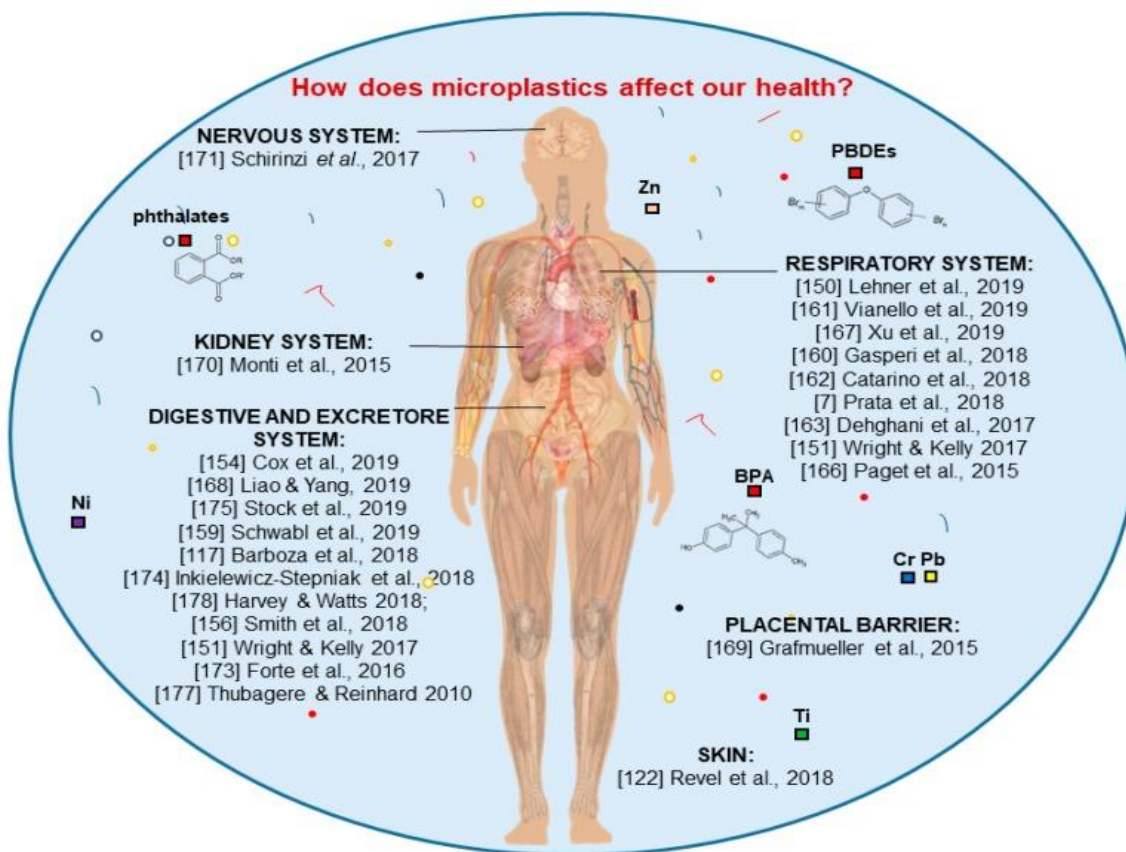


FIGURE: A Pictorial Depiction of how the Microcontaminants is affecting Human Body

- The intake of microplastics by humans is by now quite evident. The entry point may be through ingestion (through contaminated food or via trophic transfer), through inhalation, or through skin contact. Only microplastics smaller than 20 μm should be able to penetrate organs, and those with a size of about 10 μm should be able to access all organs, cross cell membranes, cross the blood–brain barrier, and enter the placenta,

⁶Jin, H. et al. *J. Hazard. Mater.* 401, 123430 (2021).

⁷Park, E.-J. et al. *Toxicol. Lett.* 324, 75–85 (2020).

assuming that a distribution of particles in secondary tissues, such as the liver, muscles, and the brain is possible.

- Another study by Sharma et al. (2020) explained the toxic effects of micro contaminants lead to cancer risk to humans. Many researchers have reported that micro contaminants can lead to aggregated health issues, if such micro contaminants are ingested by humans.

OBJECTIVE 4: IDENTIFYING THE GAPS BETWEEN THE PRESENT POLICY DECISIONS AND GIVING SUGGESTIONS.

POLICIES/ INITIATIVES INDIA HAS ADOPTED ON SUSTAINABLE DEVELOPMENT

The 2030 Agenda for Sustainable Development with 17 Sustainable Development Goals (SDGs) encapsulates India's broader development agenda by integrating social, economic, and environmental dimensions. FY 2020-21 Economic Survey, presented to Parliament by Union Minister for Finance and Corporate Affairs, Smt. Nirmala Sitharaman, emphasizes this approach and calls for the achievement of equality not only across nations and within nation but also across and within the generations, thus preventing the negative impact of the COVID-19 pandemic as well.

The Climate Change Action program (CCAP) is a central sector program, launched in 2014, with a total outlay of `290 crores for a period of five years. The program is now expanded to 2025-26 and consists of eight broad sections covering the integration of National Action Plan on Climate Change (NAPCC), State Action Plan on Climate Change (SAPCC), National Institute on Climate Change Studies & Actions., National Carbonaceous Aerosols Program (NCAP), Long Term Ecological Observations (LTEO), international dialogue and capacity building.

One of the SDG out of 17 is related to climate change, as SDG 13 states to take action to combat the problems of climate change. The plan that is adopted by India to investigate the problem of climate change is, The National Action Plan on Climate Change (NAPCC) which was released by the Prime Minister on 30th June 2008. It includes a national strategy that aims to enable the country to adapt to climate change and enhance the ecological sustainability of India's development path. It focuses on maintaining a high growth rate so that it can increase the living standards of most people of India and can reduce their vulnerability to the impacts of climate change.

The National Action Plan included the eight National Missions which represents multi-pronged, long term and integrated strategies for achieving key goals in the context of climate change. These Missions are National Solar Mission, National Mission on Enhanced Energy Efficiency,

National Mission on Sustainable Habitat, National Water Mission, National Mission for Sustaining the Himalayan Ecosystem, National Mission for a Green India, National Mission for Sustainable Agriculture and National Mission on Strategic Knowledge for Climate Change. These missions can contribute to achieving the sustainable development goals in an effective manner.

INDIA'S INITIATIVES AT THE INTERNATIONAL STAGE

1. **Lifestyle for Environment (LIFE):** In November 2021, the Hon'ble Prime Minister proposed a One-Word Movement in the context of climate i.e., LIFE - Lifestyle for Environment, at the COP 26 in Glasgow. This movement calls for coming together with collective participation, to take lifestyle for the environment forward as a campaign and as a mass movement for environmentally conscious lifestyle.
2. **International Solar Alliance (ISA):** Hon'ble Prime Minister launched the 'World Solar Bank' and 'One Sun One World One Grid Initiative' –global impetus to bring about the solar energy revolution globally. The ISA Secretariat has recently launched a 'Coalition for Sustainable Climate Action' composed of global public and private corporations.

4.1 POLICIES CONCERNING CLIMATE CHANGE WITH RESPECT TO GLOBAL HEALTH

4.1.1 Climate change and sustainable development goal 13

“SDG 13 mentions to take urgent action in order to combat climate change and its impact”

India made a commitment to reduce the emissions intensity of its GDP by 20-25% from its 2005 levels by 2020 and by 33-35% by 2030 in October 2015. On 2 October 2016 India formally ratified the historic Paris Agreement. India has committed to reduce the emissions intensity of its GDP by 20-25% by 2020. The Government of India has also adopted a National Action Plan on Climate Change to address this issue directly, as well as a National Mission for Green India. These national schemes are complemented by a host of specific programmes on solar energy,

enhanced energy efficiency, sustainable habitats, water, sustaining the Himalayan ecosystem, and to encourage strategic knowledge for climate change.

SIGNIFICANT GAPS IN SUSTAINABLE DEVELOPMENT GOAL13:

- The three of the four targets in SDG 13 focus on awareness raising and capacity building. While they respond to calls for improving capacity to adapt. They do not specify who this capacity building should be targeted at and what mechanisms can be used to carry it out. As research has repeatedly shown, capacity building alone does not necessarily lead to improved adaptation action and such initiatives need to be flexible, iterative, forward-looking and repeated.
- The target on integrating climate measures into national governance is so broad that it loses meaning and application in practice.
- Financial instruments to meet Goal 13 have been discussed but are confined to the Green Climate Fund and not mention the Adaptation Fund, which was established in 2001 to finance climate change adaptation and resilience activities in developing countries.
- The climate goal suffers from the same issues faced by the SDGs in general, that the goals are often self-contradictory and sectorial in their approach. In the absence of clear targets of whose adaptive capacity is to be built and how this will be done and funded, fleshing out context-specific details of the targets would be a good step forward.

4.1.2 Other climate processes

In December 2015, the Paris Agreement was signed under the United Nations Framework Convention on Climate Change (UNFCCC), with the aim of reducing the pace of climate change and accelerating and intensifying actions and investments needed for a sustainable low-carbon future.

SIGNIFICANT GAP :Such climate action and the SDGs (Goal 13) are closely linked. However, it remains unclear how the SDGs will add to or tie in with agreements like The Paris Agreement and other related global policies such as the Sendai Framework for Disaster Risk Reduction or the United Nations Convention to Combat Desertification (UNCCD).

4.1.3 Environmental governance in India

The Ministry of Environment, Forest and Climate Change has adopted an environmental policy – National Environmental Policy in 2006 which sets mandates for concerned departments both at the apex and at the sub-national level for the implementation of environmental quality standards including thematic areas of air, water and solid waste management and land degradation within their defined areas of jurisdiction.

National Action Plan on Climate Change (NAPCC) 2008 also explicitly stated in the 12th Five Year Plan, introducing measures that promote economic development while yielding secondary climate benefits. NAPCC, released in 2008, aimed to create a directional shift in India's development trajectory by integrating climate concerns with larger developmental one through sustainable development pathways that advance both economic and environmental objectives.

GREEN-AG PROJECT

The Union government on July 28, 2020, launched the Green-Ag Project in Mizoram along with four states- Rajasthan, Madhya Pradesh, Uttarakhand, Odisha, where the project will be implemented. The aim is to reduce emissions from agriculture and ensure sustainable agricultural practices. It would help local people to take advantage of the rich agro-biodiversity present in their landscape for sustainability of agriculture and livestock production practices and thereby enhance their incomes.

The Green-Ag Project is funded by the Global Environment Facility, while the Department of Agriculture, Cooperation, and Farmers' Welfare is the national executing agency.

Other involved in its implementation are Food and Agriculture Organization (FAO) and the Union Ministry of Environment, Forest and Climate Change (MoEF&CC).

SIGNIFICANT GAP: There are also significant gaps between international commitments and domestic policy and practice. Not only are institutional capacities and resources limited in Indian cities, but these are often complex, multi-hazard environments and climate change hotspots with large populations living in poverty, highly vulnerable to both everyday risk as well as extreme events and risks arising from climate change related variability, such as drought-induced water

scarcity and food insecurity, localized urban floods, and urban heat island effect, as well as environmental and health risks. Coordinating and integrating climate mitigation and adaptation actions in these cities will require careful analysis, stakeholder consultation and mobilization and determined action.

4.2 FUNDING GAPS AND POTENTIAL FINANCIAL OPPORTUNITIES FOR RESEARCH ON CLIMATE AND HEALTH

In recent years, numerous high-income countries have allocated public funds to climate and health research. Canadian federal funds through Natural Resources Canada's Climate Change initiative are one example. However, the 10-90 gap, which states that only 10% of global resources are utilized to undertake research on diseases that affect 90% of the world's population, may also apply to inequitably dispersed climate and health research. The UNFCCC also encouraged climate-focused financing institutions. The Green Climate Fund (GCF) was formed at the 16th COP in 2010 to mobilize money for climate reduction and resilience, while the Adaptation Fund was established as a financing vehicle for all developing nations parties to the Kyoto Protocol.

The Global Environment Facility (GEF), an international partnership of 183 countries, has provided nearly US\$ 18 billion in grants addressing environmental issues around the world. However, much effort focused on the natural and social aspects of climate-induced health risks, with very limited prioritization of action-oriented research on the health effects of climate mitigation and adaptation strategies. This possibly signals the need to enhance efforts to forge strategic partnerships that can consolidate efforts both for successfully accessing funds and conducting impactful research.

G. RECOMMENDATIONS

Drawing lessons from previous successful and innovative partnership building efforts for health research may be useful. For example, in 2020, the Wellcome Trust announced a new strategy putting “climate and health” as one of its top three priority areas of work. The Foundation's goal is to “engage with the communities most impacted by climate change to investigate the detrimental impacts of global warming on health, and to use research to develop new methods of safeguarding people's health.^[1]”.

Furthermore, under the UNFCCC principle of “common but distinct duties and respective capabilities,” developed countries have a moral duty to contribute climate financing to developing countries in order for them to meet their objectives. The greatest emphasis and attention must be placed on assisting extremely vulnerable areas, such as SIDS, through purpose-driven collaborations that help leverage money for contextually appropriate research that supports their climate initiatives and policies.

WHO, other UN agencies, multilateral funding agencies and communities of researchers must join hands to build the evidence base of research on climate change and human health.

India in its effort to control pollution will be implementing a nationwide ban on single-use plastic from July 1. Single-use plastics are essentially items made of plastic for single use. These items are mostly polythene bags, sachets, shampoo bottles, disposable glasses, etc., which are used and disposed of immediately after.

Ø One of the ecofriendly methods which can be used as alternative to the plastic products is use of banana leaves for serving of food at different places, which would be affordable and will also decrease the use of plastic leads to better for the economy.

Ø Install a laundry filter. Clothing is one of the world’s largest sources of pollution. Most of your clothing probably has polyester or other forms of microplastics in it. When you wash these clothes, microplastic fiber leaks out into the water. A single load of laundry can release over a million microplastic fibers. In order to combat this, you can install a filter in your washing

machine to catch these plastics. Then, you can properly dispose of them. You can also wash your clothes on a lower setting, wash by hand, or try to buy less synthetic clothing.

Ø Reduce your use of products with microplastic beads in them. Toothpaste and facial scrubs are examples of products that contain microbeads. These beads can pass through filtration systems and travel far distances, even into the water supply. By avoiding these products, you can reduce your own plastic exposure and that of the entire world.

Ø Sugarcane residue can be used for making of plates rather than having the use of plastic for making those dishes.

- Green technology, or green tech, is an all-encompassing term for the type and use of technology that are considered environmentally friendly based on its production process or its supply chain, which as a result, reduces our carbon footprint. Green technology can either have lower negative impacts on the environment when compared to traditional resources like fossil fuels, or they actively reverse and reduce human activity to mitigate climate change

Ø Use of plastic can be done for the road construction in India, where the ministry already provided the guidelines that how to use it for making of national highways in the country. The front runners are Chennai, Pune, Surat, Indore who has built the roads using the discarded plastic. It shows that there is ne to recommend that the awareness for the use of plastic in such a manner need to takes place by providing the help of campaign and providing the information that how economic it would be to use such method in making roads.

Ø Also the goal of India to switch to electronic vehicles around 30 percent by 2030 need to bring to a pedestal where India should fully switch to electronic vehicle as stated by Europe that they will became switch fully towards electronic vehicle.

- Stormwater management is the effort to reduce runoff of rainwater or melted snow into streets, lawns and other sites and the improvement of water quality” according to the US Environmental Protection Agency (EPA).

Ø It is important to avoid pollutants from contaminating the water and helps to use water more efficiently, for this one of the activity that can be done is to have the better drainage system in the country so that the water can be drained into that and would provide the path towards

achieving the goal. A proper functioning can be done where the survey can take place both in rural and urban area so that the efficiency can come into existence.

Ø Other method can be to keep out oils, fat, or grease from the sink. Desist from pouring cooking oil, fat or grease down the kitchen sink. Instead, keep a jar that collects all the fats, grease or oil then discard in solid waste.

RECOMMENDATIONS:

- To avert the worst impacts of climate change, global carbon emissions must be drastically reduced. However, we must also plan for the severe and inescapable repercussions of carbon emissions, such as rising temperatures, altering precipitation patterns, ocean acidification, sea-level rise, and an increase in the severity and frequency of extreme weather events.
- WHO recommends drinking-water suppliers and regulators prioritize removing microbial pathogens and chemicals that are known risks to human health, such as those causing deadly diarrhoeal diseases. This has a double advantage: wastewater and drinking-water treatment systems that treat faecal content and chemicals are also effective in removing microplastics. A recent study by Nithin et al. (2021) suggested that manufacturing table salt from groundwater instead of seawater could lead to lesser contamination of micro plastics.
- Gap areas in the micro contaminants research in Human Consumables in Indian Environment:
 - i. The estimation of micro contaminants abundance in all kinds of food items and beverages
 - ii. The estimation of risk associated with consumption of micro contaminated food items.

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