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12. Environment Degradation and Human Displacement

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12.1 Introduction:

Climate change amplifies extreme weather conditions like intensifying heat waves, extreme rainfalls, etc. affecting vulnerable population throughout the globe. Climate change is not a new phenomenon and is quite evident in last few decades with increasing the risks related with climate change. Anthropogenic pressure not only led to climate related hazards but also amplified their frequencies, intensities and duration leading to damage to nations infrastructure and property, loss of human and animal life along with long term economic effects worldwide. One of the major impact of climate change on human population is the human displacement forcing them to become environment refugee. Persons who are displaced within their country of habitual residence or who have crossed an international border and for whom environmental degradation, deterioration or destruction is a major cause of their displacement, although not necessarily the sole one, belong to environmentally displaced people. These persons are refugees in the real sense of the word, but their situation does not coincide with the legal definition of "refugee." Primary causes for environmental displacements include natural events necessitating disaster relief such as earthquakes, volcanic eruptions and floods. Human-made causes are by far the most underlying causes of the displacements. They include depletion of water, soil and other resources and/or environmental degradation, dam construction, nuclear testing, hazardous waste site construction, and industrial accidents. Global warming necessitates specific attention. Secondary causes (which in part result from the primary ones) include population pressure, diseases, malnutrition and poverty.

People may be forced to leave a region because the environment does not allow a safe living anymore. Moreover, it is possible that the displacement of people may eventually cause environmental insecurity both in the region of origin and in the new settlement area. Environmental security is a state in which an ecosystem is able to support the healthy pursuit of livelihoods of the people living in that system. An environment can by itself be naturally insecure; for example, areas that are prone to natural disasters, such as floods, cyclones and volcanic activity. Moreover, there are human impacts that result in environmental changes, such as industrial pollution, or over-exploitation of natural resources. Special attention should be given to global environmental changes such as desertification, biodiversity and climate changes. Human actions may also lead to sudden and disastrous environmental disruption. This is for example the case when constructing large infrastructures such as dams, transport corridors and industrial accidents. Both human-made and natural environmental security may interact and mutually reinforce each other. For instance, when natural floods in the lowlands are exacerbated by the consequences of large-scale deforestation in the upper regions. Lack of environmental security does not necessarily lead

to displacement of people. There are many examples of populations who coped with difficult environmental conditions and adjusted to possible dangers from natural disasters. If resources such as water become scarce, they may be used more efficiently (e.g. through integrated water management) or be replaced by substitutes (e.g. by replacing surface water by groundwater). Soil degradation can be prevented or slowed down, by using appropriate agricultural techniques. But next to the environmental elements, there are other factors that make people vulnerable to the lack of environmental security. These factors include economic conditions such as ownership, income, the social network, health, education and the family situation. When the combination of environmental, economic and social factors is too unfavorable, people might decide to migrate. If the environmental component is a major factor in their decision to move out, they are referred to as environmentally displaced persons. During the 1980s and the early 1990s, environmentally displaced persons were called environmental refugees. "Refugee" is however a term which has a strong legal connotation. "Refugee" is an international term, defined in section 6B of the 1950 statute of the Office of the United Nations High Commissioner for Refugees (UNHCR), and in article 1 of the United Nations Convention of 1951 relating to the Status of Refugees. In these documents a refugee is "any person who is outside the country of his former habitual residence, because he has or had well-founded fear of persecution by reason of his race, religion, nationality or political opinion, to avail himself of the protection of the government of the country of his nationality or, if he has no nationality, to return to the country of his former habitual residence." Environmental refugees consequently refers then to the people who are being forced to leave their homes; to retreat after losing battles with their environment, both natural, such as droughts, floods, cyclones and earthquakes, and permanent human-caused changes, such as dams, the slow degradation of farmland, the remnants of war and from industrial accidents. A more recent, concise definition has been provided by Myers. Environmental refugees are persons who no longer gain a secure livelihood in their traditional homelands because of environmental factors of unusual scope, notably droughts, desertification, deforestation, soil erosion, water shortages and climate change, also natural disasters such as cyclones, storm surges and floods. Sea level rise, cyclonic storms, desertification have long term effects on populations and also on their resettlements. Risk management approaches are gaining importance.

According to IOM(2017) Environmental migrant is a person who for reasons of sudden or progressive changes in the environment that adversely affect their lives or living conditions, are obliged to have to leave their habitual homes, or choose to do so, either temporarily or permanently, and who move either within their territory or abroad. It has been predicted that by 2050 1 billion people will be forced to migrate due to climate change and environmental causes (IOM 2017b).More than 25 million people were displaced in 2016 due to natural disasters occurring in Asia, particularly China, India and Pakistan (IDMC 2017).

Long term climate variability along with extreme weather events has led to striking displacements both within and international boundaries. Primary causes for environmental displacements include natural events necessitating disaster relief such as earthquakes, volcanic eruptions and floods. Human-made causes are by far the most underlying causes of the displacements. They include depletion of water, soil and other resources and/or environmental degradation, dam construction, nuclear testing, hazardous waste site construction, and industrial accidents. Global warming necessitates specific attention. Secondary causes (which in part result from the primary ones) include population pressure,

diseases, malnutrition and poverty. Environmental displacements are seldom caused by one event. Rather they are a response to multi-factorial stresses.

Moreover, many of the causes are interlinked. The mass and sudden displacement pose logistic and political challenges to the government also. Losses and damages incurred in the form of health, access to services and education, protection and culture(UNICEF UK,2017).The risks associated with these environmental migration vary between different geographic locations and different social structures(IPCC 2014).Globally millions of people are affected by cyclonic storms every year, with 12.9 million people in 2016 alone (IDMC 2017).The internal migrations mostly in poor countries towards capital cities led to more urbanization, overcrowding and threatening the attainment of sustainable development goals, making population more valurnable to communicable diseases due to no access to sanitation(World Bank 2015,Banu *et al*,2013).Poorer countries are more vulnerable to cyclonic storms due to their location in tropical regions and impact on their populations is many fold due to factors like poverty, more dependence of their on natural resources for livelihoods, poor health care facilities and low levels of education in comparison to rich and developed countries(Blaikie *et al* 2014).

Environmental security threatens not only human existence but also the peace and stability of regions around the world, especially (but not only) in poor countries. Environmental security and displacement have been addressed in several international documents. Both the Brundtland report and the UN Conference on Environment and Development in Rio de Janeiro, 1992, pointed to environmental degradation as an important underlying cause for mass migration. Agenda 21 calls for increased research to identify "the major migration flows that may be expected with increasing climatic events and the cumulative environmental change that may destroy people's local livelihoods." Environmental degradation is identified as one cause for the movement of people by the Programme of Action of the UN International Conference on Population and Development in Cairo, 1994.

According to Henrietta fore, executive director at UNICEF (2019) children are the victims of rampant destruction to the planet and a global crisis. It is threatening their basic rights -a clean environment to live in, clean air to breathe, water to drink and food to eat. Frequent droughts and floods has futher increased the global burden of hunger and malnutrition for the next generation of children. More than half a billion children live in areas with extremely high flood occurrence and almost 160 million in high-drought severity zones. Rise in extreme weather patterns, lack of access to clean water to drink, increasing temperature, polluted and toxic air to breathe will worsen children's health. By 2040, one in four children will live in areas of extreme water stress and thousands will be made sick by polluted water. UNICEF is working to mitigate the impact of the climate crisis in countries across the world, especially in African nations-Ethiopia and Malawi.

Traditionally, natural disasters have been associated with temporary displacement or migration but now a day's climate change is triggering widespread extreme weather events leading to unheard of disasters across the world. According to research conducted by IIT, Kharagpur (2019) that climate change was the reason behind the collapse of the Indus valley civilization and led to mass human migration. The gradual southward shift of Intertropical Convergence Zone (ITCZ) over the last 7000 years forced people to migrate for greener pastures as the shifting of the ITCZ decreased monsoon rains, drying up of rivers resulted

in difficulty to do agriculture. The human migration from the dark age is similar to the one that world is witnessing today, especially in low-lying coastal regions and islands which bear the brunt of extreme weather events and sea level rise due to global warming.

Climate change estimates project a 3 to 5°C rise in temperature by 2060. This temperature effect will unevenly be distributed over the world, with more pronounced changes at the poles as compared to the equator. Sea rise is expected to be 18cm by 2030, indicating the loss of coastal lands and flooding estuaries. Today, there are 70 to 80 annual cyclones worldwide, causing 15,000 to 23,000 deaths a year. The damage they cause is estimated at around US$1.5 billion. The trend increases. Areas, which are most vulnerable, include coastal zones where one third of the world population lives. Islands with a minimal elevation above sea level such as the Maldives in the Indian Ocean and many Caribbean Islands, and areas prone to cyclones, which are formed overseas with surface temperatures above 27°C. This allowed the Intergovernmental Panel on Climate Change (IPCC) to conclude, "The gravest effects of climate change may be those on human migration as millions are uprooted by shoreline erosion, coastal flooding and agricultural disruption." The periodic World Migration Report 2020 has dealt in details on the migration due to natural disasters." Many more people are newly displaced by disasters in any given year, compared with those newly displaced by conflict and violence and more countries are affected by disaster displacement', says the report. In 2019, 1.6 million people displaced by disasters were still in camps or places out of their homes. In 2018, of the total new 28 million internally displaced people in 148 countries, 61 percent were due to disasters. At 2.678 million people, India has the highest number of people displaced by disasters and extreme weather events in 2018.According to IDMC, storms displaced 9.3 million people and floods 5.4 million. According to UN, disasters and geophysical hazards have an average of 3.1 million displacements per year since 2008.According to WMO Secretary General Petteri Taalas "Heat waves and floods, which used to be once-in -a -century events are becoming more regular. This is a trend that has continued since the last few decades. According to the report, more than 10 million people were displaced internally-within a country-between January and June 2019.Out of this, 7 million were due to extreme weather events like floods, cyclones and hurricanes.

Environmental Degradation Spirals A growing frequency of natural disasters, partially linked to climate changes, is one of the causes of the destruction of people's basic means of living. Difficult circumstances may drive people towards marginal (e.g. the edges of the Sahara), fragile (e.g. mountain areas) or disaster-prone (e.g. the fertile, but flood prone islands in front of Dhaka's cost) areas, not fit for cultivation or human settlement. The result is a further degradation of a land and a narrowing of the basis for their already precarious situation. In many developing countries, notably in Africa and Southern and Eastern Asia, the likelihood and frequency of natural and human-made disasters is closely linked to economic, social and political difficulties. Countries, which are hardest hit by natural disasters, are often those, in which environmental degradation is proceeding rapidly as a result of human activity. In many Southeast Asian countries upstream deforestation has made coastal areas more vulnerable to cyclones and floods. Rapid population growth and poverty drives people to cultivate fragile and endangered land, and adds to a steadily rising numbers of people vulnerable to environmental change. A vicious spiral of environmental degradation and displacement may start if the problem of environmental insecurity is not addressed at an early phase.

A natural disaster is "the impact of a natural hazard upon a population or area which is vulnerable to such impacts and where impacts result in substantial damage, disruption and casualties."

They include earthquakes, volcanic eruptions, hurricanes, floods, droughts, heat- and cold waves, and fires. In all these situations the impact is manifested as a disruption of the human ecology of the affected area. They have become hazards since humans are involved and they have become disasters as a result of the way humans live in natural hazard-prone areas. Natural disaster prone areas are unevenly distributed over the world. Areas where tectonic plates meet are prone to earthquakes. Hurricanes can only originate in areas where the surface temperature of the ocean water is 26°C or higher. Islands offer an interesting case study. Some of them are prone to earthquakes and volcanic eruptions as a result of their geographic location and geological ontogenesis. Moreover, many islands and island archipelagos lie in the oath of revolving storms. Extreme weather events such as the El Niño/La Niña climatic phenomena also affect island states causing forest fires and droughts and an increase in epidemics and disease outbreaks such as malaria, Dengue fever and cholera. Islands in the Caribbean, South Pacific, and Indian Ocean are particularly at risk to multiple natural hazards. During the last quarter of the twentieth century natural disasters killed an average of 3311 people each year on islands globally. They also affected nearly 6 million islanders per year. During the period 1280 island disasters were reported, an average of 51 natural disaster events per year. Most of them were experienced on Asian islands and the least on European islands. Most disasters during this period were the consequence of high wind incidents (30%), with islands in Asia and the Caribbean being prime hosts of hurricanes and typhoons. There were also a significant number of earthquakes (10.5%) and floods (17%) reported during this 25-year period. "Damages and economic losses directly related to the occurrence of a disaster situation" is the indicator used to estimate the economic impact of disasters. Disasters on islands caused US$61 billion in damage over 25 years, i.e. islands on the average face nearly US$2.5 billion in direct financial costs a year. Asian islands bore over 80% of these costs. In 1998 the incidence of natural disasters was particularly high. 44 disasters were reported to have affected islands. In 1998, one event, a tsunami, killed over 2000 people in Papua New Guinea. This is the event with the highest number of reported deaths during this year. Over 10 million islanders suffered from various consequences of disasters including loss of their homes, livelihoods, family and injuries. Although this is an alarming picture, it is unclear how many people, driven by these catastrophes, decided to leave their homeland and to migrate. Land degradation: Erosion, salinization and water logging of irrigated lands are the main causes of land degradation. Today, an estimated 6 070 500 ha of land each year lose its productive capacity. 20% of vegetated land in Asia is degraded since 1945. In Africa this figure amounts to 22% and in South America it is 14%.Erosion threatens the topsoil in a dramatic way. During the past 20 years some 500 billion tons of topsoil have been eroded away worldwide, roughly equivalent to the topsoil in India's croplands.

In countries as disparate as Mexico, Costa Rica, Mali and Malawi, soil erosion causes annual losses in farm output worth 0.5 to 1.5 percent of the GNP. Yet between a quarter and half a billion impoverished people in developing countries find they obliged to farm hillsides where they cause exceptional erosion. Improper irrigation has caused worldwide 3.5 million km2 of salinized land. 15,000 to 20,000 km^2 are lost every year to salinization.

Water shortage: 550 million people today live in countries with chronic water shortages. According to the World Water Council 25 countries cope today with serious water shortage. In 2005 this number will be increased to 60 countries. By 2025 an estimated number of 3 billion people will have to live with "water stress," structural shortage in different intensities.

The principal risk areas include parts of India and Pakistan, the Middle East and much of Africa. Water shortages cause major problems for health, irrigation agriculture and industry. The World Bank estimated that providing the population worldwide with drinking water would cost 600 to 800 billion dollars. Treating this water (to recycle it e.g. in agriculture) doubles this figure. Offering basic water security by the year 2025 would necessitate at least a doubling of the investment cost in water infrastructure works. Water shortages are made worse by increasing droughts in the wake of global warming. Droughts that have only a five percent frequency today may increase to 50 percent by 2050. Water is intimately related to preventable diseases, as the main group among them is water born, agricultural yield and poverty.

Desertification: Today 30% of the earth's land surface is affected by the degradation of fragile dry lands. It thereby threatens the livelihoods of at least one billion people in 100 countries, of whom 135 million are experiencing the rigors of severe desertification. It eliminates 60000 km2 of agricultural land each year, and reduced another 200 000 km2 to a state of grossly depleted productivity. The cost of agricultural output lost is around US$42 billion per year. Areas which are most threatened include northeastern Brazil, north and central Mexico, western India, Pakistan and North Africa. But drought is a still more important factor in Sub-Saharan Africa. This is the region with some of the greatest population pressures, and committing environmental pressure. It has by far the largest proportional numbers of environmental refugees already. Especially at risk are the Sahel countries, where the desert moves up and down, from the Horn of Africa, and a "dry corridor" in the South and from Namibia through Botswana and Zimbabwe to southern Mozambique. Desertification is a typical example of a complex human ecological problem: it reduces the land's resilience to natural climate variability, it undermines food production and contributes to famine, it deeply affects the socioeconomic conditions of the local population, thereby triggering a vicious spiral of poverty, ecological degradation, migration and conflict.

Deforestation: It has been estimated that up-to-date 350 million people may face absolute shortages in fuel wood. In 2010, 40 to 50% of the existing forest cover is projected to be lost. Slash-and-burn cultivator's cause well over half of all the forestation, most of them are peasants displaced by soil erosion, water deficits, landlessness, poverty and population pressure in traditional farmlands. These "shifted cultivators" now totalize at least 200 million and possibly as many as 500 million.

Whatever the causes of deforestation are, it eliminates the homelands and the livelihoods of large numbers of people. Especially ethnic minorities and other indigenous people are most vulnerable. Documented cases of involuntary migration caused by (among other reasons) desertification exist in the Philippines, Ethiopia, Madagascar, Peru, Haiti and Brazil. Deforestation influences flood/drought regimes and local rainfall. Tropical deforestation is also the cause of the bulk of species extinction.

Climate change: median estimates project a 3 to 5°C rise in temperature by 2060. This temperature effect will unevenly be distributed over the world, with more pronounced changes at the poles as compared to the equator. Sea rise is expected to be 18cm by 2030, indicating the loss of coastal lands and flooding estuaries. Today, there are 70 to 80 annual cyclones worldwide, causing 15 000 to 23 000 deaths a year.

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The process of environmental degradation may be gradual, as in the cases of water pollution and water shortage, coastal flooding and more frequent disasters due to global warming and sea level rise, over exploitation of natural resources, desertification and soil erosion. Detrimental environmental problems may remain undiscovered until a certain threshold is reached beyond which they become a severe threat to the environmental security of the region. Preventive action is the most important strategy to use in tackling these problems. Although a legislative and policy basis exists to address these issues, this should be strengthened both at the national and the international level. Next to prevention, there is a need to identify these dangers at an early stage. Regions that are likely to become environmentally insecure should be monitored. Research is needed to collect both the physical data (e.g. using geographic information systems) and the socioeconomic and political situation in the area and the vulnerable groups living there. Geographic information systems (GIS) have an important role to play here. They can be used to describe and analyze a wide variety of drivers, including drought, earthquakes, erosion, floods, forest change, irrigation, landslides, mining, pests, population, salinization, storms and volcanic eruptions. They can equally be used in locating potential problem zones, in making inventories of problem zones and in verification and analysis of the information. They have been used in monitoring both preventive and follow-up aspects of environmental displacements. Specific research is needed to establish early warning systems. They should allow global surveillance of areas at risk of gliding off into environmental insecurity and displacement. These early warning systems are essential to develop, as policy intervention for most causes underlying the problem is most successful at early stages of conflict. Of great importance to all populations living in resource-marginal and natural catastrophe prone areas is disaster preparedness should be developed as an essential tool in facilitating and preventing disruption of the developmental process. Environmental impact assessment (EIA) and strategic environmental assessment (SEA): Environmental assessment is still the most specific instrument for environmental prevention. It has been shown that displaced people

suffer the most important impact in the construction of large dams. Displacements should be addressed more fully to obtain more weight in the assessment of projects. However, as most of the causes which need to be prevented appear more at higher levels of decision making than at the project adjacent mountains, where they start agriculture in inhospitable areas, causing erosion, render the environment most unsustainable, and finally migrate for years leaving behind a trace of environmental destruction.

To avoid this, countries should have resettlement policies to prepare for those situations in which environmentally displaced people cannot return to their home countries. When, such as after floods, return is possible, an active policy which aims at assisting migrants to return to their home areas should be developed.

Environmental displacements are seldom caused by one event. Rather they are a response to multi-factorial stresses. Moreover, many of the causes are interlinked. Water shortage for example results in threatened harvests, famine, disease, poverty and social marginalization. This type of environmental degradation spirals is the real motivation of a population's decision to move, as their homeland cannot sustain them any longer. Action responses to environmentally induced migration have to do both with prevention and mitigation. At the prevention and preparedness side, environmental impact assessment, strategic environmental assessment, implementation of international environmental conventions and national environmental plans are among the most important instruments. Relocation policies, resettlements, technical improvements, early warning systems, and local ownership of mitigating actions are essential elements of the mix of instruments which is necessary to help environmentally displaced people with rehabilitation and their eventual possible return to their homeland whenever possible. Environmental displacement is closely interlinked with environmental security. Displacement can be the cause or the result of a lack of environmental security.

As environmental displacements are in part caused by exploitation of natural resources by mega industrial projects, environmentally displaced people face also environmental injustice. Environmental injustice implies any undue imposition of environmental burdens on innocent bystanders or communities that are not parties to the activities generating such burdens. Environmental inequity involves a skewed (or disproportionate) distribution of environmental risks by nationality, race, ethnicity, or class.

These concepts are intertwined with the concept of environmental racism, which suggests a deliberate targeting of the communities of specific racial, ethnic, tribal, or cultural groups as depots for hazardous waste, environmentally and health-threatening products, and other forms of pollution. Both environmental injustice and environmental racism are promoted through systematic exclusion of minority groups in vital environmental policy decisions.

Minority status, lower socioeconomic status, powerlessness, and other conditions of marginalization have been identified as major factors influencing the extent of environmental injustice and human rights repression. Localizing the cause of environmentally displace persons in the "environmental injustice" framework links up the discussion of part of them with legal frameworks and international legal recognition of the problem.

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