

Zion/Zionism

GST 211: PHILOSOPHY OF SCIENCE ENVIRONMENTAL ISSUES: POLLUTION AND SUSTAINABLE DEVELOPMENT

Outline:

By

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1. ENVIRONMENT

Environment as defined by Douglas and Holland is “the aggregate of all the external forces, influences and conditions, which affect the life, nature, behavior and the growth, development and maturity of living organisms”. It

consists of four segments- Atmosphere: The atmosphere implies the protective blanket of gases, surrounding the earth: Hydrosphere: which comprises all types of water resource ,oceans, seas, lakes, rivers, streams, reservoir, polar icecaps, glaciers, and ground water. Lithosphere: the outer mantle of the solid earth, which consists of minerals occurring in the earth"s crusts and the soil e.g. minerals, organic matter, air and water and Biosphere: Biosphere indicates the realm of living organisms and their interactions with environment, viz atmosphere, hydrosphere and lithosphere.

2. ELEMENT OF ENVIRONMENT

Environment is constituted by the interacting systems of physical, biological and cultural elements inter-related in various ways, individually as well as collectively.

These elements may be explained as under:

(1) Physical elements: These include space, landforms, water bodies, climate soils, rocks and minerals. They determine the variable characters of the human habitat, its opportunities as well as limitations.

(2) Biological elements: These include plants, animals, microorganisms and men which constitute the biosphere.

(3) Cultural elements: These are the economic, social and political aspects which are essentially man made features, which make cultural milieu.

Why this study? To learn from each other a new way of protecting and

conserving the environment

- to help in reducing your environmental impact by a little change in the way you live - to help you to live a green life.

Planet earth is the only known planet in universe that has life supporting capabilities and we must keep it clean and green for our sustainable future.

3. IMPORTANCE OF ENVIRONMENT STUDIES

The environment studies enlighten us about the importance of protection and conservation of our indiscriminate cause of pollution in the environment. A great number of environment issues have grown in size and complexity day by day, threatening the survival of mankind on earth. Environment studies have become significant for the following reasons:

1. International importance It has been well recognised that environment issues like global warming and ozone depletion, acid rain, marine pollution and biodiversity are not merely national issues but are global issues and hence must be tackled with international efforts and cooperation.

2. Problems arise as a result of development Development, in its wake gave birth to Urbanization, Industrial Growth, Transportation Systems, Agriculture and Housing etc. However, it has become phased out in the developed world. The North, to cleanse their own environment has, fact fully, managed to move „dirty“ factories of South. When the West developed, it did so perhaps in ignorance of the environmental impact of its activities.

.3. Explosively increase in pollution World census reflects that one in every seven persons in this planet lives in India. Evidently with 16 per cent of the world's population and only 2.4 per cent of its land area, there is a heavy pressure on the natural resources including land. Agricultural experts have recognized soils health problems like deficiency of micronutrients and organic matter, soil salinity and damage of soil structure.

4. Need For an Alternative Solution It is essential, especially for developing countries to find alternative paths to an alternative goal. We need a goal as under:

(1) A goal, which ultimately is the true goal of development an environmentally sound and sustainable development.

(2) A goal common to all citizens of our earth.

(3) A goal distant from the developing world in the manner it is from the over-consuming wasteful societies of the "developed" world.

5. Need To Save Humanity From Extinction

It is incumbent upon us to save the humanity from extinction. Consequent to our activities constricting the environment and depleting the biosphere, in the name of development.

6. Need For Wise Planning of Development Our survival and sustenance depend on these. Resources withdraw, processing and use of the product have to be synchronised with the ecological cycles in any plan of

development, our actions should be planned ecologically for the sustenance of the environment and development.

4. ENVIRONMENTAL ISSUES

Environmental issues are the negative aspects of human activities on natural environment.

Major Environmental Issues include:

1. Climate Change: The global climate change brings a range of highly threatening risks of extreme temperatures, uncontrollable natural calamities and disasters, rising sea level etc. Global warming is the main reason for global climate change and changing weather patterns. Uncontrolled emissions of greenhouse gases and clearing of forests for land use are the prime causes of global warming.

2. Environmental Pollution: Air, water, land and soil pollution is eating away our planet earth from the core and slowly taking the earth towards fatal end. The air we breathe, the water we drink and the food we eat, all are contaminated by the environmental pollutants.

3. Loss of Biodiversity/Species Extinction: Nearly 25% of the species are at the edge of extinction and by the end of year 2100, human activities may drive more than half of the world's marine and land species towards extinction. Clearing of natural habitats, relentless hunting and poaching by humans are the main reasons of species extinction.

4. Population Explosion: The rapidly increasing population voraciously consume resources, pollute the air and water, damage ecosystems, tear down natural habitats and endangering animal species towards extinction.

5. Deforestation: Earth's forests are under intense pressure due to our hunger for land, logging, mining and other raw material needs. Tropical forests and rain forests are depleting at a rate never recorded before. The major causes of deforestation are agricultural expansion, followed by wood fuel demands from households and other sources.

6. Melting of Glaciers: Rapidly melting glaciers and retreating Greenland and Antarctic ice sheets could result in sea level rise from 10-15 feet by the year 2100 and majority of our mega cities will be engulfed by oceans. Many glaciers have melted so fast over the past few decades that they have vanished from the face of the earth forever.

7. Resource Depletion: Natural resources are being depleting at a record high rate and humans are heading towards potential energy crises. Depletion of finite energy resources like coal, oil, natural gas and minerals will affect world GDP well before the humans will actually witness the deadly impacts of global warming.

8. Ocean Acidification: Oceans acts as a carbon sink and absorbs majority of carbon dioxide released by humans into the atmosphere. Due to this absorption of excess carbon dioxide from atmosphere, our oceans are becoming acidic day by day and endangering marine ecosystems. Several

species are already under threat of extinction due to ocean acidification.

5. IMPACT OF HUMANS ON THE ENVIRONMENT

Humans have a greater negative impact on earth's environment than it can sustain and is outside of its carrying capacity. Studies and scientific research on environmental degradation reveals that we have only a few years left to change the way we live, to preserve our depleting ecosystems and natural habitats and to reduce our emission of greenhouse gases to prevent catastrophic changes in earth's climate which will result in mass extinction of species.

Humans have altered the face of the earth more than any other species and the pace with which this change is progressing is threatening. Nearly 80% of the earth's surface is already marked by humans and the hunt is on to mark the rest. Our hunger for resources will soon become a challenge to sustain on planet earth. Sustainable Development is the only solution to combat environmental issues. Though there are several government and non-government organizations working for environment conservation, wide gap between the developed and developing economies remains the biggest obstacle in implementing policies.

6. ENVIRONMENTAL POLLUTION

Decline in the acceptable quality of environment under which we live. Pollution is the introduction of contaminants into a natural environment that causes

instability, disorder of brain, harm or discomfort to the ecosystem (physical systems or living organisms).

Pollutants can be foreign substances, energies such as noise, heat, light or naturally occurring contaminants.

- It was the industrial revolution that gave birth to environmental pollution as we know it today. The emergence of great factories and consumption of immense quantities of coal and other fossil fuels gave rise to unprecedented air pollution and the large volume of industrial chemical discharges added to the growing load of untreated human waste.

The major forms of pollution are listed below along with the particular contaminant relevant to each of them:

Air pollution:- the release of chemicals and particulates into the atmosphere. Common gaseous pollutants include carbon monoxide, sulfur dioxide, chlorofluorocarbons

(CFCs) and nitrogen oxides produced by industry and motor vehicles. Photochemical ozone and smog are created as nitrogen oxides and hydrocarbons react to sunlight. Air pollution produced by ships may alter clouds, affecting global temperatures. The air pollution comes from both natural and human made (anthropogenic). Agricultural air Pollution comes from contemporary practices which include clear felling and burning of natural vegetation as well as spraying of pesticides and herbicides.

*However, globally human-made pollutants from combustion, construction, mining, agriculture and warfare are increasingly significant in the air pollution. Motor vehicle emissions are one of the leading causes of air pollution. China, United States, Russia, Mexico, and Japan are the world leaders in air pollution emissions.

Water pollution, by the discharge of wastewater from commercial and industrial waste intentionally or through spills) into surface waters; discharges of untreated domestic sewage, and chemical contaminants, such as chlorine, from treated sewage; release of waste and contaminants into surface runoff flowing to surface waters (including urban runoff and agricultural runoff, which may contain chemical fertilizers and pesticides); waste disposal and leaching into groundwater; eutrophication and littering.

Light pollution:- includes light trespass, over-illumination and astronomical interference. **Noise pollution:-** which encompasses roadway noise, aircraft noise, industrial noise as well as high-intensity sonar. The dominant source class is the motor vehicle, producing about ninety percent of all unwanted noise worldwide.

Soil contamination occurs when chemicals are released by spill or underground leakage. Among the most significant soil contaminants are hydrocarbons, heavy metals, herbicides, pesticides and chlorinated hydrocarbons. Some of the more common soil contaminants are chlorinated hydrocarbons (CFH), heavy metals (such as chromium, cadmium—found in

rechargeable batteries, and lead—found in lead paint, aviation fuel and still in some countries, gasoline), MTBE, zinc, arsenic and benzene. Ordinary municipal landfills are the source of many chemical substances entering the soil environment (and often groundwater), emanating from the wide variety of refuse accepted, especially substances illegally discarded there, or from pre-1970 landfills that may have been subject to little control in the U.S. or EU. There have also been some unusual releases of polychlorinated dibenzodioxins, commonly called dioxins, such as TCDD.

Radioactive contamination: This results from 20th century activities in atomic physics, such as nuclear power generation and nuclear weapons research, manufacture and deployment. The development of nuclear science introduced radioactive contamination which can remain lethally radioactive for hundreds of thousands of years.

Thermal pollution, is a temperature change in natural water bodies caused by human influence, such as use of water as coolant in a power plant.

Visual pollution, which can refer to the presence of overhead power lines, motorway billboards, scarred landforms (as from strip mining), open storage of trash, municipal solid waste or space debris.

Causes of Environmental Pollution Main causes in today's global context : - uncontrolled population growth, - haphazard urbanization, and - unbalanced development.

Note:

1) uncontrolled population growth – the root cause in most of the developing countries

2) unbalanced development or no due consideration of potential adverse environmental impacts –the root cause in most of the developed countries.

Pollution can also be the consequence of a natural disaster.

Effects of Environmental Pollution Human health

1. Adverse air quality can kill many organisms including humans. Ozone pollution can cause respiratory disease, cardiovascular disease, throat inflammation, chest pain, and congestion.

2. Water pollution causes approximately 14,000 deaths per day, mostly due to contamination of drinking water by untreated sewage in developing countries. An 700 million Indians have no access to a proper toilet, and 1,000 Indian children die of diarrhoeal sickness every day. Nearly 500 million Chinese lack access to safe drinking water.

3. Oil spills can cause skin irritations and rashes.

4. Noise pollution induces hearing loss, high blood pressure, stress, and sleep disturbance. Mercury has been linked to developmental deficits in children and neurologic symptoms.

5. Older people are majorly exposed to diseases induced by air pollution.

Those with heart or lung disorders are under additional risk. Children and infants are also at serious risk. Lead and other heavy metals have been shown to cause neurological problems. Chemical and radioactive substances can cause cancer and as well as birth defects.

Other effects of pollution include: -

Biomagnification describes situations where toxins (such as heavy metals) may pass through trophic levels, becoming exponentially more concentrated in the process. - Carbon dioxide emissions cause ocean acidification, the ongoing decrease in the pH of the Earth's oceans as CO₂ becomes dissolved. - The emission of greenhouse gases leads to global warming which affects ecosystems in many ways. - Nitrogen oxides are removed from the air by rain and fertilise land which can change the species composition of ecosystems. - Smog and haze can reduce the amount of sunlight received by plants to carry out photosynthesis and leads to the production of tropospheric ozone which damages plants. - Soil can become infertile and unsuitable for plants. This will affect other organisms in the food web. - Sulfur dioxide and nitrogen oxides can cause acid rain which lowers the pH value of soil. To protect the environment from the adverse effects of pollution, many nations worldwide have enacted legislation to regulate various types of pollution as well as to mitigate the adverse effects of pollution.

Waste

Definition of Waste: a material worthless to somebody and which the person

wants to get rid of - a resource material and a source of danger as well, depending upon situations. Resource: Waste for one person or purpose may be a material resource for other person or purpose. (Waste is not waste until it is wasted) Source of danger: Waste may be a source of danger to natural environment and public health, if not managed properly. a valuable resource material at wrong place

_ Remarks: Other terminologies used for solid waste in West Europe/North America :

_ Refuse: Another term for municipal solid waste (often used interchangeably with solid waste)

_ Garbage: An American term for domestic waste fraction of MSW which includes the biodegradable organic wastes such as vegetable/ fruit wastes, food wastes etc.

_ Rubbish : The US EPA defines rubbish as MSW, excluding food waste and ashes from homes, institutions and working places.

Sources of Solid Waste Wastes are generated from various sources of activities. The major sources are:

- Households, Commercial Establishments, Institutions, Industries, Municipal Cleaning Waste, Open Space Defecation, Agriculture, Construction & Demolition

Types of Solid Waste Industrial waste Municipal waste and Stable waste:

medical waste, hazardous items and radioactive wastes not accepted. Hazardous waste: Controlled waste (not hazardous municipal waste), Stable waste: all hazardous waste must be put through preliminary treatment, e.g. incineration. Approved industrial waste Municipal waste and commercial waste, Stable waste and construction waste and hazardous waste

Municipal Waste

All general waste of non-hazardous nature- generated mainly from residential and other related activities, which usually include: o Domestic waste o Commercial waste. due to lack of proper management facilities, it may also contain: o Institutional waste o industrial waste o Sanitation residues o Municipal cleaning waste o Agricultural waste o Construction waste

7. ENVIRONMENTAL DEGRADATION

Environmental degradation occurs when humans start exploiting a freely available natural resource beyond a limit from where natural recovery isn't possible. Since humans and all other living organisms are interdependent, loss of one element causes instability in the whole chain and results in further stress on natural resources. Environmental Degradation occurs in two ways - when natural habitats are destroyed and when natural resources are depleted. Pollution is the main source of environmental degradation which contaminate the natural resources such as air, water and soil. With population explosion, world's natural habitats and ecosystems are under stress to give way to accommodate the extra population. The consequences are reducing green

cover of earth and extinction of wildlife species. Knowing the causes of environmental degradation, it is the need of the hour that we protect our environment by changing the way we live. Otherwise it will be too late to act.

Key facts on Environmental Degradation: Global Issue:

Environmental Degradation is a global issue and hence affects all of us. It doesn't matter which part on earth you live, the impacts of environmental degradation are global.

Intensity of Disasters: The rate and intensity of natural disasters are directly proportional to the level of environmental degradation. Past few decades have witnessed high intensity natural disasters and the rate of disasters have also gone up significantly. **Irreversible Damage:** The damage caused to environment is almost irreversible since nature recovers extremely slow. So the rate at which we are destroying nature will result in catastrophic changes and extinction of several species. **Diseases:** Due to contamination of air, land and water resources, diseases spread with accelerated rate. Global weather patterns are changing significantly resulting in severe flooding, droughts and other natural calamities which spread communicable diseases. **High Level threat:** Environmental degradation is one of the Ten Threats officially cautioned by the High Level Threat Panel of the United Nations.

APPROACH TO ENVIRONMENT IN DEVELOPING COUNTRIES

The nonchalant attitude of Nigerians with respect to environment

- Homes- Concreting everywhere, lack of water channels, lack of toilets
- Proper Waste Disposal- Garbage, refuse and other wastes? homes, big markets,
- Streets- Arbitrary dumping of refuse, food items, banana peel, paper, dirt and plastic bottles, plastic bags, leaves, biscuit wrappers, polyethylene (nylon) bags, cans on the tarred road by passengers and even from cars, defaecating in nearby bushes and urinating on the streets especially in the night. „ Enlightened“ people like graduates indulge in these acts also.
- Noise- horn of vehicles, churches (during night vigils, town crying) and mosques with microphones, recording studios?
- Government- No public toilets.
- Others include Oil spills, gas flaring, industrial pollution, SMOG, incineration of tires and other harmful materials, roadside mechanic shades, open and decomposing trash dumps. Niger Delta- people breathe in toxic fumes, eat food laced with toxic chemicals and drink water that has traces of toxic chemicals in it, they are bound to get sick, teeter on the edge of ill health or die prematurely. Average life expectancy for males and females in Nigeria is about 55 years and has not shown any upward swing in recent times.

Once a spill occurs and enters the creeks, it is carried further, seeping into land, rivers and the ocean. The surface of the water becomes coated with very

thick layers of crude oil, preventing oxygen from getting to the fish or other marine life in the water. This leads to the decimation of marine life and consequent death of the organisms. Some of the fish also die from poisoning after ingesting the deadly crude oil. They become dispossessed of their source of livelihood and just throw up their hands in disgust while some with no alternative, resort to eating and selling of poisoned fish. Many in the Delta Region have complained that water from freshly sunk boreholes show evidence of oil contamination. This makes the water undrinkable even after some treatment. .

The other problem with oil spill is that areas that have been known to be fertile for farming in the past have suddenly become barren or are getting close to being so. The mangrove forest is slowly withering away and the agricultural industry is suffering.

The Delta region of Nigeria has for over 43 years been subjected to environmental pollution. Nigerian oil reserves contain high amounts of gas and during the oil drilling process, the gas is constantly being released and the only way to get rid of it is by setting fire to and burning it off. Called gas flaring, this process releases carbon monoxide and other chemicals into the air. Gas flaring has obvious negative health effects; doctors have found unusually high occurrence of asthma, bronchitis, skin and breathing problems in communities where gas flaring has been practiced most .

1. Studies should be conducted to ascertain the impact of prospecting in the

area. The result of the study should help in the development of a line of action should things go awry.

2. The Nigerian government should also impress upon oil companies to become very responsive when spills occur to restore the pipes.

3. Emergency response teams must always be handy to immediately plug leaks while full blown maintenance crews are dispatched to provide lasting fixes.

4. Of course, in the unfortunate event of a spill, the companies must always compensate the communities affected and provide continuous education on how to deal with the spills.

5. It is also important that more and better-equipped hospitals are provided for treatment of people who fall sick from ailments that may be pollution-related.

Impact of Oil industry in the Niger Delta Environment

Destruction of vegetation, farmlands, human settlement. Clearing agricultural land and damaging the soil. Disturbance of fauna and flora habitat.

Accumulation of toxic waste material with the effect of:

- (i) Oil pollution of the land, sea or beaches.
- (ii) Pollution of underground water for plants. Land pollution from long-term cumulative effects.

Water and land pollution from sanitary waste, used lubricating oil and solid

waste. (i) Air pollution from gas and oil processing evaporation and flaring.

(11) Killing of vegetation around the flare area.

(iii) Production of heat.

(iv) Suppressing the growth and flowering of some plants.

(v) Reduces and diminishes agricultural production.

(vi) Destruction of mangrove swamp and salt marsh. Spillage during loading operations with all its accompanying effects on the fauna and flora.

Land pollution from effluent waste and solid wastes of chemical cans and drums for the establishment of the storage depots. Destruction of farmlands and environmentally sensitive areas. Land pollution from effluent discharge, which contains wide range organic pollutants such as phenol hydrogen, sulfide, ammonia and gas.

(1) Discharge of untreated waste;

(ii) Discharge of oil, grease or spill oil;

(iii) Discharge of injurious gas such as sulphur dioxide, oxides of nitrogen, hydrogen, sulphides, carbon, ammonia, chlorine, smoke, metallic dust and particles;

(iv) Storage of chemicals, oil, lubricants, petroleum products, cement (except for use in buildings), radioactive materials or gases in residential and commercial building (without the permission of the authority);

(v) Waste dumping without permission;

(vi) Dumping of toxic or hazardous matter without permission;

Indiscriminate sinking of well and borehole;

(viii) Use of chemical (Gamalin 20 or any herbicide or insecticide or other chemicals) to kill fish or destroy marine life in any river, stream, lake or pond within the state. Improperly disposed waste usually find a way to conspire to further wreak damage on human existence, besides making the environment sheer unsightly.

Climate change is already devastating African communities and we are fighting an intense battles in the fronts of adaptation and mitigation. Improper waste disposal can result in clogging of water-ways, flooding at road sides and soil erosion – with huge implications on human population. We can begin by changing our attitudes towards our environment, by showing more respect for the system that sustains us. We can start by keeping that candy wrapper in our pockets till we find a waste bin to properly dispose it. We can start by keeping that coke can on the vehicle floor till we find a basket when we alight. Protecting the environment is a collective responsibility...start by changing your attitude today.

9. SUSTAINABLE DEVELOPMENT

Sustainable development is the only viable solution to combat environmental issues and has been on top of political agenda since 1990. Sustainable

development ties together concern for the carrying capacity of natural systems with the social challenges facing humanity. It is the process to make sure that our interactions with the environment are in the way that there is a minimum harm to the environment and we can keep the environment as pristine (extremely clean) as naturally possible.

The field of sustainable development constitutes three parts - environmental sustainability, economic sustainability and social responsibility. Sustainable practices requires that we use natural resources at a rate lower or equal to the rate nature can replenish them so that whatever damage is done to environment can be recovered by nature through natural recovery. Failure to sustainable development can lead to extinction of humanity.

Preparing for the Future: An Introduction for Educators Session

7: A Sustainable Future –David Hicks

Some key characteristics of sustainable development:

The fact that the notion of sustainable development is contested terrain does not mean we should fail to act in ways that we construe to be more rather than less sustainable. It is entirely possible to sketch out some of the key features of a more sustainable society (CAT, 2010) and these can be explored in different ways by pupils in school.

Energy - Continued reliance on fossil fuels will cause further climate change, whilst the waste from nuclear power stations bequeaths an environmental

liability to future generations. A sustainable future will emphasise a mix of energy sources including greatly increased energy efficiency and use of renewable energy resources such as solar, wind, water and biomass.

Transport - Unrestricted use of the car has created a major series of related problems from severe traffic congestion and dangerous air pollution to urban sprawl. A sustainable future will minimise the need for people to travel, with jobs being closer to home, and emphasise use of public transport, buses, trams and cycling.

Environment - Unrestrained consumption of the earth's resources is producing irreversible damage to the biosphere and a major loss of biodiversity. In a sustainable future people will see themselves as a part of nature rather than separate and environmental conservation will be as important as economic growth.

Economics - Traditional models of development focus narrowly on economic growth as the indicator of 'progress'. Various costs are 'discounted' e.g. environmental damage, the impact on the poor, the effect on future generations. A sustainable society will use much more comprehensive indicators of social and environmental well-being.

Cities - Uncontrollable urban growth is having a profound impact on human and planetary health. In a sustainable future planning will be more participatory and land-use and transport policies carefully integrated. Homes, jobs, services and amenities will be mixed together and thus more easily

accessible to each other.

Poverty - Debt and falling export prices encourage unsustainable development. A sustainable future for all requires major change of direction in policies and lifestyles of the North towards greater equity and justice for all.

Resources - In a sustainable future waste reduction will replace rubbish disposal. Planned obsolescence, convenience, and the throwaway society will be seen as an aberration. Manufacturing will become less energy intensive and less polluting.

Farming - Current intensive farming often leads to extensive land degradation and a massive effort is needed to protect soil and conserve water. In a sustainable future more emphasis will be put on organic husbandry and mixed farming with biological pest controls. More food will be grown and consumed locally and regionally.