Environmental degration

Environment, Ecology

One of the major threat the planet faces today, environmental degradation is bound to make life difficult for all the lifeforms, including us humans, sooner or later. Studies reveal that the deterioration ofenvironmentis occurring at an alarming rate. In fact, the High Level Threat Panel of the United Nations has enlisted it as one of the ten threats for humans. This issue shares space with problems likepoverty, terrorismandcivil warin the list, and this itself highlights the fact that we are heading for a certain disaster. What is Environmental Degradation?

It is a process wherein the natural environment of the planet is degenerated to such an extent that the biodiversity and the generalhealthof the planet is subjected to drastic reduction. In other words, this phenomenon can be defined as deterioration of the Earth's natural surroundings as a result of excessive exploitation of the available resources - these include water, air, flora, fauna, soil etc. The life on the planet is interwoven to such an extent that a decrease in a particular attribute triggers a domino effect on all the other attributes dependent on it.

How is it Caused? ’; Environmental degradation can be attributed to various human activities and some natural processes, with the later having an insignificant share in the same. Most of the resources on the planet are vulnerable to depletion, and the rate at which we are exploiting them have already brought some of them to the brink of exhaustion. Exploitation of the fossil fuels is the best example of this phenomenon. Large-scale exploitation has depleted the fossil fuel reserves across the world, thus leaving us with no option but to find an alternate source of energy.

Other human activities which have been contributing to this environmental issue include urbanization, overpopulation, deforestation, pollution, hunting, etc. What Does it Affect Us? Its effects are becoming more and more obvious in form of all those environmental issues affecting the planet. The hazardous waste let out by the industries tends to contaminate the water bodies in the vicinity, thus leaving the water unfit for drinking.

Similarly, greenhouse gases, such as CFCs and carbon dioxide, let out in the atmosphere have a devastating effect on the environment, thus making the planet vulnerable to a range of problems, includingglobal warmingandclimate change. On one hand, incessant agricultural activities have resulted in degradation of soil, while excessive deforestation to accumulate the growing population has resulted in degradation of air and water on the other hand. Humans have seldom sacrificed their necessities, but lately exploitation of resources to fulfill these necessities itself is taking a toll on the environment.

How Can we Deal With it? At one point of time, the damage reaches a stage wherein the environment can't attain the required balance on its own. In such a situation, we humans need to step in, and ensure that the damage is curbed and balance is attained. Simple measures, such as conservation of electricity, use of alternative energy sources, avoiding the use of things that pollute the environment, soil conservation, etc. , can help in saving the environment from the threat of degradation. Environmentalists, the world over, are trying their best to save our environment, and we need to do our bit to make sure that they succeed.

The need of the hour is to identify the causes of environmental degradation, and eliminate them one by one. We need to understand the fact that we are a part of the interwoven life system on the planet, and any problems, like environmental degradation and environmental pollution, are bound to affect us directly or indirectly. Though the disaster is not expected to happen tomorrow or a hundred years from now, that doesn't mean it will never happen at all. That being said, the onus is on us - the most intelligent species on the planet, to make sure that such problems are kept at bay.

The main causes of environmental degradation are as follow; 1 Industrialization 2 Agricultural development 3 population growth 4 poverty 5 urbanization 6 Deforestation 7 transport development 8 marketfailureCauses of Environmental Degradation There is no doubt that man has caused environmental degradation. The causes of environmental degeneration are complex and should be addressed to, before it causes complete breakdown of the environment.

Ads byGoogleBScPsychologyOnline Study In Nigeria - UK Universities. Apply Online Now For Home Study www. rdi. co. k/psychology These are the days we keep hearing about global warming, melting of the glaciers, rising of the sea levels, etc. , all of which have been linked to environmental degradation. When the natural state of the environment is compromised upon it leads to breakdown of the biological diversity and harms the health of the environment. The process of environmental degradation can either be caused by nature itself or it is man-made (which is a fact). If one has to compare the face of earth as it was hundreds of years ago to what it is today, we will see that environment has severely been compromised upon.

When people look at environmental degradation, the intensity of the problem is not actually understood, but it could cause destruction of the human race itself. The causes of this problem vary a lot and it means depletion of the natural resources and disturbances in the natural cycle of things on the face of earth. Root Causes of Environmental Degradation The best case of environmental degradation can be seen in land degradation. There are climatic conditions responsible along with the human activities, which have brought about the degradation.

The effects can be seen in the arid, semi arid and dry sub humid lands. One of the cause is over grazing of land. Along with that the green cover has depleted severely in almost all parts of the world. The forestcover has made way for human settlement. This has resulted in the temperatures increasing with each passing day. Since the forest covers have depleted, it has resulted in large-scale erosion, which in turn, is responsible for loss of nutrients from the soil. This has led the soil to becoming barren and in some cases also sterile.

Since the forest cover has been lost, the winds now blow the top soil from the land, which also leads to degradation of the environment. Pollution is eating away into the environment. Here we are talking aboutair pollution, where toxic substances have made their way into the air, which has caused the air to become unhealthy. Air pollution is caused by a number of reasons. One of the most prominent cause is vehicle emissions. With each passing day, the number of vehicles are on the rise, which means increase in air pollution. The next cause is release of chemical waste from various factories.

The waste often forms a layer in the atmosphere of the earth, which further affects the environment. In environmental degradation we cannot forget the exploitation of fossil fuels. Since the time fossil fuels were discovered, they have been exploited. This has resulted in the fossil fuel reserves depleting all around the world, hence it has become important to find alternate sources of energy. When the fossil fuels are burnt, they release toxins into the air, which further aggravate environmental degradation. The underlying causes of environment going down way is overpopulation.

The land reserve that is available on earth is finite. However, the demands are ever-increasing due to increasing population. There is only so much, that one can actually extract from the earth. This has led to widespread use of chemicals and other toxins to produce morefoodto feed the ever-increasing number of people. This has further caused depletion of the earth. With the use of chemicals the biological balance of earth has also been destroyed as the microorganisms have been killed. If one has to see the environmental degradation causes and effects, one will see that entire ecosystems have been destroyed.

The ecosystem is made up of all the living and non living elements. However, when any one of them is destroyed, it leads to the destruction of the entire ecosystem as the balance is lost. No doubt plants and animals form an important feature of the ecosystem, but the microorganisms along with water sources and soil cannot be forgotten either. Industrial waste is known to be hazardous to the environment. The waste can be in the form of liquid waste, which pollute the rivers and cause harm to the ecosystem present in the rivers.

It can also be solid waste, which is not biodegradable and pollutes the environment and leads to its degradation. We have already spoken about the industrial waste emitted into the air. After reading about the causes of environmental decadence, we can say that if the human race has to survive on the face of this earth, it is important that stringent measures be taken up to arrest further deterioration of the environment. One will have to work towards conserving air, water and soil and try to restore balance in the ecosystem, which has been destroyed or is on the verge of destruction.

In other words, one will have to work towards restoring natural habitats and make sure no further harm is done to the environment. By Bhakti Satalkar Published: 3/25/2011 * Environmental Degradation * How do Humans Affect the Environment * Current Environmental Issues * List of Environmental Problems * Simple Ways to Save the Environment * How does Mining Affect the Environment * How to Save the Environment *Globalizationand Its Impact on the Environment * What are Environmental Ethics?

* Environmental Issues List * How to Save Our Environment * Sustainable Living Ideas Causes of Overpopulation * Why are Birds and Fish Dying Read more at Buzzle: http://www. buzzle. com/articles/causes-of-environmental-degradation. html Environmental degradation From Wikipedia, the free encyclopedia Jump to: navigation, search Eighty-plus years after the abandonment of Wallaroo Mines (Kadina, South Australia), mosses remain the only vegetation at some spots of the site's grounds Environmental degradation is the deterioration of the environment through depletion of resources such as air, water and soil; the destruction of ecosystems and the extinction of wildlife.

It is defined as any change or disturbance to the environment perceived to be deleterious or undesirable. [1] Environmental degradation is one of the Ten Threats officially cautioned by the High Level Threat Panel of the United Nations. The United Nations International Strategy for Disaster Reduction defines environmental degradation as " The reduction of the capacity of the environment to meet social and ecological objectives, and needs". [2] Environmental degradation is of many types.

When natural habitats are destroyed or natural resources are depleted, environment is degraded. | This article may be confusing or unclear to readers. Please help us clarify the article; suggestions may be found on the talk page. (May 2012) | Environmental Change and Human Health, a special section of World Resources 1998-99 in this report describes how preventable illnesses and premature deaths are still occurring in very large numbers. If vast improvements are made in human health, millions of people will be living longer, healthier lives than ever before.

In these poorest regions of the world an estimated 11 million children, or about one in five, will not live to see their fifth birthday, primarily because of environment-related diseases. Child mortality is larger than the combined populations of Norway and Switzerland, and mostly due to malaria, acute respiratory infections or diarrhea — illnesses that are largely preventable. Contents [hide] * 1 Water deterioration * 1. 1 Climate change and temperature * 1. 2 Climate change and precipitation * 1. 3 Population growth

* 1. 4 Agriculture * 1. Water management * 2 See also * 3 References * 4 External links| [edit] Water deterioration One major component of environmental degradation is the depletion of the resource of fresh water on

Earth. Approximately only 2. 5% of all of the water on Earth is fresh water, with the rest being salt water. 69% of the fresh water is frozen in ice caps located on Antarctica and Greenland, so only 30% of the 2. 5% of fresh water is available for consumption. [3] Fresh water is an exceptionally important resource, since life on Earth is ultimately dependent on it.

Water transports nutrients and chemicals within the biosphere to all forms of life, sustains both plants and animals, and molds the surface of the Earth with transportation and deposition of materials. [4] The current top three uses of fresh water account for 95% of its consumption; approximately 85% is used for irrigation of farmland, golf courses, and parks, 6% is used for domestic purposes such as indoor bathing uses and outdoor garden and lawn use, and 4% is used for industrial purposes such as processing, washing, and cooling in manufacturing centers. 5] It is estimated that one in three people over the entire globe are already facing water shortages, almost one-fifth of the world’s population live in areas of physical water scarcity, and almost one quarter of the world’s population live in a developing country that lacks the necessary infrastructure to use water from available rivers and aquifers.

Water scarcity is an increasing problem due to many foreseen issues in the future, including population growth, increased urbanization, higher standards of living, and climate change. 3] [edit] Climate change and temperature Climate change affects the Earth’s water supply in a large number of ways. It is predicted that the mean global temperature will rise in the coming years due to a number of forces affecting the climate, the amount of atmospheric CO2 will rise, and both of these will influence water resources; evaporation depends strongly on temperature and moisture availability, which can

ultimately affect the amount of water available to replenish groundwater supplies.

Transpiration from plants can be affected by a rise in atmospheric CO2, which can decrease their use of water, but can also raise their use of water from possible increases of leaf area. Temperature increase can decrease the length of thesnowseason in the winter and increase the intensity of snowmelt in warmer seasons, leading to peak runoff of snowmelt earlier in the season, affecting soil moisture, flood and drought risks, and storage capacities depending on the area. [6] Warmer winter temperatures cause a decrease in snowpack, which can result in diminished water resources during the summer.

This is especially important at mid-latitudes and in mountain regions that depend on glacial runoff to replenish their river systems and groundwater supplies, making these areas increasingly vulnerable to water shortages over time; an increase in temperature will initially result in a rapid rise in water melting from glaciers in the summer, followed by a retreat in glaciers and a decrease in the melt and consequently the water supply every year as the size of these glaciers get smaller and smaller. 3]

Thermal expansion of water and increased melting of oceanic glaciers from an increase in temperature gives way to a rise in sea level, which can affect the fresh water supply of coastal areas as well; as river mouths and deltas with higher salinity get pushed further inland, an intrusion of saltwater results in an increase of salinity in reservoirs and aquifers. 5] Sea-level rise may also consequently be caused by a depletion of groundwater,[7] as climate change can affect the hydrologic cycle in a number of ways. Uneven

distributions of increased temperatures and increased precipitation around the globe results in water surpluses and deficits,[6] but a global decrease in groundwater suggests a rise in sea level, even after meltwater and thermal expansion were accounted for,[7] which can provide a positive feedback to the problems sea-level rise causes to fresh-water supply.

A rise in air temperature results in a rise in water temperature, which is also very significant in water degradation, as the water would become more susceptible to bacterial growth. An increase in water temperature can also affect ecosystems greatly because of a species' sensitivity to temperature, and also by inducing changes in a body of water's self-purification system from decreased amounts of dissolved oxygen in the water due to rises in temperature. [3] [edit] Climate change and precipitation

A rise in global temperatures is also predicted to correlate with an increase in global precipitation, but because of increased runoff, floods, increased rates of soil erosion, and mass movement of land, a decline in water quality is probable, while water will carry more nutrients, it will also carry more contaminants. [3] While most of the attention about climate change is directed towards global warming and greenhouse effect, some of the most severe effects of climate change are likely to be from changes in precipitation, evapotranspiration, runoff, and soil moisture.

It is generally expected that, on average, global precipitation will increase, with some areas receiving increases and some decreases. Climate models show that while some regions should expect an increase in precipitation,[6] such as in the tropics and higher latitudes, other areas are expected to see a decrease, such as in the subtropics; this will ultimately cause a latitudinal

variation in water distribution. 3] The areas receiving more precipitation are also expected to receive this increase during their winter and actually become drier during their summer,[6] creating even more of a variation of precipitation distribution. Naturally, the distribution of precipitation across the planet is very uneven, causing constant variations in water availability in respective locations. Changes in precipitation affect the timing and magnitude of floods and droughts, shift runoff processes, and alter groundwater recharge rates.

Vegetation patterns and growth rates will be directly affected by shifts in precipitation amount and distribution, which will in turn affect agriculture as well as natural ecosystems. Decreased precipitation will deprive areas of water, causing water tables to fall and reservoirs and wetlands, rivers, and lakes to empty,[6] and possibly an increase in evaporation and evapotranspiration, depending on the accompanied rise in temperature. [5] Groundwater reserves will be depleted, and the remaining water has a greater chance of being of poor quality from saline or contaminants on the land surface. 3] [edit] Population growth The available fresh water being affected by climate is also being stretched across an ever-increasing global population. It is estimated that almost a quarter of the global population is living in an area that is using more than 20% of their renewable water supply; water use will rise with population while the water is also being aggravated by decreases in streamflow and groundwater caused by climate change.

Even though some areas may see an increase in freshwater supply from an uneven distribution of precipitation increase, an increased use of water

supply is expected. [8] An increased population means increased withdrawals from the water supply for domestic, agricultural, and industrial uses, the largest of these being agriculture,[9] believed to be the major non-climate driver of environmental change and water deterioration.

The next 50 years will likely be the last period of rapid agricultural expansion, but the larger and wealthier population over this time will demand more agriculture. [10] Population increase over the last two decades, at least in the United States, has also been accompanied by a shift to an increase in urban areas from rural areas,[11] which concentrates the demand for water into certain areas, and putsstresson the fresh water supply from industrial and human contaminants. 3] Urbanization causes overcrowding and increasingly unsanitary living conditions, especially in developing countries, which in turn exposes an increasingly number of people to disease. About 79% of the world’s population is in developing countries, which lack access to sanitary water and sewer systems, giving rises to disease and deaths from contaminated water and increased numbers of disease-carrying insects. [12] [edit] Agriculture

Agriculture is dependent on available soil moisture, which is directly affected by climate dynamics, with precipitation being the input in this system and various processes being the output, such as evapotranspiration, surface runoff, drainage, and percolation into groundwater. Changes in climate, especially the changes in precipitation and evapotranspiration predicted by climate models, will directly affect soil moisture, surface runoff, and groundwater recharge. In areas with decreasing precipitation as predicted by the climate models, soil moisture may be substantially educed. [6] With this

in mind, agriculture in most areas needs irrigation already, which depletes fresh water supplies both by the physical use of the water and the degradation agriculture causes to the water. Irrigation increases salt and nutrient content in areas that wouldn’t normally be affected, and damages streams and rivers from damming and removal of water. Fertilizer enters both human and livestock waste streams that eventually enter groundwater, while nitrogen, phosphorus, and other chemicals from fertilizer can acidify both soils and water.

Certain agricultural demands may increase more than others with an increasingly wealthier global population, and meat is one commodity expected to double global food demand by 2050,[10] which directly affects the global supply of fresh water. Cows need water to drink, more if the temperature is high and humidity is low, and more if the production system the cow is in is extensive, since finding food takes more effort. Water is needed in processing of the meat, and also in the production of feed for the livestock.

Manure can contaminate bodies of freshwater, and slaughterhouses, depending on how well they are managed, contribute waste such as blood, fat, hair, and other bodily contents to supplies of fresh water. [13] The transfer of water from agricultural to urban and suburban use raises concerns about agricultural sustainability, rural socioeconomic decline, food security, an increased carbon footprint from imported food, and decreased foreign trade balance. 9] The depletion of fresh water, as applied to more specific and populated areas, increases fresh water scarcity among the population and also makes populations susceptible to economic, social, and

political conflict in a number of ways; rising sea levels forces migration from coastal areas to other areas farther inland, pushing populations closer together breaching borders and other geographical patterns, and agricultural surpluses and deficits from the availability of water induce trade problems and economies of certain areas. 8]

CLimate change is an important cause of involuntary migration and forced displacement[14] [edit] Water management The issue of the depletion of fresh water can be met by increased efforts in water management. [4] While water management systems are often flexible, adaptation to new hydrologic conditions may be very costly. [6] Preventative approaches are necessary to avoid high costs of inefficiency and the need for rehabilitation of water supplies,[4] and innovations to decrease overall demand may be important in planning water sustainability. 9] Water supply systems, as they exist now, were based on the assumptions of the current climate, and built to accommodate existing river flows and flood frequencies. Reservoirs are operated based on past hydrologic records, and irrigation systems on historical temperature, water availability, and crop water requirements; these may not be a reliable guide to the future. Re-examining engineering designs, operations, optimizations, and planning, as well as re-evaluating legal, technical, and economic approaches to manage water resources are very important for the future of water management in response to water degradation.

Another approach is water privatization; despite its economic and cultural effects, service quality and overall quality of the water can be more easily

controlled and distributed. Rationality and sustainability is appropriate, and requires limits to overexploitation and pollution, and efforts in conservation.

Natural hazards are excluded as a cause, however human activities can indirectly affect phenomena such as floods and bush fires. 8. This is considered to be an important topic of the 21st century due to the implications land degradation has upon agronomic productivity, the environment, and its effects on food security. 3] It is estimated that up to 40% of the world's agricultural land is seriously degrad Measuring Land degradation is a broad term that can be applied differently across a wide range of scenarios. There are four main ways of looking at land degradation and its impact on the environment around it: * A temporary or permanent decline in the productive capacity of the land.

This can be seen through a loss of biomass, a loss of actual productivity or in potential productivity, or a loss or change in vegetative cover and soil nutrients. A decline in the lands " usefulness": A loss or reduction in the lands capacity to provide resources for human livelihoods. This can be measured from a base line of past land use. * Loss of biodiversity: A loss of range of species or ecosystem complexity as a decline in the environmental quality. * Shifting ecological risk: increased vulnerability of the environment or people to destruction or crisis. This is measured through a base line in the form of pre-existing risk of crisis or destruction. A problem with measuring land degradation is that what one group of people call degradation, others might view as a benefit or opportunity.

For example, heavy rainfall could make a scientific group be worried about high erosion of the soil while farmers could view it as a good opportunity to

plant crops. [5] [edit] Causes Overgrazing by livestock can lead to land degradation Land degradation is a global problem, largely related to agricultural use. The major causes include:[citation needed] * Land clearance, such as clearcutting and deforestation * Agricultural depletion of soil nutrients through poor farming practices * Livestock including overgrazing and overdrafting * Inappropriate irrigation[6] and overdrafting * Urban sprawl and commercial development Soil contamination including * Vehicle off-roading * Quarrying of stone, sand, ore and minerals * Increase in field size due to economies of scale, reducing shelter for wildlife, as hedgerows and copses disappear * Exposure of naked soil after harvesting by heavy equipment * Monoculture, destabilizing the local ecosystem * Dumping of non-biodegradable trash, such as plastics [edit] Effects Soil erosion in a wheat field near Pullman, USA. The main outcome of land degradation is a substantial reduction in the productivity of the land.

[7] The major stresses on vulnerable land include: * Accelerated soil erosion by wind and water Soil acidification and the formation of acid sulfate soil resulting in barren soil * Soil alkalinisation owing to irrigation with water containing sodium bicarbonate leading to poor soil structure and reduced crop yields * Soil salination in irrigated land requiring soil salinity control to reclaim the land [8] * Soil waterlogging in irrigated land which calls for some form of subsurface land drainage to remediate the negative effects [8] * Destruction of soil structure including loss of organic matter Overcutting of vegetation occurs when people cut forests, woodlands and shrublands—to obtain timber, fuelwood and other products—at a pace exceeding the rate of natural regrowth. This is frequent in semi-arid environments, where fuelwood

shortages are often severe. Overgrazing is the grazing of natural pastures at stocking intensities above the livestock carrying capacity; the resulting decrease in the vegetation cover is a leading cause of wind and water erosion. It is a significant factor in Afghanistan.

Agricultural activities that can cause land degradation include shifting cultivation without adequate fallow periods, absence of soil conservation measures, fertilizer use, and a host of possible problems arising from faulty planning or management of irrigation. They are a major factor in Sri Lanka and the dominant one in Bangladesh. The role of population factors in land degradation processes obviously occurs in the context of the underlying causes. In the region, in fact, it is indeed one of the two along with land shortage, and land shortage itself ultimately is a consequence of continued population growth in the face of the finiteness of land resources. In the context of land shortage the growing population pressure, during 1980-1990, has led to decreases in the already small areas of agricultural land per person in six out of eight countries (14% for India and 22% for Pakistan).

Population pressure also operates through other mechanisms. Improper agricultural practices, for instance, occur only under constraints such as the saturation of good lands under population pressure which leads settlers to cultivate too shallow or too steep soils, plough fallow land before it has recovered its fertility, or attempt to obtain multiple crops by irrigating unsuitable soils. High population density is not always related to land degradation. Rather, it is the practices of the human population that can cause a landscape to become degraded. Populations can be a benefit to the land and make it more productive than it is in its natural state.

Land degradation is important factor of internal displacement in many African and Asian countries[9] Severe land degradation affects a significant portion of the Earth's arable lands, decreasing the wealth and economic development of nations. As the land resource base becomes less productive, food security is compromised and competition for dwindling resources increases, the seeds of famine and potential conflict are sewn. [edit] Sensitivity and resilience Sensitivity and resilience are measures of the vulnerability of a landscape to degradation. These two factors combine to explain the degree of vulnerability. [5] Sensitivity is the degree to which a land system undergoes change due to natural forces, human intervention or a combination of both.

Resilience is the ability of a landscape to absorb change, without significantly altering the relationship between the relative importance and numbers of individuals and species that compose the community. [10] It also refers to the ability of the region to return to its original state after being changed in some way. The resilience of a landscape can be increased or decreased through human interaction based upon different methods of land-use management. Land that is degraded becomes less resilient than undegraded land, which can lead to even further degration through shocks to the landscape. [edit] Climate change Significant land degradation from seawater inundation, particularly in river deltas and on low-lying islands, is a potential hazard that was identified in a 2007 IPCC report. citation needed] As a result of sea-level rise from climate change, salinity levels can reach levels where agriculture becomes impossible in very low lying areas.

Journal ofLand Degradation & DevelopmentVol 24 (6 Issues in 2013)Edited by: Professor Artemi CerdàPrint ISSN: 1085-3278 Online ISSN: 1099-145X| * Description Land Degradation & Development is an international journal which seeks to promote rational study of the recognition, monitoring, control and rehabilitation of degradation in terrestrial environments. The journal focuses on: * what land degradation is; * what causes land degradation; * the impacts of land degradation * the scale of land degradation; * the history, current status or future trends of land degradation; * avoidance, mitigation and control of land degradation; * remedial actions to rehabilitate or restore degraded land; * sustainable land management.

Land degradation may be defined as the loss of utility or potential utility through the reduction of or damage to physical, social, cultural or economic features, and/or reduction of ecosystem diversity. There may be a single cause or a complex mix of causes, some may be biogeophysical ('natural'), some socioeconomic ('human') and it is quite possible that cause(s) will be indirect, perhaps cumulative and difficult to identify. A major challenge is to learn how interactions between development and environment can be better managed to increase prospects for ecologically and socially sustainable improvements to human well-being.

Development means attempts to improve human well-being or environmental quality in rich and poor nations on a sustained basis (sustainable development). Papers are invited on scientific, social, economic, political and historical aspects of terrestrial environmental degradation. Also welcome are analyses presenting forecasts of trends, case studies and discussion on management, planning and policy-making relating to the

promotion of ecological sustainability and the counteraction of land degradation. In addition to original research papers, regional and thematic reviews, both invited and submitted, will be included, as will short communications, book reviews and applications of remote sensing and computer techniques.

The members of the Editorial Board are drawn from a comprehensive range of disciplines and nationalities. Together with a strict refereeing procedure this will ensure Land Degradation & Development maintains a high standard and presents material from a wide range of disciplines, from interdisciplinary study and with an international coverage. The subject matter will include the following topics: ENVIRONMENTS Degradation of: deserts, savannas, rangelands; forests, woodlands, tundra; mountain environments; wetlands, floodlands; farmland, irrigated land; sand-dunes; coastal zones, islands, urban, peri-urban environments. In polar, temperate, subtropical and tropical regions.

PROCESSES #39; Desertification', rangeland degradation; soil degradation (compaction, loss of fertility, reduced organic matter, pollution, waterlogging, acidification, salinization, alkalinization, 'laterite' and hard-pan formation); erosion; degradation of vegetation cover, 'deforestation'; impoverishment of wildlife habitats, loss of species. CAUSES Climatic change; sea-level variation; drought; storms; earth processes (geomorphological, volcanicity, natural leaching of soils); bushfires; degradation as a consequence of: industry, urban growth, agrochemicals, agricultural modernization, energy production/consumption, mining, warfare, refugees or migrants, breakdown of traditional landuse strategies, altered

communications, legislative changes, demographic changes, administrative causes, institutional causes, social or economic causes. PERCEPTIONS

Perception/recognition of degradation, attitudes toward degradation; ethics and land degradation; indicators; monitoring, surveillance; assessment of significance; establishing past, present and future trends. IMPACTS Physical, biological, social, cultural and economic impacts (direct, indirect, cumulative); long-term and short-term impacts; assessment of significance; aesthetic impact of degradation. Water pollutionFrom Wikipedia, the free encyclopedia Jump to: navigation, search Raw sewage and industrial waste in the New River as it passes from Mexicali to Calexico, California. Water pollution is the contamination of water bodies (e. g. lakes, rivers, oceans, aquifers and groundwater).

Water pollution occurs when pollutants are discharged directly or indirectly into water bodies without adequate treatment to remove harmful compounds. Water pollution affects plants and organisms living in these bodies of water. In almost all cases the effect is damaging not only to individual species and populations, but also to the natural biological communities. * 1 Introduction * 2 Categories * 2. 1 Point sources * 2. 2 Nonpoint sources * 3 Groundwater pollution * 4 Causes * 4. 1 Pathogens * 4. 2 Chemical and other contaminants * 4. 3 Thermal pollution * 5 Transport and chemical reactions of water pollutants * 6 Measurement * 6. 1 Sampling * 6. 2 Physical testing * 6. Chemical testing * 6. 4 Biological testing * 7 Control of pollution * 7. 1 Domestic sewage * 7. 2 Industrial wastewater * 7. 3 Agricultural wastewater * 7. 4 Construction site stormwater * 7. 5 Urban runoff (stormwater) * 8 See also * 9 References * 10 External links|

Introduction Millions depend on the polluted Ganges river Water pollution is a major global problem which requires ongoing evaluation and revision of water resource policy at all levels (international down to individual aquifers and wells).

It has been suggested that it is the leading worldwide cause of deaths and diseases,[1][2] and that it accounts for the deaths of more than 14, 000 people daily. 2] An estimated 700 million Indians have no access to a proper toilet, and 1, 000 Indian children die of diarrheal sickness every day. [3] Some 90% of China's cities suffer from some degree of water pollution,[4] and nearly 500 million people lack access to safe drinking water. [5] In addition to the acute problems of water pollution in developing countries, developed countries continue to struggle with pollution problems as well. In the most recent national report on water quality in the United States, 45 percent of assessed stream miles, 47 percent of assessed lake acres, and 32 percent of assessed bays and estuarine square miles were classified as polluted. 6]

Water is typically referred to as polluted when it is impaired by anthropogenic contaminants and either does not support a human use, such as drinking water, and/or undergoes a marked shift in its ability to support its constituent biotic communities, such as fish. Natural phenomena such as volcanoes, algae blooms, storms, and earthquakes also cause major changes in water quality and the ecological status of water. Categories Surface water and groundwater have often been studied and managed as separate resources, although they are interrelated. [7] Surface water seeps through the soil and becomes groundwater. Conversely, groundwater can also feed

surface water sources. Sources of surface water pollution are generally grouped into two categories based on their origin. Point sources

Point source pollution – Shipyard – Rio de Janeiro. Point source water pollution refers to contaminants that enter a waterway from a single, identifiable source, such as a pipe or ditch. Examples of sources in this category include discharges from a sewage treatment plant, a factory, or a city storm drain. The U. S. Clean Water Act (CWA) defines point source for regulatory enforcement purposes. [8] The CWA definition of point source was amended in 1987 to include municipal storm sewer systems, as well as industrial stormwater, such as from construction sites. [9] Nonpoint sources Nonpoint source pollution refers to diffuse contamination that does not originate from a single discrete source.

NPS pollution is often the cumulative effect of small amounts of contaminants gathered from a large area. A common example is the leaching out of nitrogen compounds from fertilized agricultural lands. Nutrient runoff in stormwater from " sheet flow" over an agricultural field or a forest are also cited as examples of NPS pollution. Contaminated storm water washed off of parking lots, roads and highways, called urban runoff, is sometimes included under the category of NPS pollution. However, this runoff is typically channeled into storm drain systems and discharged through pipes to local surface waters, and is a point source. Groundwater pollution See also: Hydrogeology Interactions between groundwater and surface water are complex.

Consequently, groundwater pollution, sometimes referred to as groundwater contamination, is not as easily classified as surface water pollution. [7] By its

very nature, groundwater aquifers are susceptible to contamination from sources that may not directly affect surface water bodies, and the distinction of point vs. non-point source may be irrelevant. A spill or ongoing releases of chemical or radionuclide contaminants into soil (located away from a surface water body) may not create point source or non-point source pollution, but can contaminate the aquifer below, defined as a toxin plume. The movement of the plume, called a plume front, may be analyzed through a hydrological transport model or groundwater model.

Analysis of groundwater contamination may focus on the soil characteristics and site geology, hydrogeology, hydrology, and the nature of the contaminants. Causes The specific contaminants leading to pollution in water include a wide spectrum of chemicals, pathogens, and physical or sensory changes such as elevated temperature and discoloration. While many of the chemicals and substances that are regulated may be naturally occurring (calcium, sodium, iron, manganese, etc.) the concentration is often the key in determining what is a natural component of water, and what is a contaminant. High concentrations of naturally occurring substances can have negative impacts on aquatic flora and fauna.

Oxygen-depleting substances may be natural materials, such as plant matter (e. g. leaves and grass) as well as man-made chemicals. Other natural and anthropogenic substances may cause turbidity (cloudiness) which blocks light and disrupts plant growth, and clogs the gills of some fish species. [10] Many of the chemical substances are toxic. Pathogens can produce waterborne diseases in either human or animal hosts. [11] Alteration of water's physical chemistry includes acidity (change in pH), electrical

conductivity, temperature, and eutrophication. Eutrophication is an increase in the concentration of chemical nutrients in an ecosystem to an extent that increases in the primary productivity of the ecosystem.

Depending on the degree of eutrophication, subsequent negative environmental effects such as anoxia (oxygen depletion) and severe reductions in water quality may occur, affecting fish and other animal populations. Pathogens A manhole cover unable to contain a sanitary sewer overflow. Coliform bacteria are a commonly used bacterial indicator of water pollution, although not an actual cause of disease. Other microorganisms sometimes found in surface waters which have caused human health problems include: * Burkholderia pseudomallei * Cryptosporidium parvum * Giardia lamblia * Salmonella * Novovirus and other viruses * Parasitic worms (helminths). [12][13] High levels of pathogens may result from inadequately treated sewage discharges. 14]

This can be caused by a sewage plant designed with less than secondary treatment (more typical in less-developed countries). In developed countries, older cities with aging infrastructure may have leaky sewage collection systems (pipes, pumps, valves), which can cause sanitary sewer overflows. Some cities also have combined sewers, which may discharge untreated sewage during rain storms. [15] Pathogen discharges may also be caused by poorly managed livestock operations. Chemical and other contaminants Muddy river polluted by sediment. Photocourtesy of United States Geological Survey. Contaminants may include organic and inorganic substances. Organic water pollutants include:

* Detergents Disinfection by-products found in chemically disinfected drinking water, such as chloroform * Food processing waste, which can include oxygen-demanding substances, fats and grease * Insecticides and herbicides, a huge range of organohalides and other chemical compounds * Petroleum hydrocarbons, including fuels (gasoline, diesel fuel, jet fuels, and fuel oil) and lubricants (motor oil), and fuel combustion byproducts, from stormwater runoff[16] * Tree and bush debris from logging operations * Volatile organic compounds (VOCs), such as industrial solvents, from improper storage. * Chlorinated solvents, which are dense non-aqueous phase liquids (DNAPLs), may fall to the bottom of reservoirs, since they don't mix well with water and are denser. * Polychlorinated biphenyl (PCBs) * Trichloroethylene * Perchlorate * Various chemical compounds found in personal hygiene and cosmetic products.

A garbage collection boom in an urban-area stream in Auckland, New Zealand. Inorganic water pollutants include: * Acidity caused by industrial discharges (especially sulfur dioxide from power plants) * Ammonia from food processing waste * Chemical waste as industrial by-products * Fertilizers containing nutrients--nitrates and phosphates—which are found in stormwater runoff from agriculture, as well as commercial and residential use[16] * Heavy metals from motor vehicles (via urban stormwater runoff) [16][17] and acid mine drainage * Silt (sediment) in runoff from construction sites, logging, slash and burn practices or land clearing sites. Macroscopic Pollution in Parks Milwaukee, WI

Macroscopic pollution—large visible items polluting the water—may be termed " floatables" in an urban stormwater context, or marine debris when

found on the open seas, and can include such items as: * Trash or garbage (e. g. paper, plastic, or food waste) discarded by people on the ground, along with accidental or intentional dumping of rubbish, that are washed by rainfall into storm drains and eventually discharged into surface waters * Nurdles, small ubiquitous waterborne plastic pellets * Shipwrecks, large derelict ships. Thermal pollution Main article: Thermal pollution Thermal pollution is the rise or fall in the temperature of a natural body of water caused by human influence.

Thermal pollution, unlike chemical pollution, results in a change in the physical properties of water. A common cause of thermal pollution is the use of water as a coolant by power plants and industrial manufacturers. Elevated water temperatures decreases oxygen levels (which can kill fish) and affects ecosystem composition, such as invasion by new thermophilic species. Urban runoff may also elevate temperature in surface waters. Thermal pollution can also be caused by the release of very cold water from the base of reservoirs into warmer rivers. Transport and chemical reactions of water pollutants See also: Marine pollution Most water pollutants are eventually carried by rivers into the oceans.

In some areas of the world the influence can be traced hundred miles from the mouth by studies using hydrology transport models. Advanced computer models such as SWMM or the DSSAM Model have been used in many locations worldwide to examine the fate of pollutants in aquatic systems. Indicator filter feeding species such as copepods have also been used to study pollutant fates in the New York Bight, for example. The highest toxin loads are not directly at the mouth of the Hudson River, but 100 kilometers

south, since several days are required for incorporation into planktonic tissue. The Hudson discharge flows south along the coast due to coriolis force.

Further south then are areas of oxygen depletion, caused by chemicals using up oxygen and by algae blooms, caused by excess nutrients from algal cell death and decomposition. Fish and shellfish kills have been reported, because toxins climb the food chain after small fish consume copepods, then large fish eat smaller fish, etc. Each successive step up the food chain causes a stepwise concentration of pollutants such as heavy metals (e. g. mercury) and persistent organic pollutants such as DDT. This is known as biomagnification, which is occasionally used interchangeably with bioaccumulation. A polluted river draining an abandoned copper mine on Anglesey Large gyres (vortexes) in the oceans trap floating plastic debris.

The North Pacific Gyre for example has collected the so-called " Great Pacific Garbage Patch" that is now estimated at 100 times the size of Texas. Many of these long-lasting pieces wind up in the stomachs of marine birds and animals. This results in obstruction of digestive pathways which leads to reduced appetite or even starvation. Many chemicals undergo reactive decay or chemically change especially over long periods of time in groundwater reservoirs. A noteworthy class of such chemicals is the chlorinated hydrocarbons such as trichloroethylene (used in industrial metal degreasing and electronics manufacturing) and tetrachloroethylene used in the dry cleaning industry (note latest advances in liquid carbon dioxide in dry cleaning that avoids all use of chemicals).

Both of these chemicals, which are carcinogens themselves, undergo partial decomposition reactions, leading to new hazardous chemicals (including dichloroethylene and vinyl chloride). Groundwater pollution is much more difficult to abate than surface pollution because groundwater can move great distances through unseen aquifers. Non-porous aquifers such as clays partially purify water of bacteria by simple filtration (adsorption and absorption), dilution, and, in some cases, chemical reactions and biological activity: however, in some cases, the pollutants merely transform to soil contaminants. Groundwater that moves through cracks and caverns is not filtered and can be transported as easily as surface water.

In fact, this can be aggravated by the human tendency to use natural sinkholes as dumps in areas of Karst topography. There are a variety of secondary effects stemming not from the original pollutant, but a derivative condition. An example is silt-bearing surface runoff, which can inhibit the penetration of sunlight through the water column, hampering photosynthesis in aquatic plants. Water pollution may be analyzed through several broad categories of methods: physical, chemical and biological. Most involve collection of samples, followed by specialized analytical tests. Some methods may be conducted in situ, without sampling, such as temperature.

Government agencies and research organizations have published standardized, validated analytical test methods to facilitate the comparability of results from disparate testing events. [18] Sampling Sampling of water for physical or chemical testing can be done by several methods, depending on the accuracy needed and the characteristics of the contaminant. Many contamination events are sharply restricted in time, most

commonly in association with rain events. For this reason " grab" samples are often inadequate for fully quantifying contaminant levels. Scientists gathering this type of data often employ auto-sampler devices that pump increments of water at either time or discharge intervals.

Sampling for biological testing involves collection of plants and/or animals from the surface water body. Depending on the type of assessment, the organisms may be identified for biosurveys (population counts) and returned to the water body, or they may be dissected for bioassays to determine toxicity. Further information: Water quality#Sampling and Measurement Physical testing Common physical tests of water include temperature, solids concentrations (e. g. , total suspended solids (TSS)) and turbidity. Chemical testing See also: water chemistry analysis and environmental chemistry Water samples may be examined using the principles of analytical chemistry. Many published test methods are available for both organic and inorganic compounds.

Frequently used methods include pH, biochemical oxygen demand (BOD), [19]: 102 chemical oxygen demand (COD),[19]: 104 nutrients (nitrate and phosphorus compounds), metals (including copper, zinc, cadmium, lead and mercury), oil and grease, total petroleum hydrocarbons (TPH), and pesticides. Biological testing Main article: Bioindicator Biological testing involves the use of plant, animal, and/or microbial indicators to monitor the health of an aquatic ecosystem. Control of pollution Domestic sewage Main article: Sewage treatment Deer Island Waste Water Treatment Plant serving Boston, Massachusetts and vicinity. Domestic sewage is 99. 9 percent pure water, while the other 0. 1 percent are pollutants.

Although found in low concentrations, these pollutants pose risk on a large scale. [20] In urban areas, domestic sewage is typically treated by centralized sewage treatment plants. In the U. S. , most of these plants are operated by local government agencies, frequently referred to as publicly owned treatment works (POTW). Municipal treatment plants are designed to control conventional pollutants: BOD and suspended solids. Well-designed and operated systems (i. e. , secondary treatment or better) can remove 90 percent or more of these pollutants. Some plants have additional sub-systems to treat nutrients and pathogens. Most municipal plants are not designed to treat toxic pollutants found in industrial wastewater. 21]

Cities with sanitary sewer overflows or combined sewer overflows employ one or more engineering approaches to reduce discharges of untreated sewage, including: * utilizing a green infrastructure approach to improve stormwater management capacity throughout the system, and reduce the hydraulic overloading of the treatment plant[22] * repair and replacement of leaking and malfunctioning equipment[15] * increasing overall hydraulic capacity of the sewage collection system (often a very expensive option). A household or business not served by a municipal treatment plant may have an individual septic tank, which treats the wastewater on site and discharges into the soil.

Alternatively, domestic wastewater may be sent to a nearby privately owned treatment system (e. g. in a rural community). Some industrial facilities generate ordinary domestic sewage that can be treated by municipal facilities. Industries that generate wastewater with high concentrations of conventional pollutants (e. g. oil and grease), toxic pollutants (e. g. heavy

metals, volatile organic compounds) or other nonconventional pollutants such as ammonia, need specialized treatment systems. Some of these facilities can install a pre-treatment system to remove the toxic components, and then send the partially treated wastewater to the municipal system.

Industries generating large volumes of wastewater typically operate their own complete on-site treatment systems. Some industries have been successful at redesigning their manufacturing processes to reduce or eliminate pollutants, through a process called pollution prevention. Heated water generated by power plants or manufacturing plants may be controlled with: * cooling ponds, man-made bodies of water designed for cooling by evaporation, convection, and radiation * cooling towers, which transfer waste heat to the atmosphere through evaporation and/or heat transfer * cogeneration, a process where waste heat is recycled for domestic and/or industrial heating purposes. [23] Agricultural wastewater

Main article: Agricultural wastewater treatment Riparian buffer lining a creek in Iowa Nonpoint source controls Sediment (loose soil) washed off fields is the largest source of agricultural pollution in the United States. [10] Farmers may utilize erosion controls to reduce runoff flows and retain soil on their fields. Common techniques include contour plowing, crop mulching, crop rotation, planting perennial crops and installing riparian buffers. [24][25]: pp. 4-95–4-96 Nutrients (nitrogen and phosphorus) are typically applied to farmland as commercial fertilizer; animal manure; or spraying of municipal or industrial wastewater (effluent) or sludge.

Nutrients may also enter runoff from crop residues, irrigation water, wildlife, and atmospheric deposition. [25]: p. 2-9 Farmers can develop and implement

nutrient management plans to reduce excess application of nutrients. [24] [25]: pp. 4-37–4-38 To minimize pesticide impacts, farmers may use Integrated Pest Management (IPM) techniques (which can include biological pest control) to maintain control over pests, reduce reliance on chemical pesticides, and protect water quality. [26] Feedlot in the United States Point source wastewater treatment Farms with large livestock and poultry operations, such as factory farms, are called concentrated animal feeding operations or feedlots in the US and are being subject to increasing government regulation. 27][28] Animal slurries are usually treated by containment in anaerobic lagoons before disposal by spray or trickle application to grassland.

Constructed wetlands are sometimes used to facilitate treatment of animal wastes. Some animal slurries are treated by mixing with straw and composted at high temperature to produce a bacteriologically sterile and friable manure for soil improvement. Construction site stormwater Silt fence installed on a construction site. Sediment from construction sites is managed by installation of: * erosion controls, such as mulching and hydroseeding, and * sediment controls, such as sediment basins and silt fences. [29] Discharge of toxic chemicals such as motor fuels and concrete washout is prevented by use of: * spill prevention and control plans, and specially designed containers (e. g. for concrete washout) and structures such as overflow controls and diversion berms. [30] Urban runoff (stormwater) Main article: Urban runoff See also: Green infrastructure Retention basin for controlling urban runoff Effective control of urban runoff involves reducing the velocity and flow of stormwater, as well as reducing pollutant discharges.

Local governments use a variety of stormwater management techniques to reduce the effects of urban runoff.

These techniques, called best management practices (BMPs) in the U. S. , may focus on water quantity control, while others focus on improving water quality, and some perform both functions. 31] Pollution prevention practices include low-impact development techniques, installation of green roofs and improved chemical handling (e. g. management of motor fuels & oil, fertilizers and pesticides). [32] Runoff mitigation systems include infiltration basins, bioretention systems, constructed wetlands, retention basins and similar devices. [33][34] Thermal pollution from runoff can be controlled by stormwater management facilities that absorb the runoff or direct it into groundwater, such as bioretention systems and infiltration basins. Retention basins tend to be less effective at reducing temperature, as the water may be heated by the sun before being discharged to a receiving stream. [31]: p. 5-58 *