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Annual Magazine

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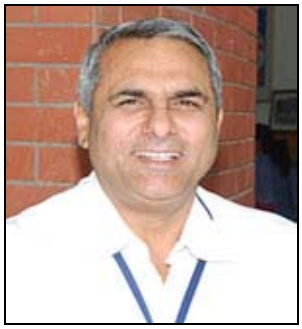

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Principal's Message

It gives me immense pleasure to write a message for **'Shivalik-2019'** an annual magazine published by the Department of Geography, Shivaji College. "*The mind is not a vessel to be filled, but a fire to be kindled*," said Plutarch. Shivalik kindles the imagination of our young geographers. I congratulate the faculty members and students who used various media of expression to present their ideas. As long as our ideas are expressed and thoughts kindled, we can be sure of learning, as everything begins with an idea. I appreciate every student who contributed to the magazine and participated in extracurricular activities that helped in making learning fun.

As an academician, I can fully understand the importance of penning down ideas on a proper platform, and Shivalik provides such a platform to students. I firmly believe that the Geography Department is more than just a place to learn. It gives students a chance to grow and be equipped with everything they need to achieve excellence.

I convey my best wishes to the Department of Geography for the grand success of the Geo-Fest: Shivalik-2019.

Dr. Shashi Nijhawan
Principal

From the Desk of Teacher-in-Charge

A famous philosopher once said, “Inside all of us is a hidden dream”. The academic institutions are knowledge centres, and therefore, it becomes imperative that whatever is being performed by the institution must be shared amongst the stakeholders. I believe that magazine is a means through which academic activities and achievements are shared.

Shivalik magazine provides a platform for students and teachers to express their ideas. Shivalik, our Annual Magazine, enthusiastically brought out by the Department of Geography, Shivaji College for the past many years, addresses a variety of issues. While students were free to express themselves on any issue of their choosing, teachers were requested to write on subjects from the undergraduate syllabus. The present edition of Shivalik includes articles from vast array of the subject.

I express my appreciation for the efforts of authors and editors of the articles who gave this Shivalik magazine its present form. These contributions have required a generous amount of time and effort. It is this willingness to share knowledge, concerns and special insights with fellow beings that have made this magazine possible.

I hope readers will enjoy reading the current issue of Shivalik. Happy Reading!

Dr. Prabuddh Kr. Mishra
Assistant Professor

Message from the Student Advisor

"If you want to change the world, pick up the pen and write." Martin Luther

As an avid reader of the newspaper, my heart is often full of despair. Growing disparities, rising crime, corruption, unemployment, floods, droughts, diseases, pollution, climate change.....there seems to be no respite from bad news. Those at the helm of affairs seem oblivious to such issues, being concerned instead with winning elections. If business continues as usual, there seems little hope for the country, indeed for the world. Clearly there is need for change. And I think that change will come from the next generation.

"Indeed, learning to write may be part of learning to read. For all I know, writing comes out of a superior devotion to reading. " Eudora Welty

Many years ago the Department of Geography, Shivaji College, launched Shivalik, its annual magazine. The idea was not just to encourage students to write, but to encourage them to read too. Reading, we hoped, would expose them to new ideas and stimulate them to think. New thoughts would perhaps bring change. For the last few years, Shivalik has provided a platform for students to read, write, think, and bring about change.

I would only say to them, *"Start writing, no matter what. The water does not flow until the faucet is turned on." – Louis L'Amour*

Dr. Preeti Tewari
Associate Professor

Executive Editors: Dr. Preeti Tewari and Dr. Prabuddh Kr. Mishra

From the Student Editor

It gives me immense pleasure to bring out the latest issues of our annual magazine, Shivalik 2019. There are a lot of things one hears about magazine –making, but the one truth everyone glosses over is the sheer effort you have to put in to get things in motion. The relentless request for articles starting with notices and announcements, polite entreaties, persuasion, veiled threats and coercion.

The initial process involved some procrastination and then bouts of ambition leading to impossible deadlines and work done in fits of panicky efficiency.

As this cannot be said enough, I would like to thank my teachers, whose immense support steered me through what might have been completed by 2020. A special thanks to Sneha and Hritick for their help in proof reading and valuable suggestions.

I hope this magazine has accomplished what it intended to – a literary celebration of a subject that fascinates and intrigues. Enjoy!!

Tanya Chaudhary
B.A (H) Geography, Semester VI

Annual Report: Department of Geography
(2018-19)

The Department of Geography, Shivaji College is teaching BA (H) and BA (P) and interdisciplinary courses to approximately 350 students cutting across all social science disciplines. Presently ten faculty members are providing their expertise to the students, and two non-teaching staff members are engaged in lab work. Department has received one major research project funded by ICSSR for the year 2017-19. Two Ph.D and one M.Phil scholars are pursuing their research under the supervision of department faculty. Faculty members have participated in national and international seminars, workshops and conferences and have also contributed research papers in various journals and books. The department has a well-developed lab with a variety of instruments and GIS software and also runs a departmental library.

Various events and co-curricular activities were organised in the current session.

An Orientation Programme for the departmental students was organized on 19th July, 2018. All the faculty members addressed the fresh batch of students introducing them to the curricula and the activities of the department and shared their experiences. Students were provided with a copy of the timetable and departmental magazine **'Shivalik-2018'**.

A film entitled *"**Inferno Village**"* based on *Jharia* coal mines were screened on 29th August, 2018 in the department. This was followed by a discussion on the issues raised in the film.

A **Freshers' Welcome** was celebrated on 8th September, 2018. The programme provided first year students an opportunity to introduce themselves and showcase their talent. In a fun-filled event, the titles of Mr. and Ms. Fresher were conferred upon the two most talented students. A Departmental quiz contest was organized by students on 6th February 2019 followed by **Map Pointer** event on 14th February, 2019. Winners of the various events will be honoured in the Geo Fest 'Shivalik-2019'.

The Department has also organised two invited lectures on Sustainable Development. The first lecture was by **Martin J Ossawarde** on 11th September 2018 (Sustainable Development Speaker and Writer, Bishkek, Kyrgyzstan) on the title '**Sustainable Development'**. The second lecture was delivered by the German researcher **Dr. Stephanie Ledar** on 6th October 2018 on the title '**Education for Sustainable Development'.** An audience of approximately 150 under-graduate students and faculty members from Geography, Environmental Studies, Economics, Political Science and other departments participated in the discussion.

An Alumni Meet was organized by the Department on 14th April, 2018. A total of 98 alumni registration was done. The alumnus of different batches shared their views, experiences and progression in the Alumni Meet.

Under the local academic excursion, the department visited ***Damdama*** Lake, Gurugram, Haryana on 06th February 2019 and on February 12th 2019 one-day local excursion for 3rd year students was conducted to ***Manaoli Toki*** village of Sonepat district, Haryana as the part of their project based course on Disaster Management.

Content

The Digital Earth

Dr. Lalita Rana, Associate Professor, Department of Geography, Shivaji College

With the widespread introduction of computer technology, geography has entered a revolutionary phase in the 21st century. The traditional geography has been radically transformed since the latter half of the 20th century. It has fundamentally changed not only how geographers study the world, but also what they study, as the natural and human landscapes, are constantly being refigured by computers. Such a change has been brought about by the so-called Digital Revolution. The modern techniques are opening up new avenues for geographers, and this has unwrapped vast areas for analysis and research.

The Digital Revolution refers to the advancement of technology from analogue to the digital. Implicitly, the term refers to the sweeping changes brought about by digital computing and communication technology. The Digital Revolution marks the beginning of the Information Age with the widespread use of digital logic circuits, and its derived technologies, including the computer and internet. These technological innovations have altered the traditional practice of data collection, presentation and analysis.

Computers have extended geographers' eyes (via remote sensing and air photos), their hands (via computer-assisted cartography), their mouth (via the World Wide Web and telephones), and their minds (via data processing and artificial intelligence). These extensions have greatly facilitated the acquisition, visualization, processing, and communication of unprecedented amounts of geographic data. In addition, rapid innovations have fostered the development of specialized instruments and software tools that can greatly facilitate geographic research. For example, GPS, laptops, portable digital assistants (PDA), handheld computers, digital cameras, portable scanners and electronic data loggers all raise the efficiency of field work as well as library retrieval. The computer has drastically transformed both the world of geography as an academic discipline and the geography of the world in which we live. The computers penetrate almost every aspect of human lives. The increasing use of computers has allowed geographers faster processing of larger sets of data. With faster processing of more data comes the capacity to estimate ever more complex and distinct relationships and structures in data and to design and test far more comprehensive models of behavior.

The most recent developments in geocomputation[1] especially in data mining and knowledge discovery techniques have pushed the computing capabilities for spatial data to a new height.[2] Computers also stimulated the growth of new branches of geography, as for example, the quantitative geography[3], computer-assisted cartography, analytical cartography, remote sensing, and GIS. With the maturing of GIS technology and the further convergence among remote sensing, global positioning systems (GPS), and computer cartography, visualizing spatial data and mapmaking have been made much easier. The proliferation of GIS and the increasing use of georeferenced data have made the broader social science community recognize the key role that space plays in human society. The growth in routine use of the Internet among geographers, on

the other hand, has lead to the emergence of a new geography department, i.e. the Virtual Geography Department (VGD), with more and more courses, journals, books, and data available on-line. The goal of the VGD is to produce and disseminate geographic knowledge and geography course materials.

This new world, different from the physical, tangible world geographers studied for thousands of years, is virtual, digital, and ephemeral. In this virtual world, everything geographers study has become bits of information, which can be transmitted across the globe instantaneously[4]. Each one of us is not only an information processor, but also information processed. In other words, we have literally become digital individuals: our identity is more and more equated by digital information such as Social Security and credit card numbers, multiple ID and PIN numbers. Indeed, even the entire earth is now becoming digital as embodied in the concept and initiative of digital earth (www.digitalearth.gov). This brand new digital virtual world itself provides geographers with a fascinating new subject of study.[5]

The most ambitious concept to exemplify the potential of computers both as tools and as reality is the concept of "Digital Earth." Digital Earth is a virtual representation of the Earth that is georeferenced and connected to the world's digital knowledge archives[6]. It enables geography to access vast amounts of scientific and cultural information to help them understand the Earth and its human activities. The origin of the idea can be traced back to Buckminster Fuller's Geoscope, a large spherical display to represent geographic phenomena.[7] Digital Earth is believed to play a strategic and sustainable role in addressing such challenges to human society as natural resource depletion, food and water insecurity, energy shortages, environmental degradation, natural disasters response, population explosion, and, in particular, global climate change. The Digital Earth is not one, but it is multiply connected infrastructures addressing the needs of different audiences: citizens, communities, policymakers, scientists, educationalists.[8] It is problem oriented: e.g. environment, health, societal benefit areas, and is transparent on the impacts of technologies on the environment. It allows search through time and space to find analogue situations with real time data from both sensors and humans. It asks questions about change, identification of anomalies in space in both human and environmental domains. It enables access to data, information, services, and models as well as scenarios and forecasts: from simple queries to complex analyses across the environmental and social domains. It is based on open access, and participation across multiple technological platforms, and media (e.g. text, voice and multi-media). It is engaging, interactive, exploratory, and a laboratory for learning and for multidisciplinary education and science.
The digital earth can be envisioned as "a multi-resolution, three-dimensional representation of the planet, into which we can embed vast quantities of georeferenced data". Digital Earth is inherently an intriguing concept for geographers. First, it has a vision that can motivate a wide range of interdisciplinary research and development activities. Digital Earth challenges our state of knowledge about the planet, not only in terms of raw data, but also in terms of data access and

the ability to communicate data through visualization. Moreover, it challenges our understanding of process in the invitation to model, simulate, and predict, since the concept is not limited to static portrayal. Second, Digital Earth is interesting because of its implications for the organization of information. The prevailing metaphor of user interface design is the office or desktop, with its filing cabinets and clipboards. Many prototype digital libraries employ the library metaphor, with its stacks and card catalogs. But Digital Earth suggests a much more powerful and compelling metaphor for the organization of geographic information, by portraying its existence on a rendering of the surface of the Earth. Third, at a much deeper level, Digital Earth may be regarded as a materialization of what has been called the 'Noosphere', dominated by flows of digital information. Together with geographers' focus on the atmosphere, hydrosphere, and biosphere, the study on the geography of Noosphere could be a new challenge for geographers in the 21st century.

The Spatial analysis through digital mapping can transform education and society through better decision-making using the geographic perspective. This may be best accomplished in the various areas of geographic interest, as rural, urban, more effectively economic, landuse, and population issues. Such concepts as settlement, age, birth rate, growth rate, and human-environment interaction in population dynamics; zoning and land-use practices in land use; historical and current development of cities, site versus situation, and challenges facing cities in urban development; industrialization, energy, employment, and measures of development in economic geography; and watersheds, landform dynamics, and natural hazards in physical geography may be more effectively understood and studied with the help of new technology. Joel Kotkin[9], a renowned economic and social-trend forecaster, dicusses how the digital revolution is changing where and how we live and work in the bricks-and-mortar world. Historically unprecedented forces are at work buffeting cities, suburbs and towns across the country. In his *The New Geography*, Kotkin focuses on the digital revolution's surprising impact on cities: their traditional role as the centers of creativity and the crossroads for trade and culture is becoming ever more essential in a globalized information-age economy. Embedded in studying these issues is the spatial perspective, critical to understanding the geographic content and processes.

A geospatially literate population is the goal of geographers in the 21st century. Such a population is better equipped to recognize, understand, and resolve those critical issues, whether local or global, that will confront us today and in the future. New technologies have always been important in advancing geographic understanding, but never have they been as thoroughly and rapidly transformative of the discipline as at this stage in geography's evolution. They are also creating new and resurgent roles for geography in both society and in the university. This trend is still accelerating, as the integration of geographic technologies, such as the global positioning system and geographic information systems (GPS/GIS), is creating an explosion of new "real-time, real-world" applications and research capabilities. The resultant dynamic space/time interactive research and management environments created by interactive GPS/GIS, among other technologies, places geography squarely at the forefront of advanced multidisciplinary research and modeling programs, and has created core organization management tools (geographic

management systems) which will dramatically change the way governments and businesses work in the decades ahead.

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Mechanism of Environment and Ecology in Natural System: Concept and its Functions

Dr. Tejbir Singh Rana, Associate Professor of Geography, Shivaji College

Introduction

Environment means the sum total of surrounding of all living species which remain completely acclimatized and continuously interact and respond for their survival and maintain their entity. It is the combination of natural factors like sunlight, water availability, wind circulation and soil condition which determine the entity, reproduction, energy flow and metabolism of organisms. Therefore environment is the combination of all living and non-living substances surrounding the lithosphere which consists the inseparable whole system constituted by physical, biological and social elements which are inter linked in different perspective.

The natural environment of a living organism may be divided into three basic components:

1. **Biotic component:** This includes all living organisms existing on lithosphere like human, wildlife, plants and micro-organisms.
2. **Abiotic component:** This consists of all non-living components such as water, air, sunlight and soil etc.
3. **Energy component:** consists of solar energy, geothermal energy and all other energy released due to radiation.

Elements of Environment

Considering the physical, chemical and biological components, the environment may be classified into four different elements.

1. Atmosphere (Air and Wind Circulation)
2. Lithosphere (Soil and Earth's crust)
3. Hydrosphere (Water)
4. Biosphere (Living organisms)

Ecology

Ecology is the science of community (plant and wild life) which investigates the relation of all living organism with their respective environment. Therefore, the study of structure and function of natural life forms determines the ecology. The German biologist Ernest Haeckel in 1866 defined ecology as the body of knowledge concerning the economy of nature the investigation of total relations of the animal, both to its organic and inorganic environment, including above all its friendly relation with those animals and plants with which it comes directly or indirectly into contact. The study of ecological principles provides a vast knowledge for understanding the problems of depleting forests, soil, salinization of oceans and degrading the inland water.

Sub-Division of Ecology

1. **Auto ecology** deals the ecological study of an **specie** of organism.
2. **Synecology** which deals with the ecological study of entire ecosystem and whole plant and animal communities.
3. **Habitat ecology** deals with ecological study of different habitats and their effects on the organism living there.
4. **Community ecology** deals with the study of local distribution of animals in various habitats which relates the composition and succession of community units.
5. **Population ecology** deals with the study of the pattern of structure, growth and control of population organisms. It also deals with the inter-relation between populations of different species in the community. It also known as **demecology.**
6. **Human ecology** deals with interrelationship between men along with environment. Human effects on biosphere and its implication also studied in Human ecology.
7. **Applied ecology** deals with the application of ecological concept to human needs like wild life management, aquaculture, land use planning, agriculture, forestry conservation and management, application of insecticide and pesticide, horticulture and apiculture.
8. **Pedology** deals with the study of soil specially its mineral content, typology, acidity, profile, formation process and their influence on organism.
9. **Ethology** is the study of animal behavior under different natural habitat.

Eco-system

Ecosystem is the result of integration of all the living and non-living factors in the environment like how a particular component of environment like soil, water, temperature, effect the living organisms. For instance, availability of high temperature and regular supply of water influence the rapid growth of plant in equatorial climate, while varied temperature and little water supply in desert restrict the plant growth. Organism species live in communities and groups and influence their respective growth. This structural and functional system of communities of their relationship with environment is called eco-systems or Ecological System. The green plants utilize the inorganic material like carbon dioxide, nitrate, phosphate, potash and water etc. along with the energy received from the sun and produce numerous organic substances. The plants grow and increase in weight as a result of organic production. Part of organic material so built is lost by green plant in the process of respiration. This left over organic matter is known as NPP (Net Primary Production). Like all animals including man consume directly or indirectly the primary products in the form of food. The total quantity of solar energy converted into chemical energy by green plants is known as GPP (Gross Primary Production). The GPP becomes equal to energy required for metabolic activities. If the GPP is less than energy required for metabolic activity then biomass will go under degradation. If GPP is more than energy required for metabolism there will be increase of bio mass.

The term eco-system was first time coined by British botanist A. G. Tansley in 1935 and defined the eco-system as a set of inter dependent living (biotic or organic) and non-living (abiotic or inorganic) components. According, E.P. Odum ecosystem is the basic functional unit of organism and their environment interacting with one other and their own components.

Types of Ecosystem

1. ***Terrestrial eco-system*** i.e. forests, grassland, bush land, desert, tundra.
2. ***Aquatic eco-systems*** which can be divided into two sub divisions:
   a. Fresh water (running fresh water and standing fresh water).
   b. Marine/saline water ecosystem.

Components of Eco-System

1. **Biotic components**
2. **Abiotic components**

Biotic components: The living organisms present in the natural environment system constitute the biotic components. The living organisms are distinguished on the basis of nutritional relationship i.e. food preparation and food dependency. Biotic components can be subdivided into two groups.

A. Auto-trophic components – means self-food producing organisms. The members of auto-trophic components are green plants, bacteria etc. On the basis of size of producers they are divided into two types.

1. Micro producers (microscopic) like phytoplankton, algae etc.
2. Macro produces (macroscopic) like green plant, grasses etc.

The main function of producer or autotroph is to absorb energy from non-living environment and make it available to all living organisms. Besides the production of food, the function of producers is to convert the solar energy into chemical energy. Apart from producers the autotrophic components are also known as converter or transducer.

The large rooted plant (macro produces) not only produce food but also provides physical and metabolic supports for other organisms and plants. They can be further classified into following categories.

1. **Epiphytes:** These are the plants with aerated roots dependent on another plant for physical and metabolic support.
2. **Phanero-phytes:** These are also aerial plants but their renewal buds are exposed on upright shoots.
3. **Chamae-phytes:** These are the surface plants but their renewal buds are at the surface of grounds.
4. **Hemi-Cryptophytes** are the tussock plants and their buds are just below the soil surface.

5. **Geophytes or Cryptophytes** are the earth plants their buds are below the surface on a rhizome or bulb.
6. **Thero-phytes** are known as annuals and comprises life cycle of seeds in one vegetation period.

Heterotrophic components- These are the living organisms which are unable to manufacture their own food and consume and decompose the material prepared by producers they may be herbivores or carnivores and also known as macro consumers.

Food Chain

The green plant (autotrophs) synthesizes food using solar energy and different inorganic constituents like water, carbon dioxide. The food manufactured by the green plants is utilized by themselves and also by herbivorous (primary consumer). The herbivores are consumed by carnivores. Therefore one form of life is supported by the other form. The food from one trophic level reaches the other trophic level and a chain in established which is known as food chain. For example aquatic grass is consumed by grass hopper, grass hopper is consumer by shrew and shrew is consumed by marsh hawk. So the relationship of food supply and number of community is established.

Types of Food Chain

1. **Grass or predator food chain:** Its starts from green plant (producer) and passes through herbivorous (primary consumer) and ends with carnivorous (tertiary and secondary consumer). The total energy acquired by green plant is subjected to following processes.
    a. It may oxidize through respiration.
    b. It may decay / die.
    c. It may be consumed by herbivorous.

Grazing food chain may be explained in terms of trophic level as shown below:

Autotrophs----→ Herbivorous ---→ PrimaryCarnivorous ---→ Secondary Carnivorous ---→Tertiary Carnivorous ---→Decomposer etc.

2. **Parasitic Food Chain:** This food chain starts from herbivorous but food energy passes from larger to smaller organism without outright decay or killing as in case of predator. Therefore the larger animals are considered as hosts and smaller animals which fulfill their nutritional requirements from the host are considered as parasites.
3. **Detritus or Saprophytic Food Chain:** In this food chain the dead organic matter or organic waste (metabolic wastes orextrudates) of ecosystem go to micro-organisms and finally to detritus feeding organisms known as **detrivores**. The energy stored in detritus serves as a source of energy for detrivores. The organisms of detritus food chain include

algae, bacteria, fungi, protozoa, mites, insects, **rottifers**, nematodes, slime, **moldes**, **actinomyoetes** and some vertebrates. They ingest pieces of partially decompose organic matter, digest them partially and after extracting chemical energy for their metabolism and excrete the remainder in the form of simpler organic molecules. Gradually the complex organic molecules are broken into simpler molecule like carbon dioxide and water. This process continues till humus is formed.

Ecological Pyramid

Since a lot of potential energy is lost as heat at each step in the food chain, the organisms in each trophic level dissipate lesser energy to the next trophic level than they actually received. Because of such a tapering off of available energy in food chain, the trophic structure and function of successive trophic levels may be represented graphically by means of ecological pyramids. In other words, an ecological pyramid may be defined as diagrammatic representation of data pertaining to standing crop at each trophic level in an ecosystem. In pyramids, the producer level forms the base and successive levels form the tires which make up the apex. The higher the steps in the ecological pyramid, lower the number of individuals and larger their size. The concept of ecological pyramid was suggested by English zoologist Charles E. Elton in 1927 in his classic book Animal Ecology.

Ecological pyramids are of three general types:

i. **Pyramid of Number**

It depicts the relationship between the producers and different orders of consumers at successive trophic levels in terms of their number. The base of pyramid is represented by large number of producers and in successive levels of consumers; the number of organisms goes on declining sharply. The pyramid numbers indicate that a large number of producers are consumed by a smaller number of primary consumers. These primary consumers are ingested by relatively lesser number of secondary consumers, which are subsequently eaten by only a few **tertiary** consumers.

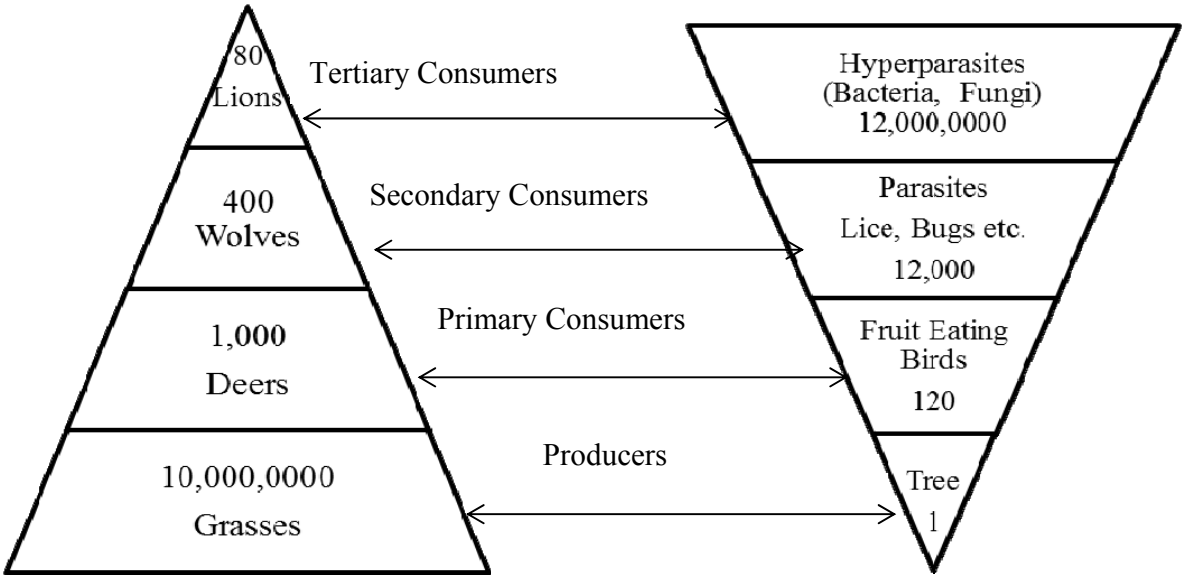
However, in a parasitic food chain starting from tree as producer, the pyramids are always inverted. A tree may support the growth of many herbivores and each herbivore in turn, may provide nutrition to a number of parasites. Subsequently, each parasite supports the survival of a number of hyper parasites. Thus, the numbers of organism gradually show an increase making the pyramid in inverted shape.

i. **Pyramid of Biomass**

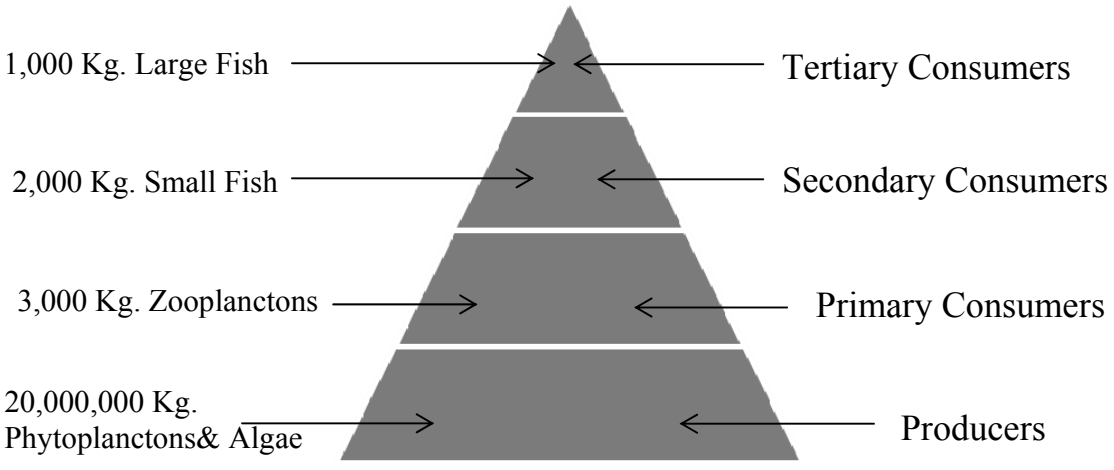
Biomass is the total living organic material (dry weight) of an organism. The pyramid of biomass describes the qualitative relationship between the producers and consumers. It indicates the decrease of biomass in each trophic level from base to apex. The total biomass of producers consumed by herbivore is more than the total biomass of the herbivore and the total biomass of the secondary consumer will be lesser than that of herbivore and so on. In grassland eco-system,

there is a gradual decrease in biomass of organisms at successive levels form the producers to the top carnivore. Thus, the pyramid is upright.
However, in pond eco-system, the producers are smaller organisms having lower biomass and the value of biomass shows an increasing trend towards the apex of pyramid. Thus, the pyramid becomes inverted in shaped.

Pyramid of Numbers



The Upright Pyramid of Numbers **The Inverted Pyramid of Number**

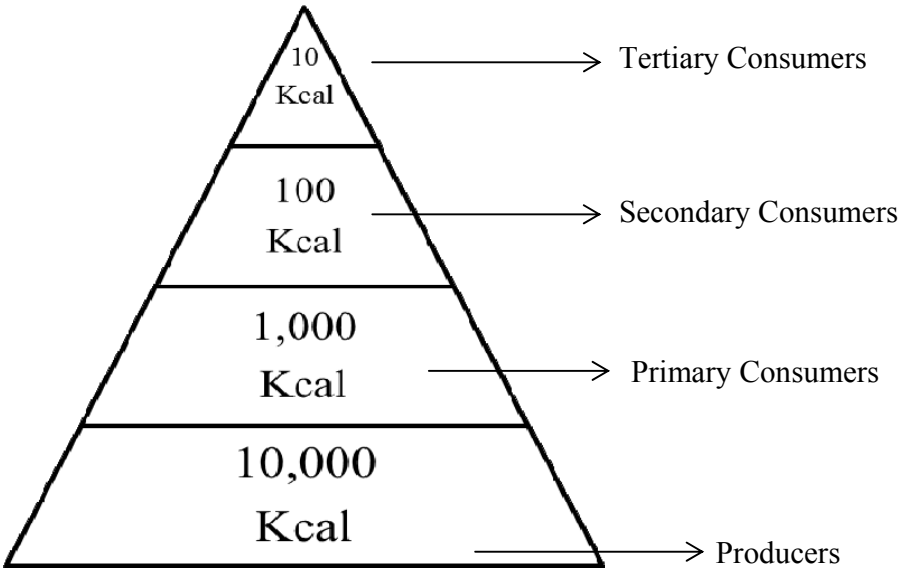


Pyramid of Biomass

Pyramid of Energy

The pyramid of energy describes the total amount of energy utilized by the organisms at each trophic level of food chain and actual role of various organisms in energy transfer. It also gives a picture of the rates of passage of food mass (producers) through the food-chain. When energy passes from a lower trophic level to higher **trophic** level (consumer)only about ten per cent of the potential energy is being transferred and the rest is lost as heat. Hence the energy pyramid in any ecosystem will be always an upright one. With regard to energy flow process, two important conclusions can be derived from the pyramid of energy.

a. Energy flow is unidirectional and irreversible, that is, the energy captured by autotrophs from the sun, passes through different heterotrophs at various trophic levels in an irreversible manner.
b. There happens a gradual decrease in energy level at each trophic level which is due to the energy dissipation as heat in metabolic activities.



Pyramid of Energy

Ecological Succession

The term ecological succession refers to the changes in the biotic communities over a period of time at a particular place. The changes are due to climatic or physiographic conditions. When therehappens a change in environment, due to biological activities, the modified form of environment may not be suitable for the existing community. Such a process induces the formation of a new and developed community in place of old ones, one after another over the same area. The process continues and successive communities develop one after another over the same area until a relatively stable community is established. This relatively stable community is known as climax community which has potentiality to tolerate the changing environment. Thus, the sequential change of communities with the modification of environment over a period of time in the same area is known as ecological succession.

Types of Succession

Some basic types of successions may be outlined as below:

1. **Primary succession:** This type of succession begins in a sterile area or **barren** land or in an inorganic environment. When a bare or nude area is colonized by organisms for the first time and subsequently the communities are changed in a successive form, the process in known as primary succession.
2. **Secondary succession:** The community development on area previously occupied by another well-developed living community amidst the interruption due to adverse conditions like natural calamities, biotic intervention etc. is designated as secondary succession. The natural calamities include forest fire, disease, flood, overgrazing etc.
3. **Autotrophic succession:** When the population of autotrophs (plants) dominates the population of heterotrophs, the succession caused is known as autotrophic succession.
4. **Heterotrophic succession:** It is characterized by early dominance of heterotrophs like bacteria, fungi, and some animals in an organic environment. Since the environment is dominated by heterotrophs, the succession is called heterotrophic succession.
5. **Autogenic succession:** Due to the continuous interaction of community with environment, there happens a modification of the later.Such a modification of environment causes the replacement of an old community by a new one which is known as autogenic succession.
6. **Allogenic succession:** When the replacement of a community is caused by any other external condition and not by the existing organisms, the course of succession is known as allogenic succession
7. **Habitat Succession:** Successions are also named differently basing upon the type of habitat from which the phasic replacement starts.
    a. **Hydrosere:** The succession starting from aquatic habitat is known as Hydrach and the series of changes occurring in the vegetation ofhydrarch are called Hydrosere.
    b. **Mesarch:** The succession starting from a habitat where adequate moisture condition are present.
    c. **Halosere:** The succession occurring at saline water or soil is known as halosere.
    d. **Xerosere**: The succession taking place in xeric habitat like sand or rocks where moisture is present at minimal amount is known as xerosere. Xeroseres can further be subdivided into:
        i. Psammosere: Where the succession starts on sandy habitat.
        ii. Lithosere: Where the succession starts on the surface of rocks.
    e. **Oxylosere**: The succession starting on acidic soils in known as oxylosere.

Food Security

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The importance of food cannot be overstated. Food is needed to fill our bellies and to provide our bodies with energy and nutrients. Indeed, food is a fundamental necessity without which our bodies would not be able to function. Food security, as defined by the United Nations' Committee on World Food Security is the condition in which all people, at all times, have physical, social and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

In 1798, Thomas Robert Malthus, an English cleric and scholar, theorized that human population would outgrow the supply of food. This imbalance between number of people and the availability of food would lead to catastrophe in the form of both natural and human-made disasters, following which population would decline to a more sustainable number. In the more than two hundred years since Malthus published his theory, human population has increased manifold but humanity has managed to avoid mass starvation.

Crisis was averted due to a number of factors. More area was brought under cultivation. The continents of North and South America and Australia and parts of southern Africa were colonised by Europeans and they came to be more intensely cultivated. New crops, such as potato and maize, were introduced all over the world. Improvements in means of transportation and storage enabled transportation of food from surplus to deficit areas with less spoilage and loss to pests. They also enabled areas to specialise in what they grow best. The Green Revolution that came in the 1960s resulted in huge increases in agricultural production. There was a threefold increase in the production of food grains between 1961 and 2008. In the same period world population increased by four billion so that the per capita availability of food remained the same.

Humankind as a whole may have averted 'Malthusian catastrophe' by increasing the production of food, but an equitable distribution of food remains a great challenge. Famines (a temporary but severe shortage of food) resulting from crop failure due to drought, flood, war and disease, have occurred throughout human history in different regions. There is also a problem of chronic hunger- a condition of exhaustion caused by lack of food – that leads to malnutrition. Current estimates by the United Nations indicate that there are 796 million undernourished people in the world. This means that one out of nine people do not get enough to eat. Most of the hungry live in developing countries, especially in southern Asia and sub-Saharan Africa. One out of seven children aged below five years are underweight while one in four children in the same age group have stunted growth. While the world has met with success in reducing hunger, a lot of effort will be required to eliminate it altogether.

In order to eliminate hunger and malnutrition, it is important to understand their underlying causes. Poverty is one of the obvious reasons- there are millions of people with incomes so low that they cannot afford to buy food. They remain trapped in a vicious circle wherein their poor

nutritional status lowers their productivity thereby reducing their income which in turn affects their ability to buy food. Insensitive and inefficient governments and food distribution systems mired in bureaucratic red tape fail to provide food to the hungry. In an economic system where those with military, political and economic power have control over resources, millions of people affected by conflicts face starvation. These include Conflict Affected Residents (CARs) as well as Internally Displaced Persons (IDPs) and refugees. As world population grows and research in subjects related to agriculture remains relatively neglected, one can only expect the situation to remain grave.

So what lies ahead? On the positive side, more land can be brought under cultivation in Latin America, sub- Saharan Africa and east Asia. Irrigation can help in cultivating areas that receive less rainfall. There is also scope for increasing the efficiency of irrigation as currently only 37% of all irrigation water in the world is actually utilised by crops. Research in dry land farming and other farming techniques may lead to increased production of food. Improvements in storage and transportation of food can reduce spoilage. At least 75000 plant species have edible parts but humanity depends on just a few of them. Many worms and animals too are tasty and nutritious. If cultural barriers can be overcome, human beings can expand their food base. Some scientists also suggest genetic modification of plants and animals as a means of enhancing the availability of food.

On the other hand are challenges like global warming that may reduce the availability of food globally as well as locally. In 2001, the FAO estimated that by the year 2080 the world's poorest 40 countries (in 2001) could lose 20% of their ability to raise food because of global warming. An additional threat to food security comes from diversion of very productive agricultural land to non-agricultural uses such as industries, highways, residential areas and dams. Fertile agricultural land is also diverted to non-food crops. Rising oil prices in 2008 pushed countries to look for substitutes in the form of biodiesel. As cultivation of plant oils reduced production of food grains, prices of the latter increased to such an extent that an additional hundred million people were pushed more deeply into poverty and hunger. Environmental problems such as depleting ground water, degradation of agricultural land, rising salinity and alkalinity of soils and overfishing of oceans will put additional pressure on availability of food. It has also been observed that as food consumption increases with rising incomes, it is accompanied by a shift away from staples towards livestock products. Food grains are fed to animals and then consumed indirectly, in the process reducing the amount of food available for humans. (For instance, it takes 2.7 kg of grain to produce a kilogram of chicken.)

Producing enough food to feed the world's population and then ensuring that it is equitably distributed is a major concern for humanity. Yet it is a concern that must be addressed earnestly and immediately.

Urban Geography: Historical Development

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Introduction

Urban geography is the study of areas which have a high concentration of buildings and infrastructure. These are areas where the majority of economic activities are in the secondary and tertiary sectors. They often have a high population density. When geographers study urban areas, they consider location, land use, and functions of the city. Urban geography is that branch of science which deals with the study of urban areas, in terms of concentration, infrastructure, economy, and environmental impacts. It can be considered as a sub-discipline of the larger field of human geography with overlaps of content with that of cultural geography. It can often overlap with other fields of study such as anthropology and urban sociology. Urban geographers seek to understand how factors interact over space, what function they serve and their interrelationships. Urban geographers also look at the development of settlements. Therefore, it involves planning city expansion and improvements. Urban geography, then, attempts to account for the human and environmental impacts of the change. Urban geography focuses on the city in the context of space throughout countries and continents. Urban geography forms the theoretical basis for a number of professions including urban planning, site selection, real estate development, crime pattern analysis and logistical analysis.

Meaning and Definition of Urban Geography

Various geographers have given numerous definitions of Urban Geography in the spatio-temporal context. A few definitions are as follows:

"Urban geography includes the site, evolution, pattern and classification of towns".

-G. Taylor

"Urban geography is in fact the intensive study of towns and their development in all their geographical aspects". **- L.D. Stamp**

"Urban geography is concerned with interpreting the patterns and relationship, that exists within urban areas on the one hand and between urban areas on the other". **-H. M. Mayer**

"Urban geographic investigations are concerned primarily with the areal variation within and among cities, including the relationships between urban and non-urban area, and forces of development and change that are shaping the urban landscape". **-Pater Sholar**

"Urban geography deals with spatial aspects of urban development and non-urban areas as they relate to cities. The concern is with determining the areal pattern associated with urban centres and in explaining their arrangements". **-R.E.Murphy**

According to Mayer and Kohn "The study of urban geography is largely a product of twentieth Century. Early writers devoted much of their attention on the physical sites of urban places and to their situation. It is closely related with the other branches of geography in terms of location and structure of specific cities and the land they occupy" (Fig-1).

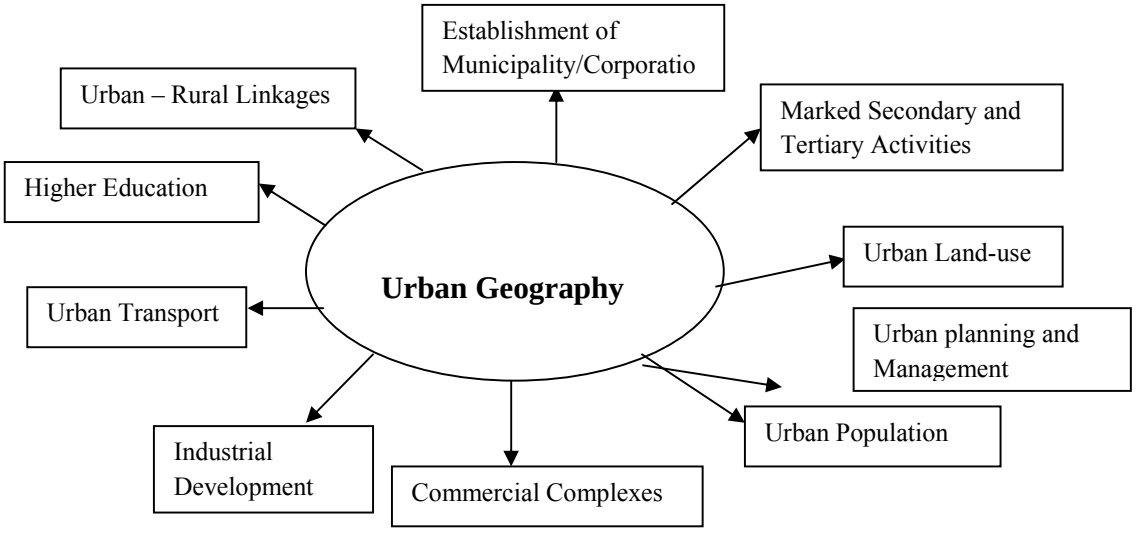

Fig: 1- Subject matter of Urban Geography

Changing Field of Urban Geography (*History of Urban Geography*)

Urban geography is the contemporary recent branch of Geography. It was not taught as a special branch of the subject prior to the Second World War It was the Chicago school of Sociology, and not geographers, who initiated the study of urban space (Fyfe and Kenny, 2005). Early urban geography was characterized by historical studies that saw physical morphology to be a determinant of urban development, or regional studies that looked at the different relations between towns. By way of contrast, Chicago sociologists studied human ecology, gathering data through social surveys and participant observation, and producing rich urban ethnographies. It was not until the mid-1950s that geographers, drawing heavily on sociology and neo-classical economics, and on the locational theories of geographers Chauncey Harris and Edward Ullman, systematized the sub-discipline of urban geography. Over the next 50 years, urban geography advanced to a central position in the discipline.

By the 1960s and 1970s, urban geographers had become key players in the quantitative revolution. Urban geographers adopted locational analysis, the philosophy of positivism and the methods of spatial science as the tools of their trade. The economy of cities was central to their work and a number of urban geographers sought to translate their theories into urban policy prescriptions for the revitalization of de-industrializing cities. The theoretical models associated with this spatial science, such as central place theory, industrial location theory, urban factorial ecology and the rank size rule, was the backbone of a broadly (neo-) classical school of analytical urban geography. At the same time, there was other work on the city in geography that resisted the orthodoxy of spatial science. Kevin Lynch's (1960) *The image of the city*, provided a sort of behavioural geography that looked at people's perceptions of the urban environment by analysing their mental maps, and prefigured, in radically different form, recent work on the city as text, and the body and the city.

By ***the early 1970s,*** however, spatial science was being criticized for not explaining the social processes behind the spatial patterns being mapped and modeled, and two alternative theoretical frameworks emerged – one from Marxism, espousing a radical political economy approach, and the other from humanism, drawing on the pragmatism and the more interpretative methods (as opposed to the models) of the Chicago School. These approaches are evident in two very different books that focused on the city – David Harvey's (1973) *Social Justice and the City* and David Ley's (1974) *The black inner city as frontier outpost: images and behaviour of a Philadelphia neighbourhood*. The former rejected liberal assumptions about the city and began to expose the structural logic of capitalism and its role in social inequality; the latter was interested in how individuals experienced the city and the values and meanings they attached to it. Although focused on the city, these books are often seen to be studies in social geography – this mirrors the fact that studies of the urban at this time began to dominate other sub-disciplines, including also cultural geography, economic geography and political geography and sub-disciplinary boundaries became more blurred. Indeed, cities were being analysed by social geographers such as Ceri Peach and Fred Boal.

From ***the late 1970s***, global economic (and, indeed, the associated social) restructuring significantly expanded the scope of urban geography. New research agendas emerged looking at financial capital, silicon landscapes, telecommunications networks, the new urbanism, the new (urban) middle class and global cities. Research interests moved away from the inner city to the suburbs and edge cities and, indeed, outwards from the metropolitan to the global scale. Those that did choose to study the inner city looked at urban revitalization initiatives and festival marketplaces, and began to theorize processes of gentrification.

The geographical literature on gentrification that was to become so central to urban geography in the 1990s saw its genesis in the mid1980s with the publication of Smith and William's (1986) *Gentrification of the city*. In this edited collection, theoretical debates raged between structure and human agency. From this point on, urban geographers began to seek a more sophisticated conceptualization of agency in an urban geography that was dominated by political economy. In the late 1980s, Marston, Towers, Cadwallader and Kirby (1989) argued, in a chapter titled '*The urban problematic'*, that urban geography was suffering from a decline in its vitality due to the crippling historical legacy of outmoded approaches, but that it was beginning to move into new areas of research and expertise. In the 1980s, two distinct but overlapping developments – feminism and postmodernism – began to permeate urban geography. Feminism charged urban geographers to look at the lives of women in the city and to reconsider urban theory in the light of feminist theory (McDowell, 1983), whilst postmodernism forced urban geographers to consider the privileging of one urban theory over another, the social construction of the urban, and the fact that there were differences in the city other than class and race/ethnicity, such as gender, age, sexuality and disability.

In the 1990s, the import of feminism and postmodernism forged the cultural turn in social geography and the subsequent emergence of the new cultural geography in the discipline as a whole. As a result of urban geography's relatively greater attachment to quantitative and applied

work, the strong influence of political economy, and its long tradition of empirical and practical research, it embraced the cultural turn relatively late. This state of affairs was nowhere more apparent than in the debates over gentrification that dominated urban geography at this time. In the early to mid-1990s, debates over the causes of gentrification became stalemated between Neil Smith's political economy production explanation and David Ley's humanist consumption explanation – demonstrating to many geographers the necessity of challenging and (re)negotiating such meta narratives. In some respects, however, the slower import of the cultural turn into urban geography was fortuitous, as it meant that urban geography was able to avoid many of the allegedly immaterial excesses in which social and cultural geography became embroiled (Lees, 2002). Over time, interest in the identity politics of difference in the city grew, culminating in the notion of 'cities of difference' (Fincher and Jacobs, 1998). The hegemony of human-centred urban theories was questioned so that non-human actors, such as animals, began to be included in urban theory, leading Wolch, West and Gaines (1995) to construct a trans-species urban theory. And urban geographers began to integrate the study of language and culture into urban geographical analysis much more fully.

In many ways symptomatic of the fact that more or less everything and everywhere had by now become urban and that urban geographers identified themselves less as urban geographers and more as feminist, postmodernist, Marxist or population geographers, in 1993 Nigel Thrift proclaimed an 'urban impasse' – the loss of the urban as both a subject and object of study. Nevertheless, refocusing on the urban as a subject and object of study, there was a proliferation of work in the 1990s on global cities and on global economic restructuring. Certain cities emerged as the command and control centres of global capitalism – cities such as New York, London and Tokyo. Sassen (1991) argued that such global cities are characterized by an hourglass socio-economic profile, with growth at the top and bottom ends and decline in the middle ranks. Hamnett (1994) refuted this claim, arguing that the outcomes of globalization in cities are mediated by national and city specifics. Rather than focusing on individual cities, Beaverstock, Smith and Taylor (2000) examined the networks that connect such world or global cities. Drawing on sociologist Manuel Castells' (1996b) *The rise of the network society*, they argued that global cities should be studied less as places and more as a process located in a networked space of flows.

The notion of global or world cities, though, is very much from the point of view of the West. And urban geographers are increasingly critical of the hegemony of the West in urban theory, evidence of the impact of post-colonialism on urban geography. Countering this hegemony, urban geographers are now complicating the dichotomy between the urban North and South in terms of both urbanizations and urbanism, and between First World and Third World cities. Unlike McGee's (1971) pioneering work on Third World cities, which called for urban models to be sympathetic to the cultural and historical backgrounds of such cities, contemporary work on Third World cities argues that in an era of globalization a process of convergence has emerged such that there should now be a single urban discourse that is inclusive of all cities. Chakravorty (2000), for example, uses Calcutta to demonstrate concerns about Third World cities being

viewed separately from the development of First World cities, and argues that urban development in one part of the globe cannot be understood without reference to urban development elsewhere in the world. This idea that urban processes are now converging around the globe can also be seen in the gentrification literature. For gentrification is now seen to be a process of 'new urban colonialism' occurring all over the globe from Brazil to Poland to Japan. Also linked to global economic restructuring, post-socialist cities have come under the lens of urban geographers. There has been some research on post-socialist eastern and central European cities, but more recently there has been a proliferation of research on the 'market socialism' of contemporary Chinese cities. Perhaps not surprisingly, it seems to be the economically successful cities that attract the most research. Jenny Robinson (2004) asks how it is possible to write across diverse urban contexts, which are distinctive and unique, but also interconnected and part of widely circulating practices of urbanism. She argues that suggestions that growing convergences between cities of the 'North' and the 'South' make them more comparable are a little misleading, and that the ambitions of post-colonialism suggest that simply universalizing Western accounts of cities is inappropriate. Instead, she suggests that if we are to engage in a properly comparative or transnational urbanism we need to excavate and disturb some long-standing and frequently taken-for-granted assumptions about how urban geography deals with differences among cities. She argues that two key concepts have led urban studies to this impasse – the concepts of modernity and development. These have to be unpacked and urban geography allowed to learn from the diverse tactics of urban living around the world.

As urban geography entered the twenty-first century, Michael Dear (2000) proclaimed that 'the dominance of the Chicago model is being challenged by what may be an emergent ''Los Angeles School'' . Like the Chicago School, the LA School is not a geography school; rather, the LA School is made up of scholars largely, but not solely, based in the Graduate School of Architecture and Urban Planning at UCLA, even if many of those scholars are in fact geographers. Where Chicago was seen to be the exemplar of the old, modern, industrial city, Los Angeles is touted as the exemplar of the new, postmodern, post-industrial city. With its decentred urban sprawl, gated communities and edge cities, LA is (re)presented as the prototypical postmodern urban landscape – multinucleated, disarticulated and polarized. The city has become so unpredictable that the School represents it as a centreless urban form, a keno gameboard in place of the Chicago School's concentric rings of industry and settlement. Yet this new representation is still subject to the forces of capitalism. Dear even invents a new language for the new urban processes to be found in LA to signify the distinctiveness of postmodern urbanism – words such as 'cybergoisie' (elite executives and entrepreneurs), 'protosurps' (marginalized surplus labour), 'commudities' (commodified communities) and so on. Most geographers have been critical of claims about the paradigmatic status of Los Angeles. Nijman (2000) has argued that Miami, which also experiences the same issues, but at a smaller and as a result more intense scale, is more deserving of the status of quintessential post- modern city; whilst other authors have criticized the 'thin' methodologies behind the LA School's research. In time to come, 'postmodern urbanism' may become one of the definitive statements of the LA

School, ‘notable more for its intellectual bravado than theoretical displacement’ (Beauregard, 1999): on the other hand, all that is not solid also melts into air.

At the same time as urban geography has taken on board the interpretative turn, it has begun to move in another direction too, towards what Batty (2000) calls ‘the new urban geography of the third dimension’. Here, the approach is quantitative rather than qualitative, and studies use data sets to detect fine-scale, intensive and extensive, patterns in metropolitan areas. In this work, GIS and modelling are the central techniques not textual, semiotic or discourse analysis. This reminds us that urban geography covers a large community of researchers, using different approaches to study the urban. In contrast to the LA School’s representational turn, Amin and Thrift’s (2002) *Cities: reimagining the urban* demonstrates a non-representational turn (see non-representational theory). Amin and Thrift argue that cities are too intricate and as such are difficult to generalize, thus voicing the limits to representation encountered in the hermeneutic tradition. They argue that the city is a spatially open entity, cross-cut by various mobilities – people, information, commodities – and as such to properly engage with the ‘multiplexity’ of the city we have to recognize that cities are the ‘irreducible product of mixture’. This way of looking at the city has implications for how we define urban life and for a new politics of the city.

In recent years, urban geographers have become more confident of their position again. Aitken, Mitchell and Staeheli (2002) maintain ‘that [urban] geographers are [now] at the forefront not only of understanding contemporary urban space, but also of imagining and mapping its futures’. No doubt connected to this new confidence, urban geographers have begun to reflect on the post war development of urban geography, to which the numerous special issues devoted to this in the journal Urban Geography over the past few years attest. Urban geographers have also begun to reengage more clearly with questions of urban policy, and to promote an urban geography that critically evaluates urban theory and methods and has a social change and/or justice agenda. This ‘new’ urban geography has practical relevance and resonance, and the material engages with, and works through, substantive political engagement.

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Youth and Climate Change

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Climate change is one of the most critical global challenges of our times. Recent events have emphatically demonstrated our growing vulnerability to climate change. Climate change impacts range from affecting agriculture, further endangering food security, to sea-level rise and the accelerated erosion of coastal zones increasing the intensity of natural disasters, species extinction, and spread of vector-borne diseases. This issue is of immense importance for every global citizen. Hence it requires an initiative against it globally.

Human activities, such as the use of fossil fuels, deforestation and unsustainable agriculture contribute to climate change, which decreases the availability of nutritious food and clean water, and destroys ecosystems and secure living environments. This leads to malnutrition, ill health and migration, rendering youth particularly vulnerable. At the same time, youth constitute the majority of the population in many countries and have an increasingly strong social and environmental awareness, which has the power to transform our societies towards a low-carbon and climate resilient future. Today's youth stands at the climate change frontier. The current actions taken on the part of the governments, the private sector and the civil society will determine what future climate is bringing for them and how well prepared they are for what is to come. The large number of today's youth is growing up in those parts of the world which are likely to be hit hardest by climate change impacts. The strong need therefore, arises to address their capacities in taking on the challenges that stand before youth. For this, there is a need to view holistically the lives and opportunities for young people.

The United Nations, Youth and Climate Change

The United Nations System recognizes the key role that youth play in tackling climate change and works closely with youth-led and youth-focussed organizations around the world through the United Nations Joint Framework Initiative on Children, Youth and Climate Change (Joint Framework Initiative). Since 2008 the Joint Framework Initiative has been coordinating efforts by sixteen intergovernmental entities and many youth organizations to empower youth to take adaptation and mitigation actions and enhance effective participation of youth in climate change policy decision-making processes.

- The Food and Agricultural Organization of the United Nations (FAO) supports the development of food security and climate change educational programmes.
- The United Nations Development Programme (UNDP) implements the Global Environment Facility's Small Grants Programme, which provides funding for projects on mitigation or adaptation to climate change proposed by youth organizations or non-governmental organizations that work with youth.
- Through its Climate Change Education for Sustainable Development Programme, the United Nations Educational, Scientific and Cultural Organization (UNESCO) supports

the development of national climate change education programmes, policies and resources.

- With the *YouthXchange* initiative UNESCO and United Nations Environment Programme (UNEP) support youth projects on sustainable lifestyles in 45 countries around the world.
- UNEP adopted a long-term Tunza Youth Strategy for engaging youth in environmental activities in the areas of capacity-building, environmental awareness and information exchange, with a vision to foster a generation of environmentally conscious citizens, capable of positive action.
- The United Nations Human Settlements Programme (UN-HABITAT) supports youth-led groups through its Urban Youth Fund and 'One Stop Youth Resource Centres' to develop programmes to mitigate the effects of climate change in urban areas.
- The United Nations Children's Fund (UNICEF)'s Climate Change Adaptation and Disaster Risk Reduction teams have greatly contributed to the introduction of Education for Sustainable Development (ESD) for the past eight years through the Inter-Agency Committee (IAC) of the United Nations Decade of Education for Sustainable Development (DESD 2005-2014). As 2013 IAC Chair, UNICEF is prioritizing programmes that support adolescence and girls/youth empowerment.
- The United Nations Institute for Training and Research (UNITAR) supports, through UNCC:Learn , a long-term and strategic approach to climate change education which includes designing national strategies, developing learning materials for both formal and non-formal learning contexts, and raising international awareness of the need to integrate climate change fundamentals into national curricula.
- The United Nations Framework Convention on Climate Change (UNFCCC) secretariat coordinates the work of the Joint Framework Initiative. It also works closely with the rapidly expanding UNFCCC observer constituency of youth non-governmental organizations (YOUNGO) to support the substantive engagement of youth in the intergovernmental climate change process through the organization of high-level briefings with decision makers, capacity-building events for youth organizations, the facilitation of youth participation from developing countries and virtual participation of youth around the world who cannot attend UNFCCC conferences.

The Way Forward

Youth could play a crucial role in combating climate change. The young generation inhabits the Earth and inherits the responsibility to protect the planet, in fighting the complex scientific problems and social quandaries presented by climate change. Youth education represents one of the most effective tools to combat the destructive potential of climate change and cultivate an international understanding among members of the next generation since it is a long-term process that will impact an infinite number of future generations.

As per the 60th annual DPI/NGO conference organized by the United Nations Department of Public Information (DPI) in collaboration with the NGO/DPI, an executive committee meet on "Climate Change: How It Impacts Us All" was held from September 5 to 7, 2007, at the United Nations Headquarters.

The theme of International Youth Day, 2008, was "Youth and Climate change: Time for action." In his address, Ban Ki-moon, Secretary-General of the United Nations said young people who are adept at spreading new habits and technologies are well placed to contribute to the fight against climate change. Mr. Ban stressed: "*They (youth) are adaptable and can quickly make low-carbon lifestyles and career choices a part of their daily lives. Youth should therefore be given a chance to take an active part in the decision-making of local, national and global levels. They can actively support initiatives that will lead to the passage of far-reaching legislation.*" A more defined role should be given to the youth to prevent the impact of climate change. It is essential to conduct major studies among youth regarding awareness about climate change as well as role of youth in combating climate change.

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Sustainable Livelihoods: Need and Approaches

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Introduction

The concept of "livelihoods" has gained wide acceptance as a valuable means of understanding the factors that influence people's lives and well-being, particularly those of the poor in the developing world. "A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintains or enhances its capabilities and assets both now and in the future, while not undermining the natural resource base" (Department for International Development, DFID 2000).

Many local and external factors influencing livelihood include markets, the physical environment and the social, legal and political environment. Just as peoples' livelihood opportunities and their patterns of assets and incomes are determined by wider political and economic processes, vulnerability to disasters is also a function of this wider environment. All the vulnerability variables are inherently connected with peoples' livelihoods (lower vulnerability is likely when livelihoods are adequate and sustainable), and with poverty (in most disasters, it is mostly the poor who are disproportionately more vulnerable than other groups, and much less capable of recovering easily).

There is generally a very high – but not absolute – correlation between the chance of being harmed by natural hazard events and being poor. In which case, it should follow that development work that reduces poverty should also be instrumental in reducing disaster vulnerability. But the relationship does not seem to be that straightforward, and there seems to be general acceptance that advances made in development projects and progammes can be wiped out in a matter of minutes or hours by a sudden hazard impact, or over months by persistent drought. And in any case, much disaster relief and recovery assistance fails to take account of the need to support livelihoods and future resistance to hazards by reducing vulnerability as well as dealing with peoples' immediate needs.

Therefore, when disasters occur, the key point should be to ensure that *relief and recovery is tied into the restoration and reinforcement of livelihoods*, and also to the strengthening of self-protection and the reinforcement of social protection (e.g. through support to relevant institutions).A full and useful assessment of sustainable livelihoods must involve three steps: first, identifying potential threats, second, identifying vulnerabilities, and third, assessing the capacities and resources of the community.

Step 1: Identifying potential "threats"

There are three basic categories of threats (derived from Anderson & Woodrow's Capacity and Vulnerability Framework):

- *Those based in nature*; such as earthquakes, cyclones, droughts, floods, or pathogens.
- *Those based in violence*; such as war, intimidation, harassment, or sexual assault.

- *Those based in deterioration*; such as declining health, education and other social services, trade shifts, government policy or environmental degradation.

Step 2: Identifying Vulnerabilities

There are three basic characteristics that make some groups more vulnerable than others:

- *Proximity and exposure*: people who live or work near some kind of hazard are more vulnerable than those who don't.
- *Poverty*: people who have fewer options, few resources and few reserves can be pushed over the "edge" of survival more easily than those who are wealthier.
- *Exclusion / marginalisation*: People who are left out of economic and social systems or lack access to social services due to religion, race, gender, class and other factors are vulnerable.

Step Three: Assessing People's Capacities to Prevent or Cope with Threats

It is important to know what useful capacities exist in a country or region, or within a National Society, community or individual, as well as what external resources are needed to cope with threats.

People's capacities can be understood in three categories:

- *Physical and material*: people have physical resources that they rely on to survive and to lead a satisfying and dignified life, such as cash, land, tools, food, jobs, energy sources or access to credit and borrowing capacity.
- *Social and organisational*: for example, communities which are close-knit and have social networks to support each other, where there is good leadership, and where people share the physical resources they have in times of need, are more likely to survive.
- *Skills and attitudes*: those people with skills, knowledge and education can have more choices and a greater ability to improve their conditions. When people are dependent on others and feel victimised by events outside their control, they have few attitudinal capacities.

The completion of all three steps produces a Vulnerability and Capacity Assessment.

Sustainable Livelihoods Approaches

Sustainable Livelihood approach is a recent conceptual development which starts from a development standpoint and puts livelihoods at the centre of discussion. Sustainable Livelihoods Approaches (SLAs) prioritize people's assets (tangible and intangible); their ability to withstand shocks (the vulnerability context); and policies and institutions that reflect poor people's priorities, rather than those of the elite. Many multi-lateral, bi-lateral, and non-government agencies believe that using a sustainable livelihoods approach is a sensible and practical way of thinking about, planning and implementing development.

Many people and institutions are involved in developing Sustainable Livelihoods (SL) theory. Three approaches are considered in this paper. The principal one is the SL approach that has been developed by a number of researchers and institutions and is now being promoted by DFID (Department for International Development, UK). The other two discussed are those of UNDP and CARE. UNDP's model is considered with regard to its thinking on vulnerability, and CARE's approach with regard to its application specifically to disaster contexts.

DFID's Sustainable livelihoods framework

The UK Department for International Development (DFID) was one of the first proponents of the SL approach. A sustainable livelihoods approach represents a positive evolution in thinking around poverty elimination, and differs from previous approaches to development in that:

- It puts people at the centre of development. People - rather than the resources they use or the governments that serve them - are the priority concern
- It builds upon people's strengths rather than their needs.
- It brings together all relevant aspects of people's lives and livelihoods into development planning, implementation and evaluation.
- It unifies different sectors behind a common framework.
- It takes into account how development decisions affect distinct groups of people, such as women compared to men, differently.
- It emphasises the importance of understanding the links between policy decisions and household level activities.
- It draws in relevant partners whether State, civil or private, local, national, regional or international.
- It responds quickly to changing circumstances.

The aim of the SL framework is to help stakeholders engage in debate about the many factors that affect livelihoods, their relative importance and the way in which they interact. This should help in identifying appropriate entry points for supporting livelihoods. It is emphatically participatory, believing that only participatory approaches can identify problems and solutions.

Application of the SL approach to disaster contexts

In the context of disaster, there is a link between SL perspectives to different stages in the relief to development continuum.

> In the *relief* stage, the emphasis is on livelihood provisioning. Such activities focus on meeting basic needs such as shelter, food and water.
>
> In the *relief* to *rehabilitation* stage, the aim is to prevent further erosion of productive assets or coping strategies and to help households re-establish their livelihoods. Short-term interventions may include food-for-work or cash-for-work.

The stage of moving from *rehabilitation* to *mitigation and preparedness* comprises medium-to long-term rehabilitation-to-development activities that aim to build up assets and improve household production, consumption and exchange activities. Livelihood promotion strategies are focused on longer-term asset building to improve access to resources and mitigate future shocks and stresses.

It is pointed out that while the livelihoods approach is based on holistic analysis, it does not necessarily lead to holistic or multi-sectoral projects. The intervention strategy must be focused.

Conclusion

Vulnerability is too complicated to be captured by models and framework. There are many dimensions to it: economic, social, demographic, political and psychological. There are so many factors making people vulnerable: not just a range of immediate causes but a host of root causes too. Investigations into the working of human society and human societies are complex – so complex and diverse that they easily break out of any attempts to confine them within neatly drawn frameworks, categories and definitions. They are also dynamic, in a state of constant change, and because they are complex and diverse, all the elements within societies are moving, so that these changes occur in different parts of society, in different ways and different times.

Bioremediation: A Process of Cleaning the Environment

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Bioremediation is the use of living organisms for the cleaning up of a contaminated medium such as soil, sediment, air, or water. "Remediate" means to solve a problem and "bioremediate" means to use biological organisms to solve an environmental problem such as contaminated soil or groundwater.The process of bioremediation might involve the introduction of new organisms to a site or the adjustment of environmental conditions to enhance degradation rates of indigenous fauna. Bioremediation can be applied to recover brown fields for development and for preparing contaminated industrial effluents prior to discharge into waterways. Bioremediation technologies also are applied to contaminated wastewater, ground or surface waters, soils, sediments, and air where there has been either accidental or intentional release of pollutants or chemicals that pose a risk to human, animal, or ecosystem health.

Approaches

Different approaches to bioremediation take advantage of the metabolic processes of different organisms for degradation or sequestering and concentration of different contaminants. For example, soil bioremediation might be performed under either aerobic or anaerobic conditions, and involve the optimization of the metabolic pathways of bacteria or fungi for degradation of hydrocarbons, aromatic compounds, or chlorinated pesticides. Phytoremediation is a type of bioremediation that uses plants and often is proposed for bioaccumulation of metals, although there are many other different types of phytoremediation.

Effectiveness

Bioremediation is most effective when performed on a small scale. The 1986 Chernobyl nuclear disaster, for example, was far too catastrophic to be positively affected by bioremediation efforts and is essentially beyond repair. A real-life example of bioremediation is adding nutrients to the soil to enhance bacterial degradation of contaminants and increase the rate of bioremediation on a brownfield site. Bioremediation was used extensively to combat the devastating effects of the Exxon Valdez oil spill in 1989 and BP's Deepwater Horizon oil spill in 2010.

In both oil spills, microorganisms were used to consume petroleum hydrocarbons and played a significant role in reducing the environmental impact. Bioremediation provides a good cleanup strategy for some types of pollution, but it will not work for all. For example, bioremediation may not provide a feasible strategy at sites with high concentrations of chemicals that are toxic to most microorganisms. These chemicals include metals such as cadmium or lead and salts such as sodium chloride.

There are two strategies of bioremediation used. The two strategies are:

In-situ Bioremediation Strategies

In situ refers to when contaminated waste is treated right at its point of origin. For example, there may be soil that is contaminated. Rather than remove the soil from its point of origin, it is

treated right where it is. The benefit to in situ treatment is that it prevents the spread of contamination during the displacement and transport of the contaminated material.

- **Bioventing** – blowing air through soil to increase oxygen rates in the waste. This is an effective way to neutralize certain oxygen sensitive metals or chemicals.
- **Bioleaching** – removing metals from soil using living organisms. Certain types of organisms are drawn to heavy metals and other contaminants and absorb them. One new approach was discovered when fish bones were found to attract and hold heavy metals such as lead and cadmium.
- **Bioaugmentation** – adding microbes and organisms to strengthen the same in waste to allow them to take over and decontaminate the area.
- **Biostimulation** – the use of microbes designed to remove contamination applied in a medium to the waste.

Ex-situ Bioremediation Strategies

Ex situ refers to treatment that occurs after the contaminated waste has been removed to a treatment area. To use soil as the example again, the soil may be removed and transported to an area where the bioremediation may be applied. The main advantage to this is it helps to contain and control the bioremediation products, as well as making the area that was contaminated available for use.

- **Land farming** – turning contaminated soil for aeration and sifting to remove contaminants, or deliberately depleting a soil of nitrogen to remove nitrogen based organisms.
- **Bioreactor** – the use of specially designed containers to hold the waste while bioremediation occurs
- **Composting** – containing waste so a natural decay and remediation process occurs.
- **Phytoremediation** – use of plants to remove contaminants. The plants are able to draw the contaminants into their structures and hold on to them, effectively removing them from soil or water.

Factors Responsible for Bioremediation to be Effective

The major advantage of the bioremediation methods is that it allows for contamination to be treated, neutralized or removed and then produces a waste product itself that is more easily disposed of. In some cases, there is no need for disposal at all. In the case of the plants used in phytoremediation and rhizofiltration, the plant is able to do something called bioaccumulation. This means is holds onto the contaminant. As the plant is still growing, there is no need to remove and destroy it. In many ways it is similar to having a rechargeable battery. In the case of contaminated waste, it is the plant that keeps growing to allow for more storage of waste. This is a uniquely cost effective solution for contaminated waste.

- Microbial Population: Suitable kinds of organisms that can biodegrade all of the contaminants

- Oxygen: Enough to support aerobic biodegradation (about 2% oxygen in the gas phase or 0.4 mg/liter in the soil water)
- Water: Soil moisture should be from 50–70% of the water holding capacity of the soil
- Nutrients: Nitrogen, phosphorus, sulfur, and other nutrients to support good microbial growth
- Temperature: Appropriate temperatures for microbial growth (0–40˚C)
- pH: Best range is from 6.5 to 7.5

Advantages of Bioremediation

- Useful for the complete destruction of a wide variety of contamination.
- The complete destruction of target pollutant is possible.
- Less expensive.
- Environment friendly.

Disadvantages of Bioremediation

- Bioremediation is limited to those compounds that are biodegradable.
- Biological processes are highly specific.
- It is difficult to extrapolate from bench and pilot scale studies to full scale field operations.
- Bioremediation often takes larger time than other treatment processes.

Conclusion

There are many different natural contamination processes that occur as a material or substance breaks down. As it moves through its stages of decomposition, varying levels of toxins may be present. That man is capable of creating an enormous amount of contamination is well known. Yet remediating them with unnatural substances has proven not to be the solution. When waste is bioremediated it can be recycled, or at least, stored in such a way that it causes no further harm to the environment around it. Specialists are constantly looking towards the natural decay and remediation processes to understand how they could be manipulated to help manage man-made waste. This will help prevent further pollution from waste, or the products that treat it. Bioremediation is one of the most cost effective and safe solutions we have now to manage contaminated waste.

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Geographers

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Geographers are the scientists who study geography. Geographers study human society and the natural environment, besides studying the interrelationships between them. For instance, geographers study how human society affects the natural environment and how the natural environment, on the other hand, influences the human society. Following are some geographers:

1 .Muhammad Ibn Musa al-Khwarizmi

Muhammad ibn Musa al-Khwarizmi was a Persian scholar who lived between the years 780 and 850 CE. In the year 833 CE, he wrote a book entitled the "Book of the Description of the Earth". The book was a collection of thousands of city coordinates, and borrowed greatly from work by Ptolemy that was published in the 2nd century

2. Alexander von Humboldt

Alexander von Humboldt was born in September 1769 in Berlin. He was an explorer, geographer, polymath, and a naturalist, who is known to be an influential advocate of romantic philosophy and science. Humboldt is also considered to be the father of modern geography.

3. Ptolemy

Claudius Ptolemy was a famous geographer from the time of the ancient Roman Empire, living from the years 100 to 170 AD. Ptolemy is credited with inventing the idea of longitude and latitude, and for mapping thousands of places at a time when this was not yet a common activity, even among educated populations.

4. Ellen Churchill Semple

Ellen Churchill Semple was born on January 8th, 1863 in Kentucky. She studied history but became interested in geography when she visited England. She became the first woman to hold the position of the president of the Association of American Geographers. Semple is known for her support to the theory of environmental determinism.

5. Sir Halford John Mackinder

Sir Halford John Mackinder was born on February 15th, 1861 in Gainsborough, England and was a geographer and politician who was knighted in 1920 for his work. He is well recognized as an educator and famous for his geopolitical concepts. He was a founder of the London School of Economics.

Observations from a Trip to Ziro

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Last December, I with my family, went for a trip to the Ziro Valley in Arunachal Pradesh. Ziro is a census town in Indian state of Arunachal Pradesh. It has been a World Heritage Site for a number of years now, after the Archaeological Survey of India (ASI) in a meeting on 12 December 2002 shortlisted it for inclusion in the Tentative List for nomination to UNESCO for incorporation in the World Heritage Site.

The part of the town which is the centre of economic activities and where the administrative offices are located is called as Hapoli or locally known by the Apatanis as 'Hao-Polyang'. The Apatani tribe settled here several centuries ago and are one amongst very few tribes in the world who practice Danyi – Pilo, a primitive way of worship of the Sun and the Moon. The Apatanis are primarily into farming. Rice cultivation is abundant here which is practiced without the use of farm animals or machines and focuses on using nature-friendly ways. Another fascinating culture popular amongst the Apatani tribe is the paddy-cum-fish culture, where fish is reared in the fields along with the cultivation of rice.

Apatanis have a few unique and special characteristic features which differ from other tribes in Arunachal Pradesh and India. A few of these special characteristic features are that Apatanis are permanently settled in one place whereas many other tribes are nomadic in nature and move from one place to another in search of fertile lands. Apatanis practice permanent wet land cultivation whereas other tribes practice dry land cultivation by clearing the forests by burning the jungles. Another distinguishing feature of the Apatani was tattoos on the faces of their women, a custom that has become less common now.

The Climatic condition is fairly pleasant there throughout the year. In the foothills or low high belt area of the district, the conditions are moderate in comparison to the high belt areas, where during winter it is very cold and chilly, though summers are pleasant. December and January are generally the coldest months, and July and August are the warmest.

Annual rainfall in the south is heavier than in the northern areas of the district. The southern half receives more than 70% of its rain in the monsoon period while in the northern portions this figure is about 60 percent. Variability of rainfall for the monsoon and the year as a whole is relatively small. Average annual rainfall of the district headquarter, Ziro, is 934.88 cm.

Relative humidity is always high throughout the year the winter months being slightly less humid. In the cold season, the sky is obscured on many mornings due to lifted fog which clears with the advance of the day. The area is generally moderately clouded in the period from March to May, heavily clouded to overcast in the monsoon season, and clear or slightly clouded during the post monsoon season. Winds are generally light, but strong katabatic winds blowing down the valleys are experienced due to the local effect of the terrain.

Urban populace of Lower Subansiri district mainly reside in Ziro and as per 2011 census, average urban literacy rate in Lower Subansiri district is 85.52%, and male and female literacy rates are 89.81% and 81.26% respectively. It is worth noting that, as per 2011 census, 84.58% population of Lower Subansiri district lives in rural areas. Literacy rate in rural areas of Lower Subansiri district is 72.27%. The combined literacy rate of 74.35% is second highest in Arunachal Pradesh, next only to Papumpare District where the capital city of Itanagar is located.

Our trip to Ziro was an enjoyable and an enriching experience. As a budding geographer all the practical knowledge that I gained on this trip will prove to be unparalleled to any theoretical knowledge that I can learn in class.

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Mounting Demand and Dwindling Supplies

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We visualize India as a nation surrounded by water on three sides, full of physiographic and cultural diversity, having a water tower (Himalayas) as its crown and blessed with divine streams like Ganga, Indus, Brahmaputra, and Godavari etc. But irony is that, the nation having an ocean to its south and a water tower in the north is heading towards acute water scarcity.

Indian climate is dominated by monsoon winds and out of the total annual rainfall of about 4000 billion cubic meters, nearly 3000 billion cubic meters is received in the rainy season. But nearly half of the total annual rainfall is lost through runoff. Some water is lost through transpiration and some through evaporation and about 433 billion cubic meters of rainwater is added to the underground aquifers. This water is called the total replenishable groundwater.

Mounting demand

India is the second most populous country of the world. Water resources of India that are about 4% of the water resources of world have to support about 17% of world population. Indian population is still growing and consequently the demand for freshwater is also increasing. Continuous increase of population has reduced per capita water availability from about 5100 cubic meters per year in 1951 to only 1500 cubic meter per year in 2017. In addition to this, the country is undergoing rapid industrialization which is also increasing the demand for water. Improvement in living standards of people are also creating increased demand for fresh water.

Granary of today is barren land of tomorrow

We very proudly entitle Haryana, Punjab and western Uttar Pradesh as granaries of India. But this region will not be able to hold this title for long. After the introduction of the Green Revolution, cropping pattern of this region experienced a significant change and farmers started growing water-intensive crops. For example, climatically the region is suitable for wheat cultivation but farmers prefer to grow rice. Since rainfall is not adequate for its cultivation, groundwater is exploited mercilessly. This has resulted in rapid decline of water level in this region. Let's have a look at the situation of Punjab, where the volume of annual groundwater recharge is about 20 billion cubic meters whereas the volume of underground water extracted annually is about 35 billion cubic meters! So predicting today's granary to be a barren land tomorrow is not an exaggeration.

Dwindling supplies

On the one hand, demand for fresh water is increasing while on the other hand, supplies of fresh water are decreasing. The phenomenon of climate change has made rainfall pattern quite erratic. Seepage of industrial and agricultural contaminants is polluting our groundwater. Although several major rivers flow through India, their water is highly polluted, making it unfit even for bathing at most locations. This water, although available, is unfit to be used to meet human fresh

water needs. Lakes of India are also extremely polluted. Extreme pollution of lakes has made the magic trick of fire on water a reality as in the case of Bellandur Lake of Bangalore. The reason behind the extreme pollution is that in rural areas fertilizers, pesticides etc. are used injudiciously and these reach water bodies along with runoff. In India only 38% of urban waste is treated. More than 38000 million liters of waste water enters Indian water bodies' everyday. The increasing pollution of water bodies has resulted in tremendous decline in fresh water availability in the country.

Way ahead

Since 93% of water used in the country is for agricultural purposes, we need to promote water efficient technologies like drip irrigation, sprinklers etc. in agriculture. India's population growth should be curtailed. In urban areas, water supply infrastructure should be properly managed to reduce water loss due to leakages that amounts to one third of total water supplied. Installation of water harvesting mechanisms should be promoted. Water should be properly treated before its discharge into water bodies. Reuse of water should be promoted. Government should formulate rational policies to improve the state of the country's water resources and implement already formulated policies. Each individual should pledge to save water because India's future can only be saved by saving water.

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Nitrogen Pollution

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Nitrogen is a dominant gas in the atmosphere making up 78% of its volume. It is inert and does not react. However, when it is released as part of compounds from agriculture, sewage and biological waste, nitrogen is considered "reactive" and may become a pollutant. Humans have accelerated the nitrogen disaster during the "Green Revolution" period starting in the 1960s with the worldwide adoption of fertilizer-hungry crops. Grain harvests were more than doubled in two decades, but clouds of pollution spread into air and water.

No doubt, fertilizers made from ammonia, a form of nitrogen, help in plant growth and boost crop production. However, only half of the nitrogen rich fertilizers applied by farmers in the form of manure, compost and synthetic fertilizers on their fields, is used by the plants. The rest gets eaten up by hungry soil bacteria and turn it into a greenhouse gas, which is 300 times more powerful than carbon dioxide.

A part of the excessive nitrogen gets washed into waterbodies where it leads to explosion of algae growth which retards the exchange of gases and creates an oxygen -starved dead zone that is a threat to marine life.

Major Causes of Nitrogen Polution

1. Emission from chemical fertilizers
2. Burning of fossil fuels
3. Emission from livestock manure
4. Human sewage (phosphate rich detergents etc.)

Area-Wise Situation of Nitrogen Pollution

India

In India, nitrogen emission grew at 52% from 1991 to 2001 and 69% from 2001 to 2011. There are 18 research institutions in India among a group of 50 institutions called the South Asian Nitrogen Hub (SANH). It has secured about 200 crores from the UK government to assess and study the impact of "nitrogen pollution".

Europe

In Europe, the environmental and human health costs of nitrogen pollution are estimated to be 70-320 billion Euros per year. **Nitrogen Footprint**

Australia has a large nitrogen footprint of 47 kg of nitrogen per person per year. A high animal protein diet appears to be driving Australia's big nitrogen footprint. The consumption of animal products accounts for 82% of the Australian nitrogen footprint. Animal products carry high nitrogen costs compared to vegetable products.

The United States has a nitrogen footprint of 28 kg of nitrogen per person per year.

Key Threats from Nitrogen Pollution

1. Biodiversity loss(marine life)
2. Air, water and soil pollution(Soil infertility)
3. Acid rain
4. Eutrophication-when nitrogen and phosphate rich fertilizers and detergents etc. enter the water bodies along with the run off thus cause excessive growth of phytoplankton and algae that leads to oxygen depletion of that water body and threatens the survival of the marine organisms.

Finding Solutions: A **Rice Breeding Program (China)**

Scientists in China have identified a gene that inhibits nitrogen absorption in rice. The variety of rice is also high yielding and needs less fertilizer. This is underway in China.

In conclusion, the solution to this challenge will need to come from a combination of technological innovation policy and consumer action (i.e. judicious use of chemical fertilizers) and it also requires more researches so that more efficient ways can be developed in this field.

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Coral Reefs

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Coral reefs are like the rainforests of the sea. But corals are not just colorful rocks, millions of tiny living organisms live in them. These rocks are actually the skeletons of polyps. Polyps are basically calcareous organism and over a period of time they deposit over one another and form large colonies that secrete calcium carbonate and brings out different colors. Polyps constantly secrete calcium carbonate to build their protective skeletons. The varied color in their bodies comes from symbiotic named Zooxanthellae that live inside them. As they grow and die, more coral grow on top of dead ones, and over millions of years, corals pile together to form giant coral reefs that create the basis for 25% of all ocean life. Corals appeared in the fossil record 400 million years ago. We basically classify corals in two types, Hermatypic corals and Ahermatypic corals. Hermatypic corals are hard and usually have zooxanthellae which provide corals basically warm colors where most Ahermatypic corals do not have zooxanthellae. Hermatypic corals are reef building while Ahermatypic do not contribute to the development of coral reefs. Ahermatypic are definitely found in ocean bottoms and these are less colorful.

Corals also controls the presence of carbon dioxide in the ocean. They take carbon dioxide out of water and use it to build their calcium carbonate skeleton. But today, corals are in danger. Actually zooxanthellae, in the presence of sunlight, convert carbon dioxide and water into glucose and oxygen and provide food or energy to corals. The zooxanthellae can tolerate a very narrow range of temperature, if the temperature suddenly goes too high or too low beyond the limit, the zooxanthellae comes under stress and stop providing food/energy. They move away from the corals to the coral as a result of which the corals turn white or colorless. This is called bleaching of corals. Corals are very sensitive to water temperature, water acidification, overfishing,etc. A study of corals over a period of forty two years has revealed that only a sixth of corals are left on the earth. The caribbean region has lost 50% of its corals since 1970. According to studies, the Parrotfish might be a coral savior; as corals are found to be thriving where parrotfish live. Coral reefs are very important in many ways; coral reefs protect coastlines from the damaging effects of wave action and storms. They are also helpful for nutrient recycling. They provide habitats and shelter for many marine organisms, also helping the fishing industry because many fish spawn there and juvenile fish spend time there before making their way to the open sea. According to one estimate, the total annual earnings of coral reefs in the world are $29. 8 billion. We need to protect coral reefs by not touching coral reefs, by reducing environmental damages, and not sending chemicals into waterways. These are some ways which help us to protect coral reefs.

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पर्यावरण - मनुष्य का तालमेल

प्रज्ञा बिष्ट, बी. ए. (H) भूगोल, द्वितीय वर्ष, शिवाजी कॉलेज

जहाँ बैलो से ही पहले
किसानो की आजीविका चल जाती थी
वहाँ अब बड़े- बड़े ट्रको ने
उनके माथे के पसीने को कम करा है

अद्भुत है यह मशीनीकरण
समय की बचत तो करता है परंतु
पर्यावरण के लिये विष समान है ....
स्वयं का जीवन आरामदायक बनाने हेतु
आज मनुष्य दूसरी प्रजातियो का विरोधी बन गया है

ज़मीन की गर्भ से आज हम भूगोल पढ़ पाए
पर क्या होगा जब यह ज़मीन ही ना रह जाए
जब तक पात्र है उसका उपयोग होता रहेगा
पर सही ढंग से उपयोग ना किया तो....
जीवन जीने योग्य नही रह जाएगा

एक ओर तो गाय को पूजते है
पर उन्ही को प्लास्टिक खाता देख अनदेखा कर देते है
हाय ! ये मनुष्य ज़मीन से जुड़ा होते हुए भी ....
ज़मीन की समझ से कितना दूर है ॥

Zero Waste Lifestyle

Tanya Chaudhary (B.A. (H) Geography 3rd year, Shivaji College

"I only feel angry when I see waste. When I see people throwing away things we could use." This quote by Mother Teresa aptly defines the philosophy of a zero waste lifestyle which encourages individuals to live by reducing, reusing and recycling their daily resources. The goal is for no waste to be sent to landfills and incinerators.

What is Zero waste?

We currently live in a linear economy where we take resources from the earth and then dump them in a landfill. The goal of zero waste is to move to a circular economy where we write trash out of existence. Instead of discarding resources, we create a system where all resources can be resumed fully back into the system

The definition adopted by the *Zero Waste International Alliance* (ZWIA) is:

Zero Waste: The conservation of all resources by means of responsible production, consumption, reuse, and recovery of all products, packaging, and materials, without burning them, and without discharges to land, water, or air that threaten the environment or human health.

Zero waste refers to the management and planning approaches which emphasizes on waste prevention not only through reducing, reusing and recycling but also by focusing on production and distribution methods. Zero waste is a goal that provides a guiding principle towards continuous waste reduction.

'Why' adopt a zero waste lifestyle?

According to the World Bank's new '*What a waste 2.0: A Global Snapshot of Solid Waste Management to 2015*' report "without urgent action, global waste will increase by 70% on current levels by 2050" The per capita waste generation is 1.2kgs per day per person, however global averages are just broad estimates and the situation is much more severe than it appears. We live in a disposable society where we don't value our belongings, and we're consuming way too many resources. Our excessive consumption of resources not only creates waste but also increases our individual carbon footprint. A carbon footprint is defined as the total emissions caused by an individual, event, organization, or product, expressed as carbon dioxide equivalent. Greenhouse gases emitted through the production and consumption of food, fuels, manufactured goods, materials, wood, roads, buildings, transportation etc also increase global warming. Besides overconsumption, all the waste that is ending up in landfills is toxic. It's responsible for 20% of the methane emissions and landfills aren't aerated for proper decomposition of natural materials. Toxins from cleaners, batteries, small electronics (and other items that shouldn't be landfilled) leach into the soil and can run off into the ocean and ground water when it rains.

To live a healthy and long life it's necessary for us to control and manage our waste. Since this is the only planet we have; we should try and preserve it for our future generations.

‘How’ to adopt zero waste?

Adopting a zero waste lifestyle is a process that will happen over time. One cannot shift to it overnight, it’s a slow process that requires quite an effort in adjusting to. One can begin with finding out where you are making a lot of waste and working on that part. Avoid using disposable items like plastic cutlery and utensils. Instead of getting take-out and buying packed food items try making packed lunches at home. Don’t buy household items in bulk. Replace them as they run out with zero waste alternatives. Lastly research how to properly recycle old items, donate them or up cycle them. Since all items cannot be recycled it’s better to reduce their consumption or reuse them. This is probably the reason why recycle comes last in ‘*Reduce, Reuse and Recycle*’

As individuals living in the 21st century we cannot get through a single day without having an impact on the world around us. What we do makes a difference and it’s up to us to decide what kind of difference we want to make.

Tiger Extinction

Ankit Yadav (B.A. (H) Geography 3rd year, Shivaji College

Once a cub asked his mom
Aren't we tigers?
So, who do we hide from?
I heard from dad
We used to rule this land
Those days came to an end
I heard from my friend
We were honored until
To win we kill
But it's no big deal
After all it's our meal
To mess with us none has dared
Then why so sudden are we scared?
I saw those calves playing around
Those fawn out there jump round and round
Every baby is enjoying childhood
And we the princes spend our day
Hiding behind this wood
Why our childhood is ruined this way
Why can't like others we step out and play

These questions of baby made the mother cry
To sum up the curiosity she made this reply
You are right my child
We were rulers of wild
There is no reason of lying
The fact is, I don't know why but we are dying
We were before a lot in number
And now we are left just a few
Where the family is gone every tiger wondered
We are not afraid of the battle of wild
We are afraid to lose our community
The war of existence is difficult to fight
The cub with tears hugged his mom
He got his answer
The fear of extinction they were hiding from …

Need for Public Awareness about Environment

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The Earth is the only known life-supporting planet in the solar system. The fresh water, atmosphere, favourable climatic conditions are few features which led to the formation of life in the pre-historic era. But now, the same planet is facing difficulty in running its natural systems. Excessive demands of human beings are leading threats to the planet and as a result, to themselves. As we know our natural resources are degrading rapidly, about 80% of water resources are polluted. Rivers such as Ganga, Yamuna, Cauvery, Godavari as well as their tributaries are highly polluted.

Air pollution from industries and transportation vehicles is a great threat to human health. Automobile pollution contributes to 60% of air pollution in urban areas such as New Delhi, Kolkata, and Chennai etc. This will lead to environmental degradation which can lead to extinction of life. Today we are facing ecological imbalance and challenges which are need to be addressed. This can be done by public awareness. The main challenges we are facing are mainly due to some primary factors...

***Increasing population*:** Every year the population of over thousands of millions is growing, which is at a rate of 2.1 percent per year. Over 17 million people are added each year. This has put pressure on natural resources and reduces gains of development. Increasing population creates pressure on the limited available resources, thus damaging them. The greatest challenge is to control population through public awareness.

***Poverty*:** Our country India is a country with both rich and poor people. Excessive population leads to poverty in India, as demand for resources is greater than their availability. The population depends upon natural resources for food, fuel, fodder and shelter. About 40 percent of population depends on these resources. Increasing population and poverty are directly related, so it is a great challenge to our country. Poor people struggle for survival and protecting the environment is not in their priority. This increases the need for public awareness.

***Agricultural Growth*:** People must be acquainted with the methods in order to sustain and increase the agricultural growth without damaging the environment. High yielding varieties (HYV) during the green revolution have caused salinity and damage to the physical structure of soil. Therefore, this can be reduced by public awareness.

***Degradation of Land*:** Most of the land is degraded and polluted. Degradation of land should be avoided. This can be done by public awareness. Lack of knowledge about environmental degradation, the use of excessive amount of chemical fertilizers and pesticides results in killing of the microorganisms present in the soil, which in turn contributes to the degradation of land, loss in fertility and also pollutes groundwater.

***Reorientation of institutions*:** The people must be awarded for orienting institutions, attitudes as well as infrastructure to suit contemporary conditions and needs. This change must be brought by

keeping India's traditional use of resources and management in mind. This can be done by bringing change in educational attitude, administration procedures etc.

***Air and Water Pollution*:** Air and water pollution is increasing because of industrialization, urbanization, vehicles etc. Advertisements have been made but they require proper implementation of these acts. Indian rural population needs expertise in resource management as well as taking care of the environment. People need proper awareness of these rules.

***Reduction of Genetic Diversity*:** There is a need to conserve genetic diversity. Wild genetic stocks are disappearing from nature, for example: Asiatic lions. The protected areas like sanctuaries; national parks etc must be developed.

***Ill effects of Urbanization*:** 26% to 28% of Indian people live in urban areas. People migrate from rural areas to towns in search of a better quality life and secure jobs, thus creating a pressure on cities, and ultimately creation of slums. Slums have unhygienic living conditions, thus resulting in soil, water and air pollution in the surrounding area. Increasing industrialization creates large amount of air pollution. Slums, pollution, environmental degradation are some of the ill effects of the urbanization. This needs immediate addressing through public awareness.

References:

1) https://mjcetenvsci.blogpost.com/2014/08/environmental-studies-need-for-public.html?m=1

Glimpses of Various Activities 2018-19

Orientation Programme

First Alumni Meet

Film Screening

Freshers' Welcome

Invited lecture by Martin J Ossawarde

Invited lecture by Dr. Stephanie Ledar

Map Pointer Competition

Quiz Competition

Excursion to *Damdama* Lake

Field Tip to *Manaoli Toki*, Village

Group Photograph