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IAS Rank 87

**PERSPECTIVES IN HUMAN GEOGRAPHY - THE  
MOST HATED TOPIC IN GEOGRAPHY OPTIONAL :)**

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## GEOGRAPHY NOTES

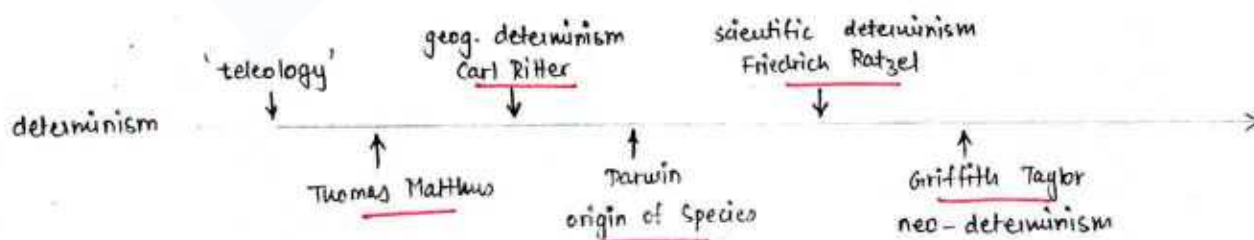
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# 2017

1. Perspectives in Human Geography Handwritten Notes .... Page 2
2. Old Notes from Same topic ( easy to understand ) – Page 88
3. **Notes on other topic**
  - a) Regional Geo Selected Topic ....Page 118
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## Determinism

- 1<sup>st</sup> approach adopted by geographers
- theoretical position established around the belief that nature of human activity was controlled by parameters of physical world within which it was set
- development by geographers
  - 1<sup>st</sup> by Greek and Roman scholars
  - Hippocrates, Aristotle, Thucydides
  - later Strabo → how slope, relief, climate govern lifestyles of people
  - tradition continued by Arab geographers
    - Al-Masudi, Al-Idrisi, Ibn-Khaldunattempted to correlate environment with human activities and move of etc.
  - Carl Ritter introduced geographical Determinism
  - similarly supported by Alexander von Humboldt
  - Influence of Darwin's Origin of Species published in 1859
  - 'new' determinism by Friedrich Ratzel
    - supplemented 'classical' geographical determinism with social Darwinism
- Viewpoint was
  - superiority of environment
  - nature is active, man is passive
- Dominant thinking among American and German geographers
- Historical Development of determinism



## • Notable geographers

### \* Ellen Churchill Semple

#### - Influences of Geographical Environment (1911)

• "man is the product of earth's surface"

• distinguishes altitudinal characteristics of people living in different physical setting

• ex of mountain, plain, city dwellers

### \* Ellsworth Huntington

#### - The Principles of Human Geography

• writings on climate and civilization

climate causation

climate as fundamental factor in rise of civilization

## • criticism

### - notable critics

O.H.K Spate → "environment taken by itself is a meaningless phrase; without man environment does not exist"

Hartshorne → rejected on grounds that it separates nature from man

- hypothesis cannot be tested empirically

- ignores role played by man to influence his own culture, history and civilization

- overgeneralizations

- Ratzel's theory failed in some cases

ex. Nepalis and	Khasis inhabiting Meghalaya
↓	↓
- paternalistic	- maternalistic
- milk loving	- milk hating

Bakarwals and Kashmiris of Jammu & Kashmir  
 ↓ ↓  
 transhumance cultivators

Assamese and Bengalis of Brahmaputra Valley.

However, impactful on geography

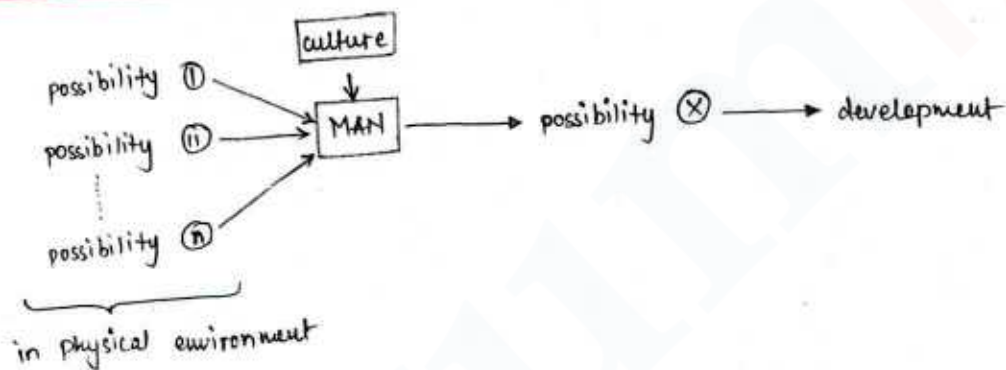
- ① Robert Malthus
- ② Halford J. Mackinder
- ③ Patrick Geddes
- ④ Davis



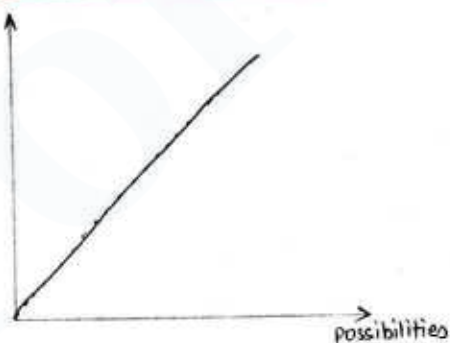


## Possibilism

- developed as a reaction and counter thesis to extreme generalization of determinism
- presented man as an active agent
- led by French geographers starting with Lucian Febvre  
French school was founded by Vidal de Lablache  
Lucian Febvre coined the term 'possibilism'
- belief asserts that natural environment provides options, the number of which increases as knowledge and technology of a cultural group develops.
- French geographers saw in physical environment a series of possibilities for human development but argued that actual ways in which development took place were related to culture



people based on their culture make decision on using resources



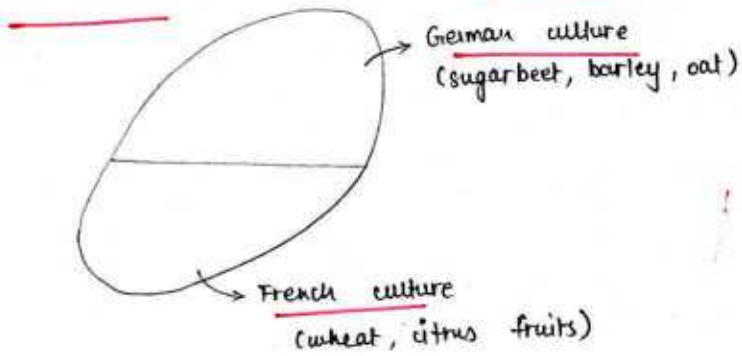
- it is impossible to explain differences in human society and its history based on influence of physical environment

- Febvre declared

"there are no necessities, but everywhere possibilities"

"true and only geographical problem is that of utilization of possibilities"

- Vidal de Lablache in his Ph.D thesis on French plateau



- he showed different landuse depending upon culture

- tried to explain differences between groups in same or similar environment citing variations in attitudes and habits creating numerous possibilities.

- central to his work was concept of 'genres de vie' (lifestyles) that develop in different geographical environment.

- opined 'genres de vie' are products and reflections of a civilization representing integrated result of physical, historical and social influences.

- According to possibilists, nature is never more than an advisor.

The range of possibilities in every region is limited more by the price man is willing to pay for what he wants than by the dictates of environment.

- examples of possibilism

• cultivation of rice in USA, Canada, Australia, Pakistan

• shifting of wheat areas towards rice (Punjab, Haryana) due to G.R.

• cultivation of banana, rice, rubber in Antartica

• tulip cultivation by Dutch farmers under greenhouses

### - Criticism

- Notable critic - Griffith Taylor  
"not all problems are connected with man or cultural landscape"
- possibilism does not encourage study of physical environment and its effect on man
- it promotes over-anthropocentrism in geography
- despite technological advancement, man cannot get rid of physical environment due to ecology disturbed, drainage of resources
- Man cannot go against plan of nature and environment, will lead to problems in long run.





## Neo Determinism

- put forward by Australian geographer - Griffith Taylor

- came out as a reaction to possibilism

• maintained that in 10% of the world, possibilism worked in remaining 90% of the world nature speaks out clearly

• argued that possibilities developed their ideas in temperate environments such as NW-Europe which provides viable alternative forms of human occupation.

- coined the term 'stop-and-go determinism'

- in short term, people might attempt whatever they wished with regards to their environment.

in long term, nature's plan would ensure that environment won the battle.

- In his book "Geography in 20<sup>th</sup> century" he correlated rainfall and human settlement in Australia.

- philosophy can be vividly explained by role of a traffic controller

man is like the traffic controller of a large city who alters the rate but not the direction of progress

Man is able to accelerate, slow or stop progress of a country

But if he is wise, he should not depart from directions of natural environment

- concepts attempts a balance suggesting

neither there is situation of absolute necessity

nor there is condition of absolute freedom

- central idea is

Nature has for each region given a blueprint programme  
intelligent people follow it.



Geographer's duty is to interpret this programme.

## Cultural / Social Determinism

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- emphasis on human element

- based on the idea

significance to man of the physical and biotic features of his habitat is a function of attitudes, objectives and technical skills of man himself

idea prevalent in American school

- ex.

① country richly endowed from point of view of hunters might appear poor to agricultural people

② Importance of coal is not identical to people who can and those who cannot make use of it.

- George Carter identifies 3 fundamental forces factors

i) greater stress on cultural forces

ii) ideas as primary cause of change

iii) human will as decisive factor

- Edward Ullman wrote

environment is neutral, its role being dependent on stage of technology, type of culture and other characteristics of a changing society

ex. assessment of a mountain pass will differ for those who possess horses, automobiles and aeroplanes

similarly assessment of soil fertility will not be identical for a Japanese farmer or an Amazonian Indian

### - Criticisms

- does not enable us to achieve profound understanding of social relations of landscape
- study becomes concentrated on 'micro-territories' that is purely empirical in character.
- cannot provide basis for scientific conclusion of any real significance
- rigid like environmental determinism
- does not adequately assess environmental factors.

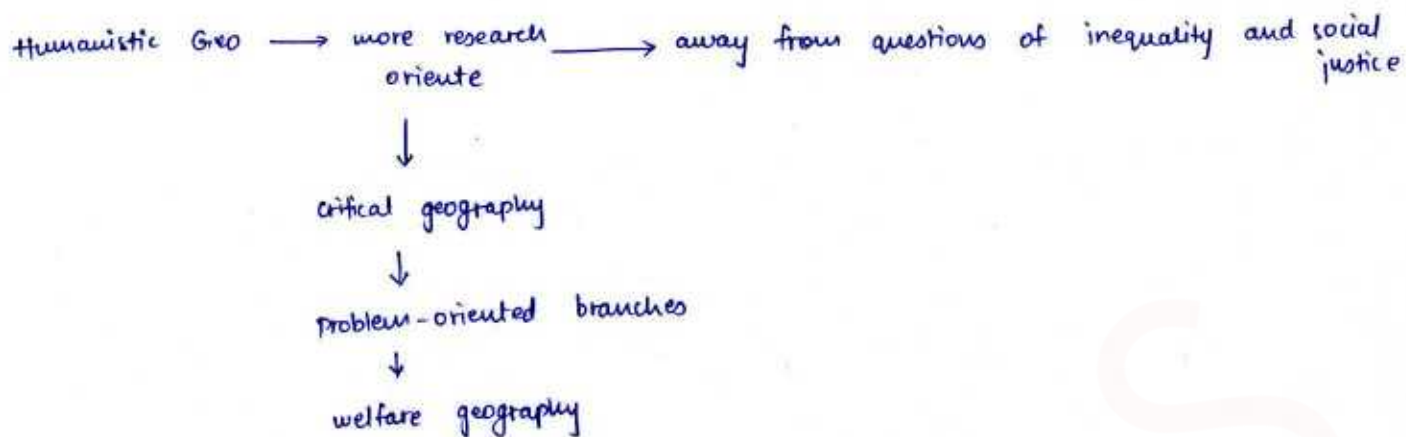
**Radicalism** → called as part of Social Relevance Revolution

- developed as a reaction to GR and positivism
- began as critique within the contemporary liberal capitalistic society but later coalesced around the belief of Marxian analysis
- earliest proponents of radicalism were Elisee Reclus, Petr Kropotkin
- Prof Peet of Clark University formed "Association of Radicalists"
- 'Antipode' was its journal started in 1969
- started with aim of publishing papers of younger generation with revolutionary leanings.
- Papers had to deal with contemporary issue of
  - life in ghettos
  - discrimination, inequality, racism, sexism
  - mismanagement of resources
- they exposed social and political irrelevance of geography as a social science
- The origin of the movement can be traced to late 1960s in USA with three contemporary political issues:
  - i) Vietnam war
  - ii) Civil rights
  - iii) pervasive poverty and inequality suffered by residents of urban ghettos and deprived rural areas
- salient features
  - exposes contemporary issues
  - highlight weaknesses
  - bring cultural revolution
  - remove regional inequalities
  - emphasized role of history in man-environment relationship
  - tried to develop just, equal, tension-free, peaceful and enjoyable society.

- Weaknesses

- theoretical base of radical paradigm was weak
- radical in ~~theory~~ topics and politics but not in theory or method of analysis
- could not change capitalistic society to make a more socialistic order
- could not develop an appropriate model about population resource in integrated dynamic way to remove inter-regional and intra-regional inequalities.

## CONTEXT



## Development

Harold Laswell paper → "who gets what, where and how?"

David M. Smith → 1973 → "Geography of Social Well-being"

HM Rose → 1971 → "Black Ghetto"

## Basic feature

what → refers to various materialistic and immaterialistic goods and ideas

who → refers to the population of the area under review subdivided further into class, race, gender

where → reflects the fact that living standards differ according to area

How → refers to process whereby the observed difference arise

Tries to understand inequality on the face of earth





## Dualism

- Geographers throughout the history of geography have been confronted with methodological problem of dualism and dichotomy
- They exist due to the delineation of the sphere of geography and the methodology adopted for its study.
- Dualism means existence of parallel streams of thought.  
Dichotomy refers to branching of the subject into distinct streams.
- Dualism became conspicuous during post-renaissance period in Europe. Since then geography seems to have been visible into a number of mutually exclusive branches.
- The most prominent dichotomies in geography are
  - i) General (nomothetic) vs Regional (idiographic)
  - ii) Physical vs Human
  - iii) Historical vs contemporary
  - iv) Formal vs Functional

Moreover, there is branching of discipline into separate branches,  
eg. geomorphology, climatology, hydrology, land use, population geography etc.



Cultural Landscape → means cultural imprint to natural landscape

- term 'landscape' introduced into American geography by Carl O. Sauer in 1925 with publication of 'The Morphology of landscape'
- idea drew upon the concept of 'landschafts kunde' developed by German geographers (Otto Schlüter)
- idea put forward the concept of landscape as an alternative to environmental determinism (Ratzel, Seumpe)
- landscape approach
  - landscape was defined as an area made up of a distinct association of forms, both physical and cultural.
  - sought to describe and explain the interrelations between human and the environment with primary attention given to human impact on environment (anthropocentric)
- this formed the basis of study for the Berkeley school  
this school became focused on study of cultural history

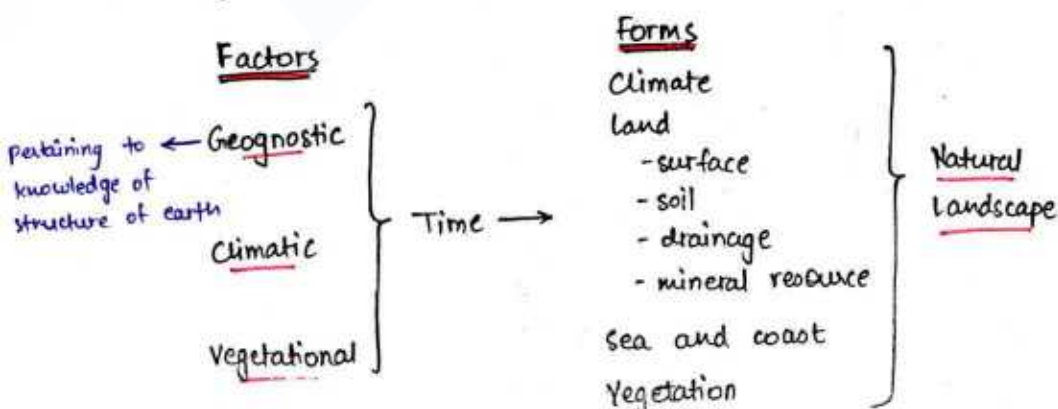
- According to Sauer, cultural landscape and the study of its creation

involved:

- general geography → systematic geography
- regional geography → comparative morphology
- historical geography → development sequence / sequent occupance

} dismissed  
dictotomy

- According to Sauer, diagrammatic representation of natural landscape





- under the influence of a given culture, itself changing through time, the landscape undergoes development, passing through phases and probably reaching ultimately the end of its cycle of development.
- natural landscape provides material out of which the cultural landscape is formed. Shaping force, however, lies in the culture itself.
- ~~Act~~ Actual example

#### Norway

- 4/5th of surface is barren highlands supporting neither forests nor flocks

#### Libya

- 4/5th is a desert w/o vegetation and human habitation

#### Carl O. Sauer (Possibilist)

- anthropocentric
- landscape morphology
- historical geography (as opposed to Hettner, Horts.)
- against environmental determinism
- based on Humboldt, Hettner
- emphasised chorology

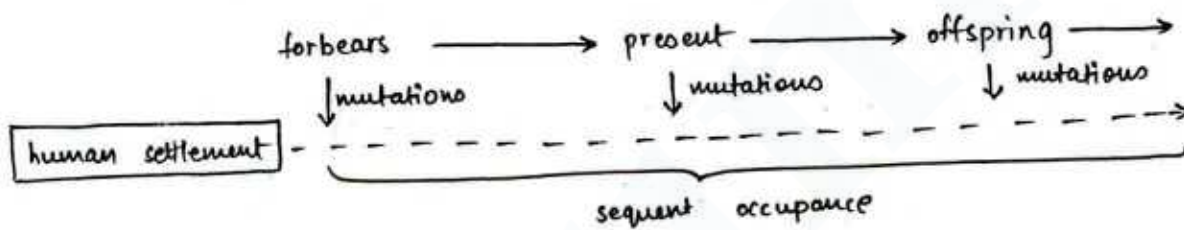


## Sequent Occupance

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- idea adopts Darwin's idea of change through time
- part of historical studies in geography
- 1st described by Dewent Whittlesey in 1927 in the Annals of Association of American Geography
- focused upon the processes of change in the settlement of an area
- According to Whittlesey,  
"each generation of human occupation is linked to its forbear and to its offspring, and each exhibits an individuality expressive of mutations of its some elements of its natural and cultural characteristics."

natural + cultural characteristics → mutations → expresses individuality



- According to Whittlesey,  
evolution of human settlement begins with a small house

small house → hamlet → village settlement → mega city

ex. Mumbai

7 separate islands → Mega City

- similar to concept of ecological succession

if ecological conditions are favourable → small village becomes city

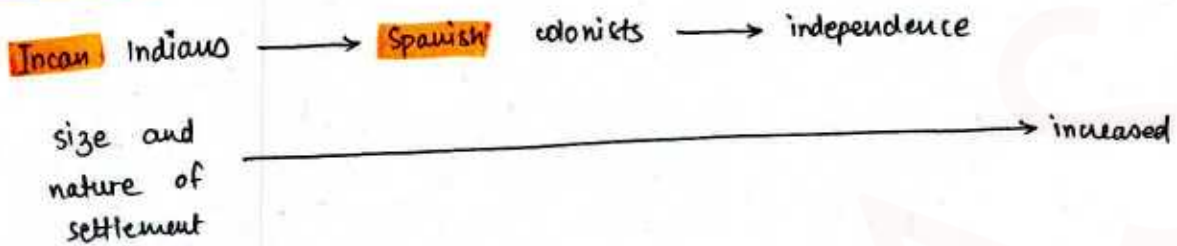
if not favourable → disappears



- it is based on the belief that successive societies leave their cultural imprints on a place, each contributing to the cumulative landscape.

concept is similar to Carl O. Sauer's idea of cultural landscape

ex. Bolivia



- represents a kind of cultural determinism.

an antithesis of the concept of environmental determinism

- refers to decline in dominance of religion in the life of people

### - CAUSES

i) development of rationality

consequent development of science and technology

ii) cultural factor

rise of monotheistic religions like christianity

especially protestants

iii) growth of science

HYV seeds → more tech → less vulnerability

medical technology

reducing belief in forces of nature

iv) Rise of nation states

functions taken by state apparatus from religious apparatus

v) spread and development of education and welfare

vi) phenomena of globalization

transmission of themes of secularization

vii) development of newer type of landuse, namely, urbanization

### - PATTERNS

Developed countries → high level of secularization

Moderate levels → India, southern Europe

urban areas → secularization

rural areas → religion

low HDI countries → West Asia  
African countries → high role of religion

## CHALLENGES

### 2 Aspects

1) Question mark on ~~religion~~ meaning of secularization

emergence of individualism, belief system

form of religion has undergone change

11) Globalization increasing secularization

but opposite also true

ex. Africa → role of missionaries

Islam

globalization aids spread of religion

## Cultural Regions

- cultural regions refers to an area over which cultural traits of human group may be identified.
- culture and cultural environment of human groups varies from place to place. This variation results in ~~some~~ ~~occupation~~ ~~and~~ variation in human occupation and his organization of space
- some important cultural regions are:

i) Population regions - population and its demographic attributes constitute an important aspect of cultural landscape.

its Delineation is based on age and sex composition, birth, death and growth rate patterns, literacy, occupations and patterns of migration may also be delineated.

ii) Language region - delineation of the basis of different language area. we delineate macro, meso and micro level language regions to examine and interpret cultural personality of a country, nation or area.

iii) Religious regions

iv) Political regions - most rigorously defined formal cultural region is the nation state

v) Economic regions - most frequent, familiar and useful employment of the regional method. identify economic activities and resources over space serves as useful tool for planning and for manipulation of people, resources and economic structures of a formal region.

- vi) Natural resource regions
- vii) Urban regions
- viii) Agricultural regions
- ix) Industrial regions
- x) Mental region

Region is a mental construct whose sole purpose is purposeful organization of spatial data. They help in understanding man-nature interaction and provide a tool for planning and socio-economic development of different segments of a country/world.



## Historical vs Contemporary Geography

- deals with geography of an area, region or world as it had been in the past
- does not fit into the framework of geography but stands side by side with the geography of present times
- embraces both general and regional works and involves all branches listed
- Historical geography concerns itself with those according to varied viewpoints


### i) Operation of geographical factor in history

- concerned with interrelationship of phenomena in space in particular period and influence of geographical factors in history.
- example sequent occupance study by Ullrich

### ii) changing cultural landscape

- leads to reconstruction of past cultural landscape

### iii) Reconstruction of past geographies

- to establish relationship between past and present distribution of phenomena
- numerous types:  agricultural, urban, industrial, social, regional geography

### iv) Geographical change through time

- study of geographical factors, both physical and cultural that change in space and time.



### contemporary Geography

- deals with existing patterns of spatial differentiation of phenomena
- becomes historical geography with passage of time

overall both geography' are mutually exclusive and must be logically supporting each other.

Alexander von Humboldt

- foremost intellectuals of his time

- **father of modern geography**

- produced the monumental work **Kosmos** published in **1862**.

- Contribution to geography

- \* contributor to several branches of knowledge including botany, geology, climatology, ecology, physiology.

- \* tried to establish a universal science. This was his specific objective in compiling **Kosmos**

- \* **father of modern geography** as a discipline devoted to study of the earth's surface and encompassing the whole range of nature as an organically interrelated and unified entity.

- \* First geographer to define and apply **two essential principles** that make geography a "distinctive science"

① **Principle of causality** according to which Humboldt had first observed the complex of spatially arranged phenomena on earth surface and then proceeded to explain their causal ~~interconnection~~ interconnection and interdependence.

② **Principle of general geography** by which Humboldt sought to compare the location and extent of terrestrial phenomena on earth surface with a view to unravelling the principles that governed their distribution

- \* Method was empirical and inductive. Due to his wide data collection and contribution to climatology and plant geography, he is also regarded as **father of systematic physical geography**.

Carl Ritter

- **cofounder** of modern geography with Humboldt

- published the monumental work **Erdkunde**

- contribution to geography

- \* through Erdkunde he ~~also~~ laid a firm foundation for the **writing of a new style regional geography**

presenting a complete picture of the area under study and incorporating all available information on every aspect through a thorough sifting and synthesis

- \* was a great **pioneer of regional approach** in geography

- \* Erdkunde designed to provide basis for tracing the general laws of physical geography

- \* conceived geography as an empirical science

#### COMPARATIVE ASSESSMENT

- both viewed geography as a unified science, part regional and part systematic and equally focused on study of man as well as the physical environment that surrounds him.

- both emphasized an **empirical approach**

- vis-a-vis general vs regional dichotomy

Humboldt: recognized dualism and emphasized systematic geography as a logical transition from regional geography

**ForumIAS**

Ritter: stressed the need for study of natural phenomena 'as a whole, as in parts' in order to comprehend the 'inherent plan'.

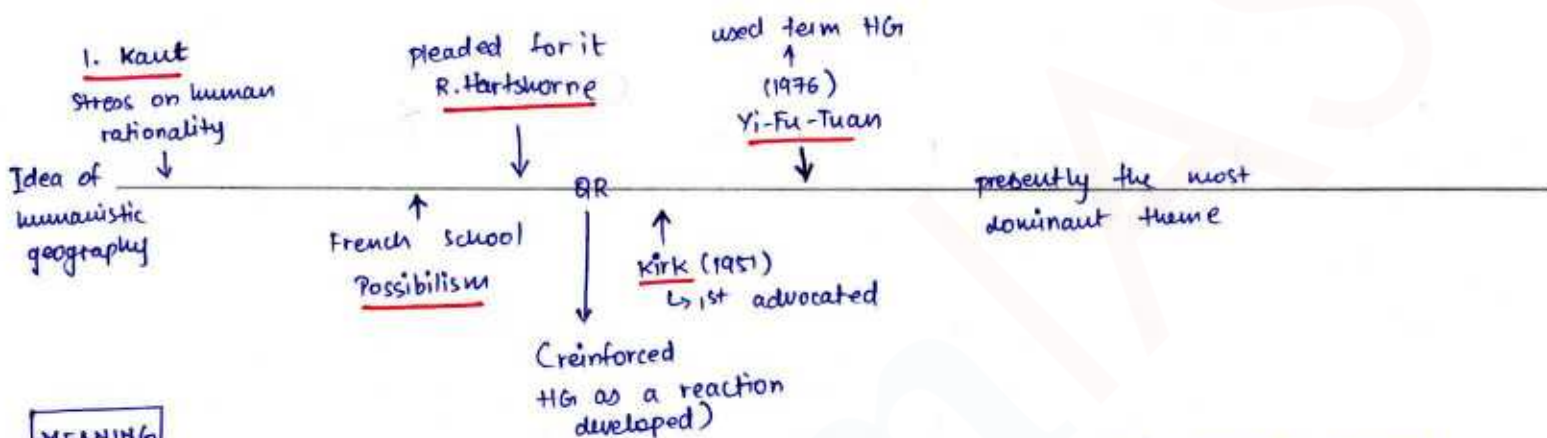
- both established lasting traditions in their own fields of emphasis.
- Humboldt was inductive in approach.
- Ritter was deductive in approach.





- developed due to apathy of QR and positivism towards human and their normative questions
- negated the whole paradigm of QR led to a counter-paradigm

### HISTORICAL DEVELOPMENT



- central and active role to ~~human~~ human awareness and human agency, human consciousness and human creativity
- interpreted & explained man-nature relationship with historical approach.
- subjective approach aims at Verstehen  
↓  
imaginative or interpretative understanding of the ~~env~~ environmental phenomena through past experiences.
- it is a ~~conviction~~ conviction that human beings can improve the circumstances of their lives by thinking and acting for themselves by exercising their capacity for reason.



- According to them, human world can be understood by examining the social institutions and cultural background of people
- Kirk suggested following methodology
  - i) Participation
  - ii) Discussion
  - iii) observation
  - iv) Logical Inference
- Tuan suggested the following frame of geographical investigation

## Comparison with Behaviouralism

### Similarities

- human at its centre and their normative questions
- context is similar → reaction to positivism and BR
- both are integral to current paradigm of Human Geo and enforce each other
- both of them use similar tools and tech to enquire

### Dissimilarities

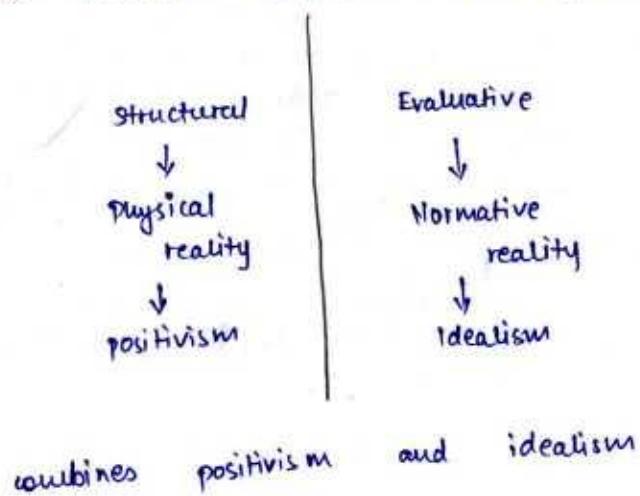
- \* universal models in behaviouralism
- \* normative questions in behaviouralism is through backdoor
- \* behaviouralism is positivism inspired
- \* behaviouralism is nomothetic in nature and aims to construct grand models and theories
- humanistic geo is idiographic and believes in individualism of geographical phenomena.

More similarities than differences

∴ Merging into each other



- highly individualistic
- according to Behaviouralists  
models and theory building in geography should follow  
inductive methodologies
- inclines towards evaluative and processual approach



Vis-a-Vis QR

QR	Behaviouralism
- no human aspect	human aspect
- universalism	change as per behaviour
- mechanistic	<del>flexible</del> flexible

Similarities

- both trying to make geo more scientific by developing universal
- models and theories
- both influenced by positivism
- both criticised by humanistic geographers as attempting to make geography scientific on basis of pseudo-scientific models

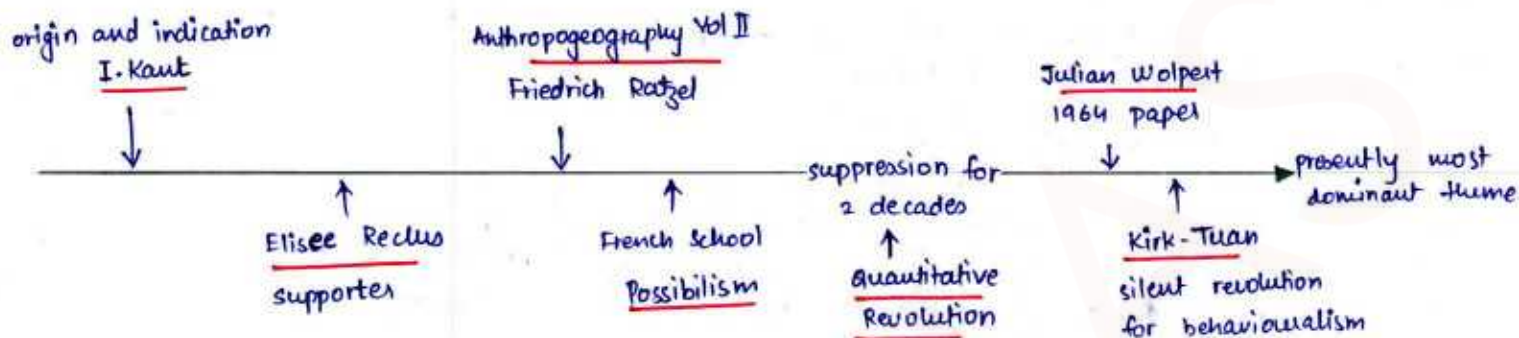
Dissimilarities

- unlike QR it amalgamates idealism into positivism

- take into account human and their normative questions as part of geo enquiry

- came as a psychological turn in human geography
- emphasizes role of cognition and decision-making as mediating relationship between man and nature

### HISTORICAL DEVELOPMENT

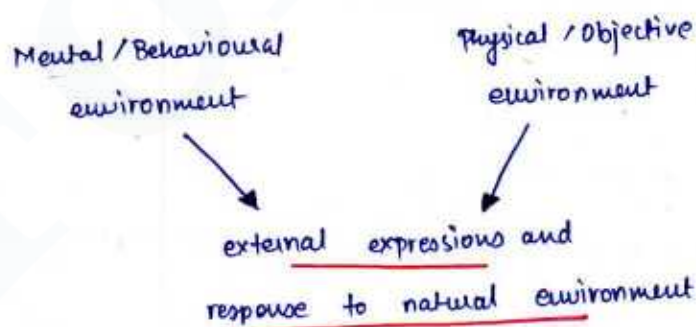


### Concept

- ```
graph LR
    OR[Objective Reality] --> NA[Normative aspects]
    NA --> MM[Mental Map]
    OR <--> NA
    NA <--> MM
    OR <--> MM
    Actions[Actions] --> OR
    Actions --> NA
    Actions --> MM
```
- challenged concept of 'rationality of man'

consider man as responder to stimuli

- considers



- thus considers environment to have duality of character
- mental framework = product of value system, emotions, normative perspective



- QR is deductive

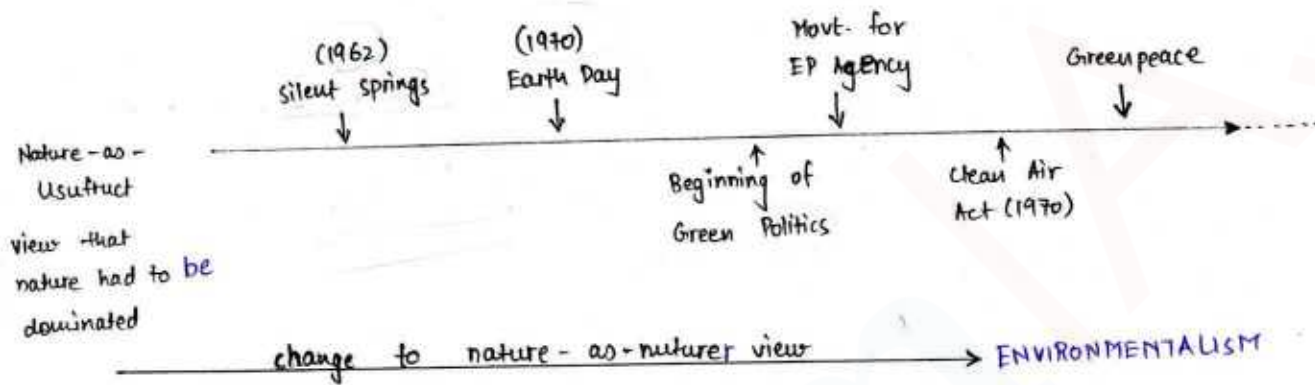
Behaviouralism is inductive

Assumptions of Behaviouralism

- ① there exists identifiable environmental images that can be accurately measured
- ② there exists strong relationship between revealed images and real world behaviour



- Environmentalism denotes a social movement that seeks to influence the political process by lobbying, activism and education in order to protect natural resources and ecosystems.
- concept basically refers to political expression of man-environmental relationship
- relates to growing awareness among people of environmental degradation as well as its relationship to human health.
- initial inspiration from Rachel Carlson's book 'Silent Springs' published in 1962.



- served as inspiration for many movements like
  - Greenpeace
  - Green Brigade
- These movements called for range of solutions ranging from radical ones suggesting [improbability between industrial development and environmentalism] to [less radical groups calling for sustainable development]
  - ecocentric
  - technocentric
- At Global level

Multiple conferences

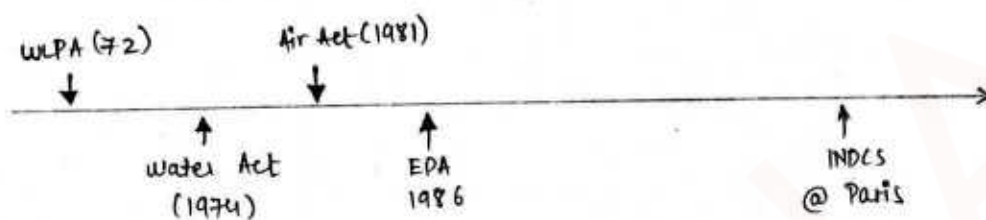
1st → UN Conference on Human Environment 1972

- CITES 1975
- IPCC 1988
- Rio 1992
- CBD
- Ramsar Convention

- At national level

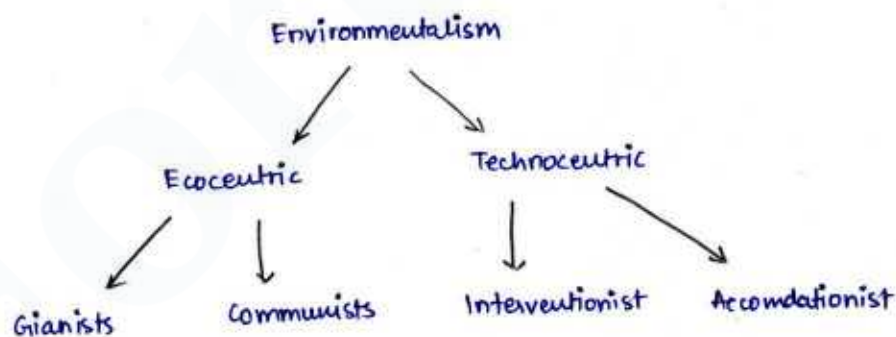
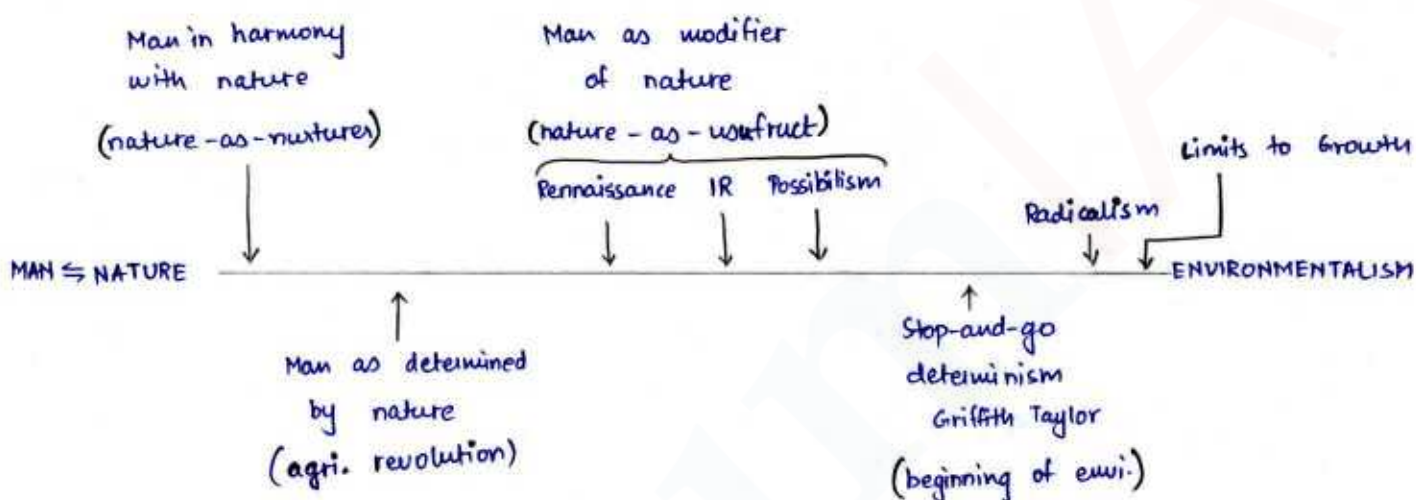
- Chipko Movement in UP Himalayas by Sunderlal Bahuguna
- Appiko Movement
- Marmada Bachao Andolan
- Silent Valley Movement
- Chautharmardhan Hill movement against bauxite mining

Legislative expression



- recent entrance
- 2<sup>nd</sup> half of 20<sup>th</sup> century
- refers to a concern that environment should be protected from harmful activities of human
- taken broadly it goes beyond recent concern for environment and can be visualized as nothing but study of man-nature relationship

Man  $\rightleftharpoons$  Nature







## Influences on Population Distribution

- multivariate that includes social, demographic, economic, political and historical factors as well as purely physical influences
- factors operate in combination

### Physical Influences

- Altitude
- Latitude
- Relief
- Climate
- Soil
- Vegetation
- Mineral and Energy resources

### Economic Influences

- type and scale of economic activity
- technological and economic advantage
- industrial revolution
- lines of transport, communication and ports

### Political Influences

- migration policies
- population policies

### Historical - social Influences

- time of settlement
- age of civilization
- urbanized - rural

- all these decide population density distribution



• dynamic aspect of changes in popl<sup>n</sup> distribution patterns

• 3 components

i) Fertility - occurrence of live births among a defined population

In most parts

fertility > mortality

∴ main determinant of population growth

Measured using

$$\text{crude birth rate} = \frac{\text{total number of births}}{\text{mid-year estimate of popl}^n} \times 1000$$

#### FACTORS AFFECTING FERTILITY

• wide range of moral, intellectual, financial and social motives influence

decisions concerned with family size limitation → directly

• changing status of women in society, new attitude towards children and marriage, decline of religious beliefs and superstition, prevalence of material ambition → indirectly

• Major factors:

i) Age structure

ii) Duration and level of education

iii) Religion

iv) Political influences

v) Economic prosperity and depression

sudden onset → ↑

depression → ↓

gradual rise → ↓

ii) Mortality - occurrence of death among a defined population

2 Important measures

IMR  $\rightarrow$  no. of deaths of infants under the age of one year  
expressed as per thousand live birth.

CMR  $\rightarrow \frac{\text{total number of deaths}}{\text{mid-year estimate of popl}^n} \times 100$

### FACTORS INFLUENCING MORTALITY

- depends upon demographic evolution of country

- causes of death  $\rightarrow$

Exogenous

result of environmental influences and includes infectious, pulmonary and digestive diseases

FACTORS

- inadequate, contaminated food, water supply
- low standards of housing and hygiene
- sanitation
- medical care access is low

Endogenous

related to degenerative causes including biological and congenital diseases and gradual exhaustion of body functions

FACTORS

- lifestyle diseases prevalence
- biological / genetic factors

III) Migration - movement of population involving a change in permanent residence of substantial duration



- book 'Critique of Pure Reason'
- was epistemologist → study of knowledge
- he said that there are 2 types of knowledge
  - i) Logical knowledge → this has external laws and is not bounded
  - ii) Physical knowledge → requires senses or presence to study

Not bounded based on reason or logic

They are bounded by time and location/space

He termed study of locations as geography

set forth geography as physical study and not logical
- he said study of time → chronology
- study of things, phenomenon and locations
- bounded by space → chorology
- this resulted in an exceptionalism approach that influenced
  - core of Richard Hartshorne's Areal Differentiation
  - promoted study of both natural, physical world and also human aspects and man
  - Reaffirmed ideas of Comte de Buffon who considered "man as active agent of change on environment"
  - Kant said natural environment could not be separated from human aspect
  - ∴ laid foundation of Possibilism of French school
  - rejected dichotomy into physical vs human



\* a naturalist

\* The Origin of Species, 1859

The Structure and Distribution of Coral Reef, 1842

\* Fundamental ideas in Darwinian theory of evolution included

- ① struggle for existence
- ② variation within species
- ③ survival of the fittest
- ④ Natural selection

\* four main themes in Darwin's theory

- i) Idea of change through time \*
- ii) Idea of organization
- iii) Idea of struggle and selection \*
- iv) Role of randomness and chance variations of character in nature

\* Impact of Darwin on development of Geographical concepts

## I] Impact on Geomorphology

- Oscar Peschel proposed that geographers should study morphology of the earth's surface.
- after Darwin's work, geologists and paleontologists concentrated on development of geograph geological time scale, systematic mapping of rock types and analysis of fossils
- W.M. Davis applied evolutionary concept of change over time in concept of geographic cycle. He developed similarity between organic life and evolution of landform.

## II] Impact on Human Geography

- ideas gave new direction to sub-fields of human geography
- inspired environmental determinism

- Friedrich Ratzel → Anthropogeographic (1881) → "similar locations lead to similar mode of life"
- Ellen Churchill Semple → Influences of Geographic Environment → "man is the product of earth's surface" (1911)
- Ellsworth Huntington → "climate controls the progress and development of human civilization"
- 2 books → (1907) Pulse of Asia → Mongol invasion  
→ (1915) Civilization and Climate → civilization and favourable climate

### III] Impact on Political Geography

- Ratzel → Political Geography → concept of Lebensraum
- concept of selection and struggle applied to nations  
also: Mackinder (check)

### IV] Impact on Cultural Landscape, Landschaft

- German geomorphologists started to define geography as 'landscape science' landshaft kunde
- Carl O. Sauer → The Morphology of landscape (1925) - main focus was study of processes leading to landscape change up to the present, beginning at prehuman stage of occupation

concept of change through time

↳ Berkeley School → focus on in-depth study of historical evolution of settlements in American SW.

also a central theme in Whittlesey's idea regarding

sequent occupance



## Quantitative Revolution - critique of Kauts exceptionalism

- DEF<sup>n</sup> { application of statistical and mathematical techniques, theorems and proofs in understanding geographical systems is known as 'quantitative revolution' in geography.
- roots in empiricism, inspired by <sup>logical</sup> positivism; starts with Hartshorne - Schaefer debate 1953
  - it involved 2 things; debate was related to scope and methods
    - i) use of statistical methods for generating and testing hypothesis using empirical data
    - ii) use of mathematical techniques and theorems for deriving models from a set of initial abstract assumptions.

Statistical models were first used in 1950s

- why called a revolution?

- becoz it involved a shift in the focus of geographical studies and nature of geographical work
- new concept of geography as science of spatial analysis of phenomena; idea of geography as spatial science (F.K. Schaefer)
- pronounced commitment to theory with a new set of methodologies;

- Main objectives of QR were to

- i) change descriptive character of the subject and make it scientific
- ii) provide geography a sound philosophical and theoretical base
- iii) explain and interpret spatial patterns of geographical phenomena in a rational, objective and cogent manner.
- iv) test hypothesis and formulate models, theories and laws for estimations and predictions
- v) use mathematical language
- vi) make precise statements about locational order

- In formulation of models and theories they assumed

- i) Man is rational (economic) person who always tries to optimize his profits
- ii) Man has infinite knowledge of his space
- iii) Assumed space as 'isotropic surface'
- iv) There is no place for normative questions

### Phases of QR

1<sup>st</sup> - 1950 - 58 ( data collection )

- characterised by development of methodology for generation of data, sampling techniques, central tendencies and deviation method

2<sup>nd</sup> - 1958 - 68 ( establishment of causality, analysis )

- emphasis on correlation, regression and multivariate analysis method
- stress on gravity models

3<sup>rd</sup> - 1968 - 78 ( theory development )

- emphasis on nearest neighbour analysis.

4<sup>th</sup> - 1978 - 88 ( more precise data; more analysis ) ( efficiency of 1<sup>st</sup> data )

- emphasis ~~on~~ on GIS and GPS based on mathematical and statistical analysis

Presently use of remote sensing techniques and computer aided cartography.



## - Impact on the subject of QR

- QR developed as a result of need to make geography more scientific and theoretical in orientation.
- \* logical outgrowth of QR was geography became a social science that recognizes random behaviour at the microcosmic level and ~~precise~~ predictable order at macrocosmic level
- \* led to a shift from descriptive geography (idiographic) to an empirical law-making (nomothetic) geography. I → N
- \* marked a change in geography, from regional geography to spatial science. R → S
- \* QR offered techniques to geography whereby theory could be developed and improved. techniques
- \* led to development of methods that served as a guide for the new practitioners
- \* served as a potent tool for planning puri-
- \* its failings led to rise of an alternative school called as qualitative approach (Behavioural, Radical, Humanistic, welfare) [counter-positivist]
- led to creation of original thought and developments in the subject.
- \* methodology was readily accepted into fields of physical geography and greatly added to study of geomorphology, climatology and oceanography.
- \* most importantly, it helped distinguish geography from metaphysics and religion and provided it with a sound philosophical, scientific and methodological base.

- \* led to rising interest in study of distance as a critical factor in understanding spatial arrangement of phenomena
- \* greater use of computer in geography led to developments in geomatics, such as creation of and application of GIS and remote sensing.
- \* greatest impacts in field of physical, economic and urban geography.

### Contribution to Geography

- development of economic theories like
  - locational theory
  - Central Place theory
- social physics → laws of physics to explain social aspects
- systems concept → system approach in studying settlements, water cycle, rock cycle
- contribution to locational analysis

### -Merits of QR

- based firmly on empirical observations that are readily verifiable
- helps in reducing multitude of observations, data and facts to a manageable number of factors. (multitude → manageable)
- help in estimation, interpolation, simulation of data that is necessary for forecasting estimation, interpolation, simulation → prediction, forecasting
- techniques provided framework within which theoretical statement could be formally presented.
- provide linguistic economy
- allowed objective measurement of data





## Areal Differentiation

- decides scope → region
- decides content → How regions have variable features
- decides method → Descriptive

- \* Defined as study of variation of physical and human phenomena as they relate to other spatially proximate and causally linked phenomena (Hartshorne, 1939)
  - \* term coined and used by Richard Hartshorne in his work 'The Nature of Geography' published in 1939. → "Geography seeks to describe and interpret variable character of earth's surface as world of man"
  - \* study of areal differentiation of the earth's surface is called chorology.
- Geography on this definition is solely concerned with the unique character of different areas of the earth's surface.

### \* History

- oldest tradition of western geographical inquiry.
- 1st → Hecataeus of Miletus in 6th century
- codified → Strabo in 17 books of geography

AD → inspired by Varenin's special geography and Kaut's chorology exceptionalism

- went out of fashion 1960s onwards due to:

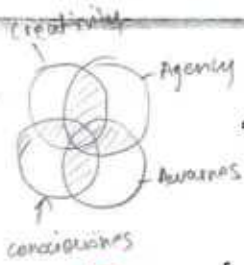
- ① positivism-inspired Quantitative Revolution
  - ② Quantification - space geometry
- } due to unpopularity of AD

- revival in 1980s mainly due to humanistic geographers emphasizing social construction of space, perception of place and the iconography of landscape in geographical discipline

- \* helped in reconstruction of regional geography. It also emphasizes that regions must not be studied as separate entities. Hartshorne's central claim was about geography was its integrative or synthetic purpose.

- \* Revival in 1980s was due to intellectual inspiration that came from three general directions

I → streams of thought referred to collectively as humanistic



uniqueness in society → culture and landscape → change

- gave central and active role to human awareness and human agency, human consciousness and human creativity.

- they emphasized social construction of space, the perception of space and the iconography of landscape in geographical discipline.
- seeing human landscapes as both, shaped by and themselves shaping broader social and cultural processes

II → Marxist geographers' analysis of uneven development and changing spatial division of labour. Due to regional disparities

- emphasis was because this unevenness may have variable influence on the levels of quality of life in different regions of the world.

III → attempts to create contextual theory in geography

- ~~contextual~~ contextual geography takes into account the interaction of place and human beings which produces homogeneity and disparity in geographical features of regions.
- came from increasing role of sociology in human geography.
- region is viewed to be linked inextricably with human agency and social structure.

sense of belongingness to a place and iconography of landscape led to a growing interest in relationship between geographical setting in particular and social life of the world, in general.

Reasons why AD became unpopular

- geography became simplistic
- mechanical inventORIZATION of unrelated facts
- not much attention paid to establishing causal relationships that integrated diverse aspects
- with loss of uniqueness of a place, geography in many ways was compromising unity of earth



### \* Analysis

- 3<sup>rd</sup> direction seen as potentially integrating 1<sup>st</sup> and 2<sup>nd</sup>
- 1<sup>st</sup> emphasizes human objective experience of a place
- 2<sup>nd</sup> & 3<sup>rd</sup> - view division of space in terms of objective sociospatial processes
- by 1980s areal differentiation was reinstated as a central perspective in human geography.

### \* Challenges and shortcomings

- most challenging dilemma is difficulty of neat boundary delimitation between places and regions
- criticized for being incapable of contributing towards effective generalization
- As per R.P. Misra, explaining areal differentiation in context of developing countries is difficult due to:
  - ① lopsided developmental processes
  - ② existence of dual economies in vast region of the country with market-economies being practised in only a few core areas.

For areal mitigating problems of areal differentiation, there should be strong existing and potential linkages between regions.

- concept was challenged by Bartholomew Ackerman who gave concept of
- most significant challenge was by Schaefer through his

ForumIAS

## Physical Geography vs Human Geography

- 1<sup>st</sup> started by Greeks

Hecateus gave more weight to physical geography.

Herodotus and Strabo emphasized human aspect

- Fundamental basis for dichotomy:

- in studies of natural phenomenon including climatology, meteorology, hydrology etc. it is possible to use the methods of natural sciences and to draw conclusions with a large measure of scientific precision.

- methods of natural science do not lend themselves very well to study of social and cultural phenomena.

- generalization about human groups must be limited in time and space and must relate to statements of probability rather than certainty.

### Additional Points

- methodological difficulty

- radically different frameworks of explanatory thinking in geography.

ex. use of law statements

est

lished

Bernhard Varen (Varenius) v  
essential differences in character  
in 1650.

Physical geography was emp

- Immanuel Kant

- Alexander von Humboldt

- Darwin - laid emphasis on phys...

The emphasis on physical geography post 1850 increased.

Koepfen, Davis, Penck, Jafferson, Mill etc.

### Notable instances

- \* Semple asserted "man is the product of earth's surface"

- \* Huntington emphasizing role of climate and weather conditions as the cause behind march of civilizations.

The German school was primarily concerned with environmental aspect and emphasized physical geography.

The Soviet geographers also conceived geography as a branch of science which deals with geomorphology, pedology, hydrology and meteorology. Major emphasis was because in initial stages of development, geography was taught by teachers who had geology background.

Emphasis on human geography started with

- Ritter who considered man as an agent who bring change in the landscape
- Lucien Febvre placed emphasis on human beings as elements of the 'landscape'.
- Vidal de Lablache founded school of human geography.

↓

contribution

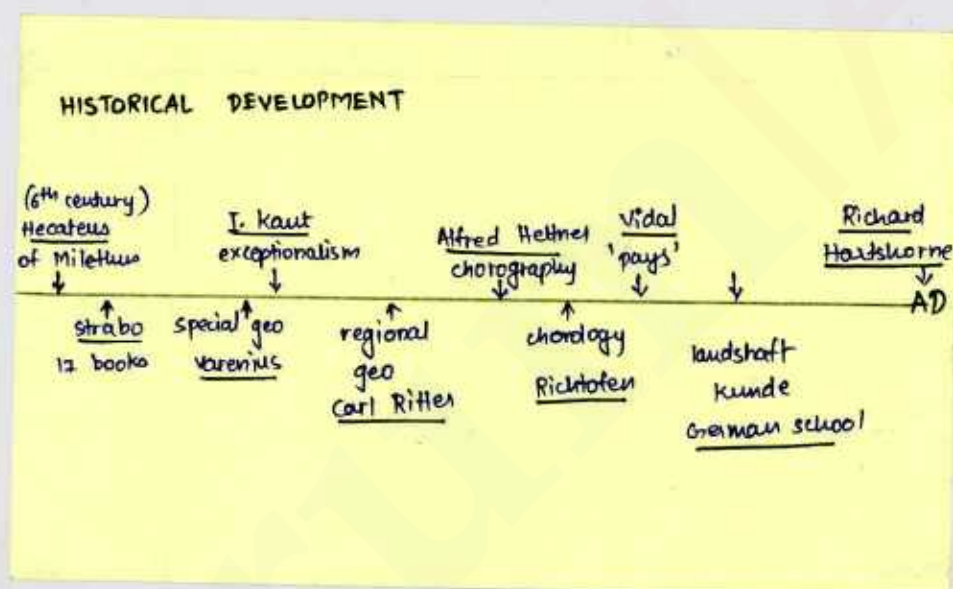
- gave less importance to elements of physical environment as determinants of cultural landscape
- had clear insight into weaknesses of physical geography and the deterministic argument.

Basic philosophy of followers of human geography was to establish a man-nature mutual relationship in which each of the two is dependent on the other.

Basic aim of research in physical geography was to clarify the unity of nature.

conclusion

- dichotomy is artificial and illogical
- dualism is the result of historical development of the discipline
- The two are the extremes of a continuum



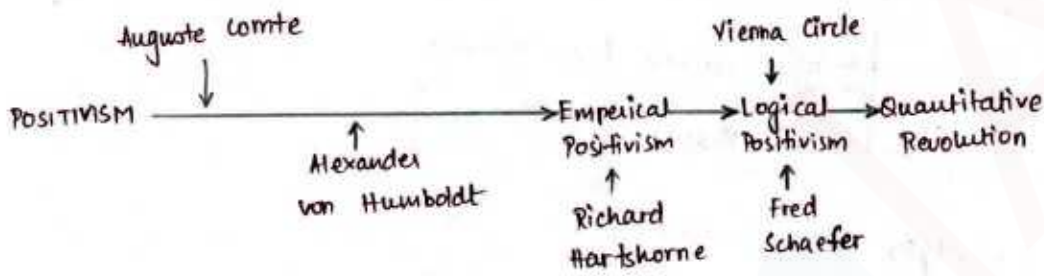


## Positivism

- established by Auguste Comte
- fallout of negativism of romanticism
- rejection of all speculation and value-laden concept
- tries to study objective reality which is verifiable

### In geography

- introduced by Humboldt in German school
- development-



- positivism developed as empirical positivism first  
i.e. objectivity on basis of physical observation  
and verification
- empirical positivism developed into logical positivism  
i.e. conclusion on the basis of reasoned logic  
which may or maynot be necessarily verified  
with empirical observation
- logical positivism was developed by vienna circle who  
later influenced GR.

## Fred Kurt Schaefer

- 1953 paper → "Exceptionalism in Geography"
- Areal differentiation was non-enthusiastic  
as no application of mind, so geography losing ground
- he said that  
descriptive method → reducing geography to mechanical inventORIZATION
- schaefer focused on scientific use of geography and making laws
- he used the term "spatial science" for geography
  - logic, science, law-making
  - analytical
- he emphasized analysis over description
- played role in making Geography a modern scientific discipline
- laid foundation of AR
- rejected kautian exceptionalism



## Locational Analysis given by Peter Hagget

- an approach of geography which focuses on the spatial arrangement of phenomena. Its usual methodology is spatial science.
- main objective of locational analysis was
  - building accurate generalization, models and theories with productive power
  - formulation of universal laws, theories and models in human geography about human behaviour and how people utilize their resources
- based on the philosophy of logical positivism which underpins the approach. concentrates on identification of theories of spatial arrangements and so is closely linked to the disciplines' quantitative revolution.

~~no. of geographers in USA advocated the cause of locational analysis in the 1950s~~

- based on empiricism, it presents a strong case for using geometry as the language for study of the spatial form.
- no. of geographers in the US advocated the cause of locational analysis in the 1950s

① Peter Haggett in his book Locational Analysis in Human Geography in 1965 appealed to adopt geometric tradition to explain order, location order and patterns in human geography.

such a focus needed:

- to adopt a system approach which concentrates on patterns and linkages within a whole assemblage
- to employ models as to understand man and environment relationship

iii) to use quantitative techniques to make precise statements (generalization) about locational order.

⑪ William Bunge in 1966 wrote a thesis on Theoretical Geography. In this he stated that geography is the 'science of location'. He also developed many theories using statistical and mathematical techniques.

⑫ Strong influence from field of economics in which spatial element was introduced. Led to close interrelationship between geographers and regional scientists in 1960s and 1970s. Led to attempts to build economic geography theories of spatial arrangement.

Other scholars

Morril, Cox, Col, Harvey, Chorley

⑬ Morril was strongly influenced by geometric traditions of Bunge and Haggett. In his book, "The Spatial Organization of Society" he argued "people seek to maximize spatial interaction @ minimum cost and so bring related activity into proximity ---- the result is that society is surprisingly alike from place to place because of predictable, organized pattern of locations and interactions."

Criticism

- ignores normative questions based on mistaken belief that "positive theory would lead to normative insight".
- did not reflect the reality of decision making processes.
- concealed complexities of real world.
- criticised on the ground that it encourages the social order of capitalism.

- due to locational analysis, there is over production and the economy enters era of overindustrialization.
- treat people as dots on map, statistics (data) on a graph or numbers in an equation.

### Impact

- substantially changed nature of human geography from mid-1960s
- developed models and procedures which could be used in physical planning.



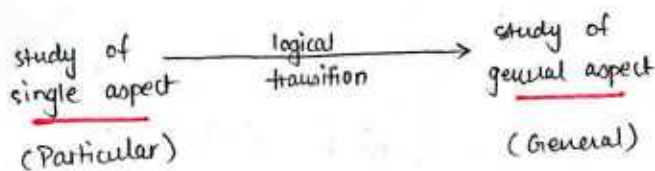


## General Geography vs ~~Systematic~~ Regional Geography

- dichotomy was raised by Bernhard Varenius in 17th century
- Varenius recognized the two main divisions and differentiated them.

### General Geography

- concerned with formulation of general laws, principles and generic concepts
- deals with one or a few aspects of human environment and study their varying performance in the world.
- deals with the whole world as a unit.
- mainly restricted to physical geography which could be understood through natural laws.
- draws inspiration from existing systematic sciences with a search for the universal and generic concepts.
- Analytic in approach
- Dichotomy later spelled out by Alexander von Humboldt. According to Humboldt, geography deals with the interrelationship of phenomena that exist together in an area.
- He emphasized need to recognize unity in diversity



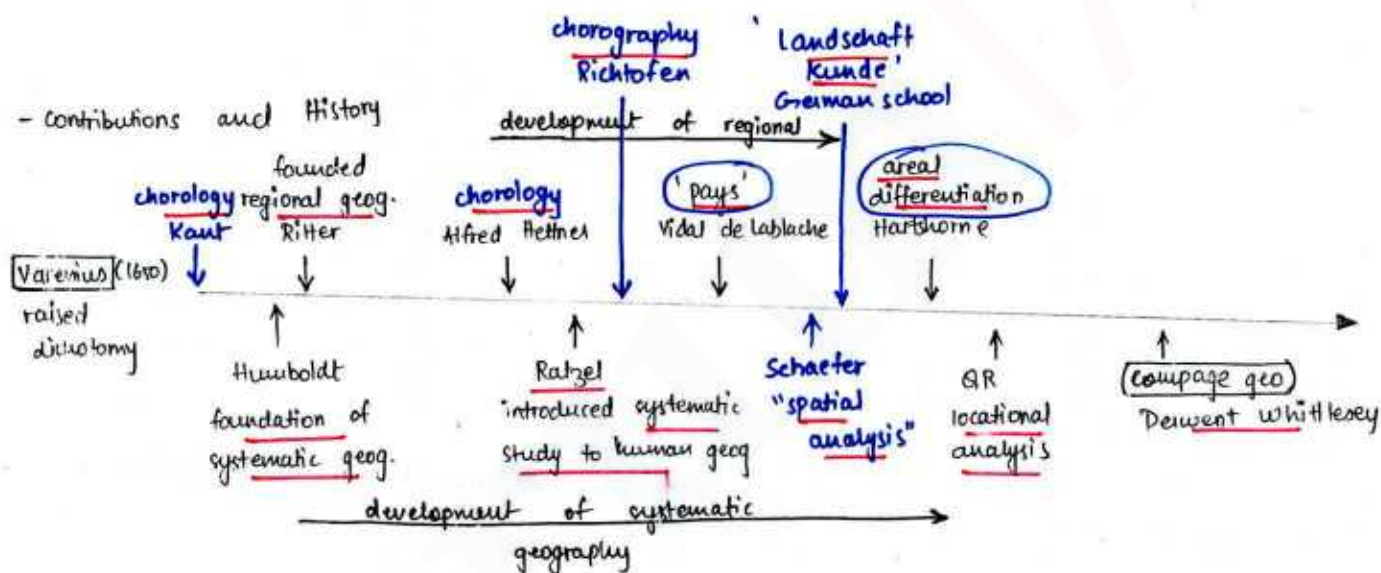
### Regional Geography

- seeks to bring together in an areal setting various matters which are treated separately in general geography
- deals with "specific situation in a particular locality". Focus on diversity, uniqueness
- is regarded as geography of regions. Deals with unique situations & peculiarities
- difficult to apply in human geography but helps in formulation of hypotheses and structured ideas.
- has not moved out of the ambit of particular studies
- synthetic in approach and descriptive  
     ↓  
     explained interlinkages

He believed in centrality of (general) systematic geography

- Carl Ritter stressed the dichotomy as need for a study of natural phenomena 'as a whole, as in parts' in order to comprehend the 'inherent plan' believed in centrality of regional approach

Diagrammatic representation



Newer Approaches to integrate both

- ① Regional synthesis
- ② compage geography - whittlesey

chorography → only describing about a place  
chorology → going beyond description and finding causal relationships between features to understand them in unity

③ by Richtofen

- ④ cultural landscape of Carl O. Sauer



## Conclusion

- geography is multidimensional not only in number of topics and regions but also approaches of study.
- geography is multivariate in
  - number of combination of natural sciences, social sciences and mathematics
  - ways in which geographers may combine these elements.
- idea of Devent
  - 3 branches of geography
    - i) General
    - ii) Compass regional geography
    - iii) Full descriptive regional geography
- idea of continuum of Brian J.L. Berry
- both fields support each other in final analysis

## Special Geography

- term first used by Bartholomeus Ackerman
- called Idiographic approach of Hettner
- Kant epistemology gave basis; he said that geography is physical study and not logical knowledge
  - ↳ formed the core of Hartshornes Areal Differentiation



## Physical Geography vs Human Geography

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Varenius had role in stating this dichotomy

- Fundamental basis for dichotomy:

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- methods of natural science do not lend themselves very well to study of social and cultural phenomena.

- generalization about human groups must be limited in time and space and must relate to statements of probability rather than certainty. Also methodological difficulty; radically different flw for explanatory thinking in geography

Bernhard Varen (Varenius) was one of the 1<sup>st</sup> scholars to suggest essential differences in characteristics in his Geographia Generalis published in 1650.

Physical geography was emphasized upon by many geographers

- Immanuel Kant (rejected dichotomy)

- Alexander von Humboldt

- Darwin - laid emphasis on physical aspect

- Oscar Peschel } raised dichotomy and emphasized phy. geo.
- Gretaud

☞ The emphasis on physical geography post 1850 increased.

Koepfen, Davis, Penck, Jafferson, Mill etc.

Notable instances

- \* Lepple asserted "man is the product of earth's surface"

- \* Huntington emphasizing role of climate and weather conditions as the cause behind march of civilizations.

The German school was primarily concerned with environmental aspect and emphasized physical geography.

The Soviet geographers also conceived geography as a branch of science which deals with geomorphology, pedology, hydrology and meteorology.

Major emphasis was because in initial stages of development, geography was taught by teachers who had geology background.

Emphasis on human geography started with Kant who used Comte de Buffon's idea

- Ritter who <sup>1<sup>st</sup></sup> considered man as an agent who bring change in the landscape
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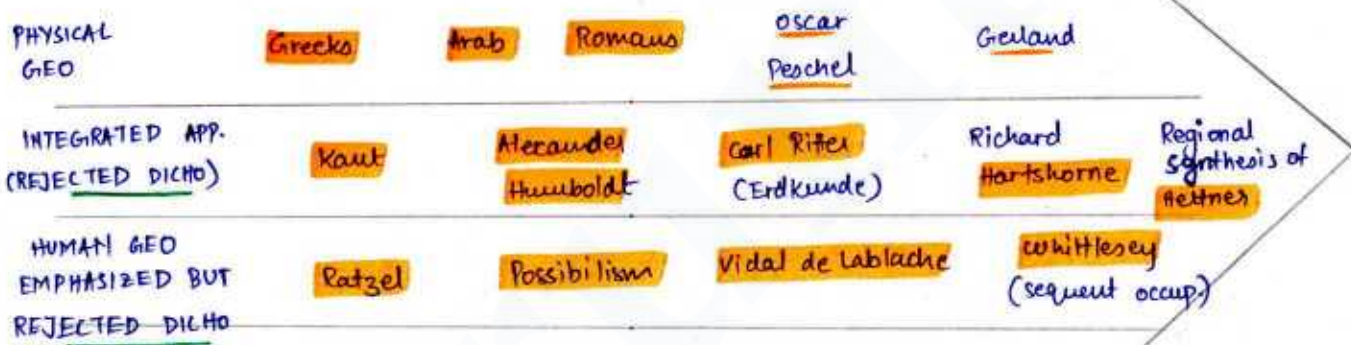
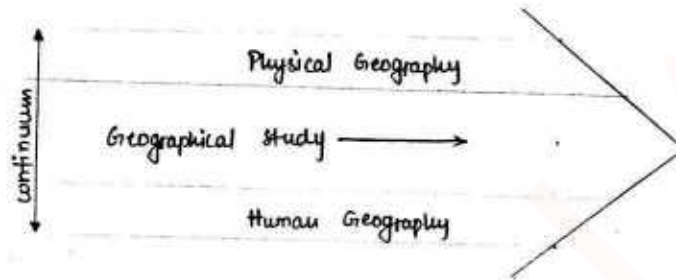
- dichotomy is artificial and illogical
- dualism is the result of historical development of the discipline
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• As per Richard Hartshorne,

if we divide geography into physical and human, we make the rest of the work illogical.

Therefore, the division into physical and human is the cause of geography being only a partial study







## Dichotomy between Functional and Formal Geography

- concept of space very important
- deals with locations, sites
- emerged to avoid controversy of other dichotomies

### FORMAL

#### Basic philosophy

uniform relief combined with uniform climate and uniform soil result into uniform land use, settlement and mode of life within a region.

#### Definition

- homogeneous areas or habitats inhabited by societies, social groups or nations are known as formal regions. They are defined on the basis of a single feature or "well-defined association of several selected features"

- geometric space on paper
- old concept; outdated
- absolute distance and space are relevant
- less dynamic, more static
- study phenomena which exists in a region or place and their interdependence on each other

### FUNCTIONAL

causal relationship exist between the complex and heterogeneous phenomena at one place and causal connection among phenomena at different places

- functional / nodal region is defined on the basis of its area of influence around a nodal centre or several nodal centres related to each other. Important factor for delimiting is spatial interaction of a node with its hinterland.

- real space on earth
- new concept
- absolute distance and space are of little relevance
- dynamic concept; constantly changing
- study structure and functions of a community within a space



- accessibility and isolations are measured in a special way, usually in terms of cost-distance, time-distance, mileage through a transport network etc. And these distances are measured from special nodes or axes.

### Presently

- formal regions appear outdated in present context and cannot help much in explaining the complex relationship between man and environment.
- with adoption of quantitative techniques and computer technology, geographers are moving from study of formal to functional regions.
- However, formal region site is complementary to the study of functional locations. Two are mutually interdependent.

P.E. James → semantic trap. Dualism is not mutually contradictory as ~~two~~ alleged opposites form a subordinate part of the other.

NOTES OF 1st Attempt  
(easier to understand)

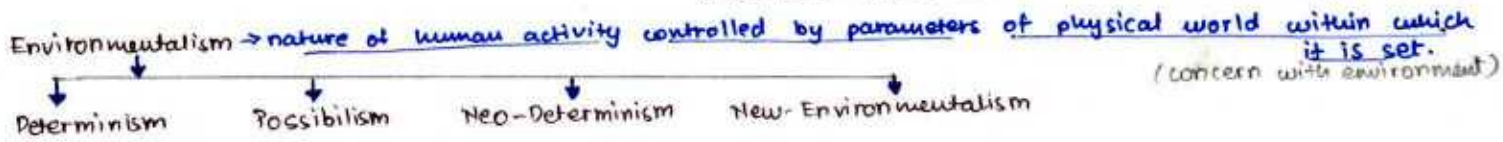








deals with man and environment relationship



### Determinism

First attempt to describe was by Greeks, Romans  
phy. features and character traits  
with reference to influence of natural cond<sup>n</sup>

- ↳ Hippocrates
- ↳ Aristotle
- ↳ Strabo

Arab  
↳ Ibn-Khaldun  
↳ Al-Idrisi

All scholars in past  
believed in determinism

### View point

- superiority of the environment
- nature is active, man is passive
- attitude, decision-making process, lifestyle governed by physical factors of environment.

Dominant thinking among American and German geographers at the turn of the 20<sup>th</sup> century.  
excited of Congo basin primates and eskimos being backward due to harsh environment.  
Classical geographic determinism

Friedrich Ratzel - founder of human geography (German), systematic study of human geography.

- founder of scientific determinism → social Darwinism supplemented to classical geographic determinism

- concept borrowed from "Origin of Species" by Charles Darwin in 1859
- published the book 'Anthropogeography' in 1881 - used deductive approach
- put forward concept of "Lebensraum" → 'living space' or 'living state'  
→ in 'Political Geography' 1897

compared state to a living organism  
advocated 'MIGHT IS RIGHT' - higher forms of civilization must expand @ cost of lower  
influenced immensely German thought till World War-II

Main idea - all civilizations appear through struggle, become mature and  
ultimately fade/deteriorate ex. Chinese, Nile valley

Justified capture of countries by superior and powerful countries by  
arguing that they will avoid anarchy and maintain law and order.

- He was convinced, man is the end-product of evolution, evolution dictated by  
ability to adjust to physical environment. - physical environment controlled human activities.
- convinced that course of history, mode of life, development stage influenced  
by physical features and location. - more emphasis on location

### Opined

"Similar location lead to similar mode of life"

ex. British Isles and Japan → compared their history

similarities - superpowers because of

- temperate location

- both mountainous countries (agri land less) → Tokyo basin (London basin)

- both had to look outwards to secure population → conquer

- insular location (invading them was impossible due to surrounded by water  
and had strong navy)



Ellen Churchill Semple - foremost women geographer, American

- direct descendant of Ratzel, staunch supporter of determinism
- produced the book 'Influences of Geographic Environment' in 1911.
- opening line in preface "Man is the product of Earth's surface"  
way of life (culture, tradition, history)  $\rightarrow$  topography (mountains, plateaus, plains)
- believed topography to be the main determinant
- distinguishes altitudinal characteristics of people living in different physical setting, terrain, and topography in her book.

People of mountainous region

- orthodox and conservative - traditional way of life, same as antecedents  
change not easily accepted
- self-reliant and courageous
- innocent, simple and honest

People of the plains

- progressive and innovative - change easily accepted
- timid and cowardly
- fox-like cunning

- she also believed that physical constitution of people also influenced by and moulded by environment

ex. people living in mountains had larger chest size and strong calf and thighs.  
people living on coasts are weak & flabby, strong chest & arm to paddle or oar

asserted that man can be studied scientifically only by the ground he tills, land over which he travels or sea over which he trades.

Ellsworth Huntington

- American, pupil of Davis

- emphasised on climate as the main determinant of culture, tradition, history and way of life. ex. of Hile valley, better climate helped civilization prosper, but it disintegrated as climate faded.

- published the book 'Principles of Human Geography' in 1945

- asserted civilization could develop only in regions of stimulating weather.

- also hypothesised that the cause of conquer of central Asia (Turk, Uzbek) was mainly due to failure of climatic cond<sup>n</sup>. Nomads invaded in search of food, water, fodder etc. - Mongol conquest of India and China

He gave reasons for development of temperate cyclone region technologically

cond<sup>n</sup> - Temp 20°C

Regions - NW Europe

reason - ideal for mental work

- RH 60-65%

NE USA

- human efficiency is high

- overcast sky

- variable wind

### CRITICISM OF DETERMINISM

- 1) Hypothesis cannot be tested empirically.
- 2) Ignores role played by man to influence his own culture, history and civilization.
- 3) Ratzel's hypothesis failed in some cases  
deviation and contrast found in regions  
ex. Khasi and Nepalis living in Meghalaya  
    ↓                      ↓  
maternalistic          paternalistic  
hate milk              love milk
- 4) Semple's theory was criticised for being overgeneralisation.
- 5) Huntington's theory criticised on the ground, development also depends upon people's resolve to work irrespective of climatic condition.



## POSSIBILISM

- came as a reaction to extreme generalisation of determinism
- associated with French geographers led by **Lucien Febvre** founded by **Vidal de Lablache**
- take man as an active agent. → to survive, improve economic & social cond<sup>n</sup>
- opined that physical environment **provides option**, number of which increases as **knowledge and technology** of a cultural group develops.
- asserted that **nature is never more than an adviser.**
- Febvre declared "there are no necessities but everywhere possibilities".  
"true and only geographical problem is that of utilization of possibilities."
- saw series of possibilities in physical environment but argued that **ways in which development** took place was **related to culture** of people concerned.  
except in regions of extremes like desert, tundra, equatorial and high mountains.
- people **based on their culture** **make decision** on using resources.
- impossible to explain differences in human society and its history based on influence of physical environment.
- people **are not just products of environment but also products of their culture.**

### Vidal de Lablache

- **minimised influence of environment** on activities of man. in his studies.
- central to his work was **genres de vie (lifestyles)** that **develop in different geographical environment.**  
↳ opined genres de vie are **products and reflections of a civilization** representing integrated result of physical, historical and social influences.
- he tried to explain differences between groups in same or similar environment citing variation in attitudes and habits creating numerous possibilities.
- in his Ph.D thesis on **plateau of France** he showed different landuse depending upon culture.

ex. Maratha  
↓  
Andhra → grapes

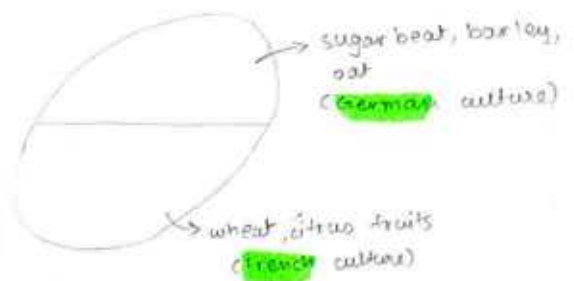
Punjabis      Haryanavis  
↓                      ↓  
rice                      rice

changed cropping  
due to Green  
Revolution

Arunachal Pradesh  
↓  
apples

ex. growth of trees under artificial conditions  
Banana and rubber in Tundra

ex. Tulip by Dutch farmers under artificial conditions  
in greenhouses.



### CRITICISMS OF POSSIBILISM

1. Despite technological advancement, man cannot get rid of physical environment (ecology disturbed, resources drained)
2. Range of possibilities limited in all regions.
3. Man cannot go against plan of nature, environment, will lead to problems in the long run.  
ex. rice cultivation in Punjab, Haryana causing environmental problems.
4. Promotes over-anthropocentrism
5. Does not encourage study of geographical environment



### - Vidal de la Blache (regional geography)

- distinction between natural environment and human communities.
- relationship between human communities and cultural milieu most important aspect.
- this mutual relation is an ongoing dialogue that produces a human world full of 'genres de vie' (lifestyles)  
lifestyles refers to particular people in particular places
- acc. to him, geographers have to focus on 'pays' (smaller areas) to do their research.
- acc. to him man and nature are inseparable. Not possible to distinguish between influence of one on another.
- argued for regional geography
- method was inductive and historical



## Neo-Determinism

- put forward by Griffith Taylor - Australian geographer in 1920

- came as a reaction to possibilism

↳ argued that possibilism developed in regions of temperate environment which provide many viable alternatives, such environments are rare

- coined the term 'stop-and-go determinism' to describe his views.

Central Idea - nature for each region has given a blueprint programme, intelligent people follow it.

- best economic programme for a country to follow has in large part been determined by nature, geographers duty is to interpret this programme.

- in his book "Geography in 20<sup>th</sup> century" he correlated rainfall & human settlement in Australia

- concept of 'stop and go determinism' conceptually attempts a balance suggesting

★ neither there is a situation of absolute necessity (determinism)

★ nor there is a condition of absolute freedom (possibilism)

briefly he explains

- human beings can conquer nature by obeying it.

- they have to respond to red signals given by nature

- they can pursue with development when nature permits modifications.

**POSITIVISM** - also called **empiricism**

Philosophical approach characterised by emphasis on **science** and **scientific approach** as the **only source of knowledge**.

- sharp distinction between realm of **fact (data)** and **(culture) value**.
- strong **hostility towards religion** and traditional **philosophy and metaphysics**.

Developed after the French Revolution

- established by Auguste Comte of the Vienna Circle 1820
- anything that cannot be converted into data is not knowledge
- emphasised **factual knowledge**.
- declared metaphysics as a useless branch of enquiry.

Positivists followed **empirical** (experienced) approach in place of **deductive** approach

**inductive, scientific**

**data first then formulate law**

**law first, then checked, applied**  
general to particular

Main objective <sup>particular to general</sup> was to formulate **strict scientific laws** about **human behaviour**.

Inspired quantitative revolution at a time when romanticism was in vogue

**Quantitative Revolution**

- roots in **positivism**
- application of **statistical** and **mathematical** techniques, **theorems** and **proofs** in understanding geographical systems is known as quantitative revolution in geography.
- statistical methods → **generating and testing hypothesis** **hypothesis**  
using empirical data

mathematical techniques and theorems → **deriving models** from initial abstract assumptions. **models**

**Main objectives**

- put subject on sound **theoretical footing** through use of **mathematical language** and make its methodology **objective and scientific**.
- **change descriptive character** of the subject and make it a **scientific discipline**.
- application of statistical techniques and emphasis on **fieldwork** for **generation of data**.

**Assumptions**

- Man is a **rational person** trying to optimise his profits.
- Man has **infinite knowledge** of his space
- Assumed 'space' as an **isotropic surface**
- **No place for normative questions**, only objective interpretation of the geographical reality.
- Based on **idealised situation**.



1<sup>st</sup> (1950-1958)

- characterised by development of methodology for generation of data, sampling techniques, central tendencies and deviation method

2<sup>nd</sup> (1958-1968)

- emphasis on correlation, regression and multivariate analysis method.
- stress on gravity models

3<sup>rd</sup> (1968-1978)

- emphasis on use of nearest neighbour analysis.  
↳ technique helped in spatial distribution of settlements.

4<sup>th</sup> (1978-1988)

- emphasis on geographical information system (GIS) and GPS based on mathematical and statistical analysis.

Presently use of remote sensing techniques and computer-aided cartography.

### Merits

- firmly based on empirical observations and are readily verifiable.
- techniques help in reducing data and facts to a manageable number of facts.
- help in estimation, interpolation and simulation of data necessary for forecasting.
- provides linguistic economy
- models so formulated are free of biases.
- provides geography a sound philosophical, scientific and methodological base.

### Demerits

- subject reduced to space geometry  
geometry is not an acceptable language to explain man-environment relationship.
- empirical data excludes normative questions  
have bearing on any economic activity, decision-making process regarding utilization of resources etc.  
ex. dairy farming not developing among Khasias (Meghalaya) & Lushais (Mizo)  
Muslims hate piggery  
Sikhs dislike cultivation of tobacco.
- advocates focused on locational analysis, ∴ it promotes capitalism.
- criticised for considering man as a rational person.
- Prof. Minshul, L.D. stamp → scientific laws cannot be formulated on nature of man
- danger of over-generalization.

final idea → inclusion of human values essential for study of man-environment rel<sup>n</sup>.  
Despite all omission & commission, quantitative revolution has played a significant role for a long time and is largely responsible for the present phase of study of geography.



## QUALITATIVE APPROACH / Ethnomethodology

came as a reaction to quantitative revolution

- advocates data, statistics and mathematical techniques are not important.

Behaviouralism      Radicalism      Humanism      Welfare Approach

### Behaviouralism

- concept came in geography from psychology in 1960-70

- developed as a result of deep dissatisfaction with model and theories of positivists.

Basic assumption- man always is not a scientific or rational man. ↓  
mechanistic models

ex. does daily work to gain satisfaction

- farming is a way of life in India, flooding does not deter him from continuing

social status dependent on his field

- concept was a psychological turn in human geography which emphasised role of cognitive and decision-making variable in mediating relationship between environment and spatial behaviour.

concept of 'rationality of man' challenged by Wolpert in 1964 in his PhD Thesis

He studied Swedish farmers who obtained one crop in a year, sometimes one crop in 1-2 years.

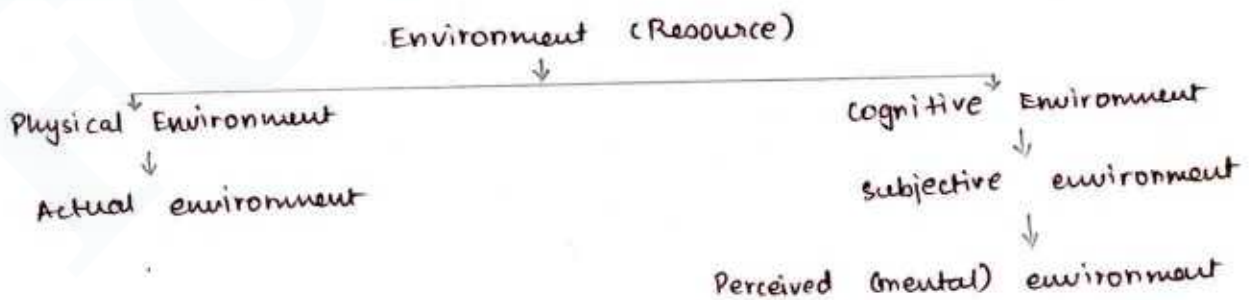
All statistical models failed to explain this behaviour.

### \* Objectives \*

- define cognitive environment which determines decision-making
- search methods that uncover latent structure in decision-making.
- emphasis on processual explanation of human activity rather than structural.

Behaviouralist say:

Environment has duality of character



~~essence~~ Essence of behavioural approach-

the way people behave is mediated by their understanding of environment in which they live

environmental cognition and behaviour are intimately related.

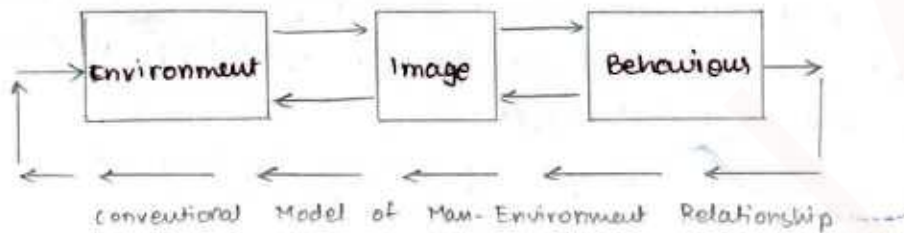
### Assumptions

- 1) There exists identifiable environmental images that can be accurately measured.
- 2) There exist strong relationship between revealed images and real world behaviour.

### Cognitive Environment

- perceived mental environment (intangible)
- different actors perceive different images
- images based upon culture, customs, tradition etc.

∴ research focused on individuals than the environment.



### Criticism

- instead of community or society, behaviouralist studied individual
- single person cannot be used to formulate laws.
- concept came from psychology, testing first done on animals
- Research on individuals time-consuming and expensive
- criticised on assumptions of measuring images accurately without distortion.
- has huge gap between theory and practise.

Despite constraints and methodological limitations, behavioural geography is now widely accepted with positivist orientations



## RADICALISM

- developed in 1970s as a reaction to quantitative revolution and positivism (regional science)
- began as a critique within contemporary liberal capitalistic society but later coalesced around a belief in power of Marxian analysis.

Radicalist were

- against data
- emphasised traditions, aesthetic, family norms, ideas etc.

Political issues that motivated radicalist:

- Vietnam war
- Discrimination against coloured people (especially American blacks)
- ~~prevailing~~ poverty and inequality, starvation due to mismanagement of economy and exploitive use of resources.

exposed social & political irrelevance of geography as a social science

∴ Prof. Peet, of Clark University formed "Association of Radicalists"

radicalised students and junior faculty who challenged traditional geography

Antipode was its journal, started in ~~journal~~ 1969

↳ Radical Journal of Geography

↳ started with the aim of publishing papers of younger generation with revolutionary leaning.

↳ papers had to deal with contemporary issues of

- life in ghettos
- discrimination
- mismanagement of resources

directed against capitalism

Cond<sup>n</sup> for membership: age < 35 years

In brief, radicalism was a quest for social relevance of the discipline

Objectives

- expose -ve aspects of capitalistic countries
- highlight weaknesses of quantitative revolution and positivism.
- prescribe revolutionary changes and solutions to social problems.
- develop just, equal, tension-free, peaceful and enjoyable society.
- against racism, imperialism, national chauvinism
- remove regional inequalities.

Though strong in cause taken up, it lacked the ~~answer~~ <sup>theoretical base or</sup> solutions needed to solve or address the causes.

Radicalism disappeared in 1992 after Prof. Peet crossed 35 years

- early proponents were Peter Kropotkin and Elisee Reclus
- advocates removal of state and its replacement by voluntary groups of individual who can sustain social order without external private property or state.
- against ~~be~~ bureaucracy - anarchist believed that they stifled judicious distribution of resources
- they believed in integrated labour rather than division of labour.

#### Peter Kropotkin

- advocated alternative capitalism
- believed that unselfish devotion to the welfare of others is the only lasting basis of social life.
- highly influenced by communism.
- criticised capitalism for fostering severe competition leading to economic disparities that threaten survival of human society.
- In their opinion, production decisions should be democratically made at grassroots level taking into account the needs of the people.



- unequal territorial relationship, usually between states, based on domination and subordination is known as imperialism.
- was considered as largely responsible for destructive economy to which poverty is attributed.
- series of articles published against imperialism, on under-development in the 3<sup>rd</sup> world, centre-periphery relationship

### James Blaut (1970)

↳ argued that conventional western science is closely interwoven with imperialism

↳ asserted imperialism is underpinned by western ethnocentrism

↳ He severely criticised the eurocentric model of European culture and advocated multi-centric-ethnocentric model.

↳ argued against the notion of 'European miracle' and 'superiority of white race'.

developed due to deep dissatisfaction with mechanistic models of spatial science developed during the quantitative revolution.

- humanists objected geometric determinism
- opposed models developed by statistics and mathematics that reduced people to dots, number, dots data in equation, maps, graph etc.

Humanistic approach was first advocated by W. H. Kierkegaard (1951)

Term 'humanistic geography' first used by Yi-Fu Tuan in 1976.

They attempted to develop geography 'of the people, by the people & for the people'.

Humanism is the conviction that men and women can best improve the circumstances of their lives by thinking and acting for themselves, by exercising their capacity for reason.

- treated geography as a social science.

- give central and active role to all human values like human agency, human feelings, attitude towards life, human awareness, and human creativity social and religious values.

According to them, human world can be understood by examining the social institutions and cultural background of the people.

Social-religious values restrict the human utilization of resources and his inventiveness.

Methodology of human geographers

**PDOLI**

1. **Participation** - field visit, interaction with residents.
2. **Discussion** - clearing out points by discussion of query & doubts on behaviour.
3. **Observation** - gauge data that people may try to conceal ex. income
4. **Logical Inferences** - inferences from above 3 steps.

Frame of Geographical Investigation

**GKTCPLER**

~~Explored~~ Tuan explored five themes of general interest to geographers

1. Geographical Knowledge - All people, even animals, have a strong geographical sense.  
People have a good range of ideas about their space.

2. Territory and Place (Topophilia)

3. Crowding and Privacy

4. Livelihood and Economies

5. Religion

Human geography tries to understand how geographical activities and phenomena reveal quality of human awareness.

### criticism

- 1) language is not precise and mathematical  
↳ chance of ambiguity and researchers feelings being involved.
- 2) laws based on qualitative research can never be universal.
- 3) overemphasis of role of cultural values and institutions.
- 4) Methodologically obscure, therefore difficulty to ascertain reality.



- approach to human geography that emphasises question of inequality and social justice is known as welfare geography.
- emerged from the radical reaction to quantitative revolutions which was thought to be insufficiently concerned with social issues.

- Developed in 1973 when Prof. Smith published his book "Geography of Social well-being in USA".

- According to Smith,

a welfare society is one in which all people have sufficient income to meet their basic needs.

a society where all are treated with equal dignity, opportunities, have equal rights and where opinion of all people are listened and respected.

Welfare state may be judged, as per Smith, on the basis of

- literacy rate
- health
- per capita income

He advocated plotting of literacy, health and per-capita income on maps to demarcate areas that were lagging behind.

Scandinavian countries started delineation of welfare regions to produce maps and research paper.

Subsequently adopted by NZ, Aus, Japan and Canada.

At present, approach is popular both in developing and developed countries.

### Criticisms

- demarcation and plotting of welfare regions is a difficult task.
- reliable data on health, disease, education and per capita income is not available
- definition of welfare varies from people to people, place to place, region to region and country to country
- qualitative approach in which no result can be tested statistically.
- developing welfare approaches in existing social orders is difficult.



## LOCATIONAL ANALYSIS - empiricism based

- came in geography in 1950-60, presented geog. as positivist social science
- based on philosophy of positivism of Auguste Comte and quantitative revolution.

Basic objective - formulate universal laws in human geography about behaviour of man. (accurate generalisation, models & theories with productive power)

- focuses on spatial arrangement of phenomenon.
- accords special privilege to empirical observations over theoretical statements.
- strongly advocated for use of geometry as a language for study of spatial form. → Haggett in his book "Locational Analysis in <sup>Human</sup> Geography" (1965)  
(Peter)
- does not take into consideration the normative questions of the society

Laws formulated with the help of locational analysis started failing because what is economically profitable may not be socially acceptable.

Main criticism of locational analysis are those of quantitative revolution

### Main criticisms

- \* Ignores normative questions that dictate human behaviour in a huge way.
- \* Models developed conceal complexities of the real world.
- \* Encourages the social order of capitalism by giving a chance to capitalists to optimise profits.
- \* Models so developed give an incomplete picture of man.
- \* interdependence at global level → spatial interdependence more important than locally experienced env. dependencies.

### Focus needed

- to adopt a systems approach concentrating on patterns and linkages
- employ models to generalise
- use quantitative methods.

### Spatial Analysis

- quantitative techniques employed in locational analysis
- popular during QR, positivism inspired
- followers consider HG as that component of social sciences which focuses on role of space as a fund. variable influencing both society's org. and operation

- distance
- dir<sup>n</sup>
- connection



- study of areal variation of human and physical phenomena as they relate to other spatially proximate and causally linked phenomena is known as areal differentiation
- term coined and used by Hartshorne in his classic work 'The Nature of Geography' published in 1939

### Hartshorne Richard

- main thrust was on rational description and interpretation of the variable character of the earth's surface
- strong supporter of regional geography.  
in his opinion, each region is different from neighbouring region  
task of geographer is to highlight salient and unique features of the region.
- emphasised regional laws in human geography.  
centre claim about geography is its integrative or synthetic purpose.

### Historical Evolution → changing perspectives

- oldest tradition of western geographical inquiry.
- set forth by Hecataeus of Miletus in 6th century BC
- codified in the form of chorology by Strabo who declared

The geographer is the person who attempts to describe the parts of the earth.

1980s - reinstated areal differentiation as a central perspective of in  
↓  
human geography

### Intellectual inspiration from 3 general directions

- 1) streams of thought referred collectively as humanistic geography  
↳ central, active role to human awareness and human agency

↳ seeks to explore composition of landscapes, interpreting their symbolic content and reimbursing landscape in their social and historical context.  
briefly, interpretation that allows us to see human landscape as both shaped by and themselves shaping broader social & cultural processes.

- 2) Analysis of uneven development and changing spatial division of labour, investment

- 3) Attempts to create contextual theory in geography which tries to establish importance of time, place, space in the cruciarity of nature of activity.

3rd influence potentially integrates the other two

1st thought emphasises human objective experience especially of the observer

2nd thought emphasises division of space

→ contextual geography takes into account interaction of place and human beings which produces homogeneity and disparity in geo features of a region

- role of sociology. region is viewed as inextricably linked with human agency & social structure.



criticism

- demarcation of region in contemporary world not possible due to territoriality being dynamic and irreducible to a singular and temporally fixed set of spatial units.
- incapable of contributing towards effective generalisation.
- Regions are not independent, they are inter-dependent.
- demarcation of regions, physical and cultural phenomenon are super-imposed.  
∴ exercise demands a lot of cartographic skills.

Despite all criticisms, areal differentiation is being considered as the rational and scientific definition of the discipline of geography.

chorology - study of areal differentiation of the earth's surface

→ studying regional geo went out of fashion in 1960s due to growing popularity of quantification  
↓  
1980 onwards AD emphasised

\*R.P. Mishra\*

- explaining AD in context of India (dev. countries) is difficult due to:

1) lopsided development process

2) existence of dual economies in vast areas while market-oriented economies are practised only in a few areas.

∴ For mitigating such problems of AD, there should be strong existing and potential functional linkages between regions.

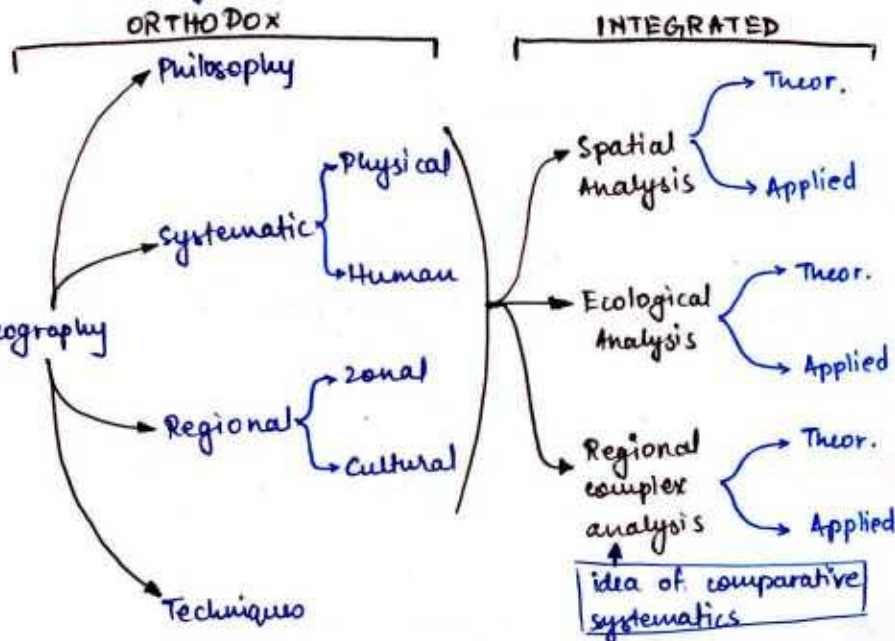
- humanistic geography → iconography of landscape in geographical discipline
- uneven development → perception of place
- contextual theory → social construction of space

**REGIONAL SYNTHESIS** → (complex whole made up of a no. of parts unified)

- thought that advocated geography must be **synthetic** (ie combining separate elements to form a coherent whole)

- ~~the~~ Geography was so far divided into various fields by various dichotomies.

Haggett felt that it was more valuable in the way to divide the subject in the way it analysed the subject.



### INTERNAL STRUCTURE OF GEOGRAPHY (Haggett)

i) **Spatial Analysis** - concerns with varieties in **localization and distribution** of a significant **phenomena** or a group of phenomena

ii) **Ecological Analysis** - concerns itself with the **study of connections** between **human and environmental** variables.

It is an intra-regional analysis of spatial distribution of phenomena.

iii) **Complex Regional Theory** - **combines the results** of spatial and ecological analysis. Appropriate regional units are identified by areal differentiation.

**Limitations** - not been able to make much advance

main reasons - synthesis deals with phy. and human components, biotic and abiotic factors which are governed by **diff. physical** and social laws.

- some **basic constraints** come in the way of making geography a discipline of synthesis.

- persisting **dilemmas** between **analytical and narrative** techniques of geographical analysis.

- general absence of academics to new trends in area differentiation. Attributed to 'multi-scalar' nature of the



Better understood by citing **James Conant**

- described science as an interconnected series of concepts and conceptual schemes that have developed as a result of experimentation and observation and are still undergoing further experimentation and observation as the universe is further explored.

Geographers are like any other scientist, identified not much by the phenomena they study as by the integrating concepts and processes they stress.

Geographical POV  $\rightarrow$  spatial

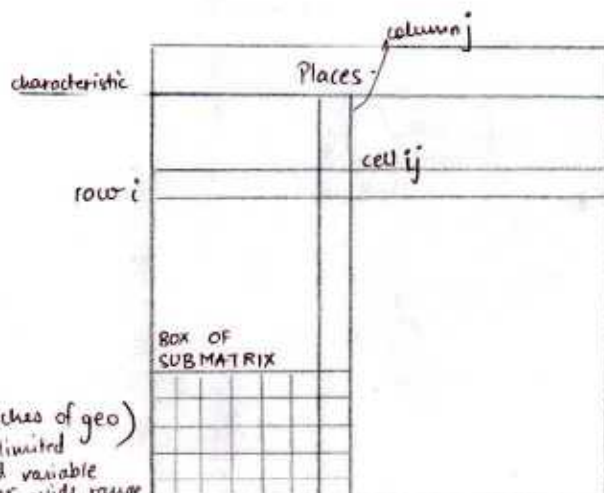
integrating concepts and processes  $\rightarrow$  relate to spatial arrangements and distributions  
to spatial integration  
to spatial interaction and organisation  
to spatial processes

spatial AIP

$\rightarrow$  define ways of viewing & not that which is viewed.

Regional synthesis was explained by **Brian J.L. Berry** in Annals of the Association of American Geographers, Vol. 54 (1964)

- used **geographical matrix** to explain (similar to matrix in maths)
- **assumption**  $\rightarrow$  **complete 'geographical data files'** are available so that data can be arranged in a rectangular array or matrix
- **simple system** in which **traditional dichotomies** are included as references.
- highlights 'the **unity of spatial viewpoint**'
- geographical characteristic  $\rightarrow$  **row**  
place under study  $\rightarrow$  **column**



Approaches to regional analysis

- i) arrangement of cells **within a row** guides us to **study maps and spatial distribution** of geographical features (systematic/topical branches of geo)  
 $\rightarrow$  find patterns & also in limited range of funt inter-related variable over wide range of diff. place
- ii) arrangement **within a column** helps us study **localised variable associations** and local inventories and how they differ in space (regional geography)
- iii) comparison of two rows useful for studying spatial co-variation or **spatial association**
- iv) " " " " " " **areal differentiation** in its holistic sense

Berry has explained RS with help of whole series of geographic matrices presented in their correct temporal sequence

### Third Dimension

vi) helps study of spatial variation of geo. features

vii) enables study of changing spatial association

~~vi)~~



term dichotomy borrowed from botany, means branching of the subject.

~~It~~ It is a methodological problem w.r.t delineation of the sphere of geography and methodology for its study.

Has become quite conspicuous during post-renaissance period in Europe.

Main dichotomies

1. General vs Regional
2. Physical vs Human
3. Historical vs Contemporary
4. Study of formal sites vs study of functional locations

Geographers right from ancient times have been dividing the subject into branches

ex. Hecateaus was in favour of universal geography while Herodotus was a supporter of spatial geography.

### General vs Regional nomothetic vs idiographic

also general or universal and special or particular

Issue first ~~raised~~ raised by Bernhard Varen, also known as Varenius

Systematic geography (general geography) deals with a few aspects of the human environment or the human population and study their varying performance in the world.

As viewed by Varenius, general geography is concerned with the formulation of general laws, general principles and generic concepts. It is essentially analytical

Gradually, all studies of generalistic nature acquired status of systematic geography.

It grew out of inspiration from existing systematic sciences with a search for universal and generic concepts.

Regional geography in traditional sense seeks to bring together in areal setting various matter which are treated separately in topical geography.

It is the study of regional geography.

It is often distinguished by its interests in "a specific situation in a particular locality". Necessarily synthetic

It is often hailed as the highest form of geography.

In brief, general geography deals with the whole world as a unit, mainly restricted to human geography

Special or regional geography was primarily intended as description of individual countries and world regions, though difficult to establish laws in regional geography it has helped in formulation of hypothesis and structural ideas.

After Varenus

### Alexander von Humboldt

- divided geography into cosmography and geography
- believed in inductive method and emphasised importance of empirical or scientific method of research.
- was inspired by overriding ~~for~~ concern for universally applicable laws

### Carl Ritter - teleologist

- conceived geography as regional science
- emphasised coherence in special arrangement of terrestrial phenomena.
- studied areas synthetically

|                   | 1             | 2             | 3      | 4      | 5    | 6         | 7          |
|-------------------|---------------|---------------|--------|--------|------|-----------|------------|
| General geography | North America | South America | Europe | Africa | Asia | Australia | Antarctica |
| Landforms         |               |               |        |        |      |           |            |
| climate           |               |               |        |        |      |           |            |
| soils             |               |               |        |        |      |           |            |
| Plants            |               |               |        |        |      |           |            |
| Animals           |               |               |        |        |      |           |            |
| Economic          |               |               |        |        |      |           |            |
| Social            |               |               |        |        |      |           |            |
| A Urban           |               |               |        |        |      |           |            |
| B Settlement      |               |               |        |        |      |           |            |
| C Population      |               |               |        |        |      |           |            |
| D                 |               |               |        |        |      |           |            |
| POLITICAL         |               |               |        |        |      |           |            |

p = New branches



Conflict

- logical dichotomy
- geography defined differently by different geographers.
- definitions range over a variety of interrelated phenomena on the earth surface.
- geography is multidimensional not only in number of topics and regions which can be included in one study but also in approach of study.
- multivariate not only in its combination of natural sciences, social sciences and mathematics, but also in way different geographers may combine these elements.

In words of Berry,

"regional and general geography are not different approaches, but are just the two extremes of a continuum"

- geographical studies do not fall into systematic (topical) and regional groups but are distributed along a gradual continuum from topical studies of most elementary integration at one end of regional studies to a most complete integration at the other.

All material objects and phenomena which exist in real world and have been observed have two entities - individual or particular and general or universal.

They have ~~peculiar~~ particular characteristics which are peculiar to them making them unique, they also have some general features common to other objects of the same type. It is their individuality ~~that~~ that makes them different from other objects while certain recurrent features link them to a group of objects.

Therefore, general characteristics exist in and are seen through, the particular and the individual characteristics and are not independent of them, the two are mutually interpenetrative.

The dichotomy of systematic and regional therefore falls, as they do not oppose but support each other in the final analysis.

## Physical and Human Geography

First done by Greeks.

Hecateus → physical geography

Herodotus and Strabo → human geography

considered to be an essential dichotomy on the grounds that respective methodologies of physical and human geography must be different.

Also, methods of natural sciences do not lend themselves very well to the study of social and cultural phenomena, since generalisation of human groups are limited in space and time and relate to statements of probability rather than certainty.

Varianus was the first to point out these essential differences in *Geographia Generalis*, 1650

All geographic studies are aimed at developing an understanding of the earth surface and its physical and social phenomena both as spatially varying entities unique in their own way as well as components in a mutually interacting system.

Methodology adopted to promote such an understanding differs from field to field and is essentially designed to suit the requirements of the content intended to be studied and the underlying objectives involved therein.

∴ from above discussion, dichotomy sounds artificial and illogical.

The dualism is the result of historical development of the discipline.

same in this case, both are extremes of a continuum.

Division of geography into physical and human geography results in the study being only a partial study.



## Study of Functional (or Nodal) Region and Geography of Formal (or Uniform) Region

Means the division of geography into studies of geography of real places on earth's surface and the geometric space on paper.

idea emerged to avoid controversy of regional and systematic and physical and human geography.

### Function location or functional region

- variety of relief, soil, land use, industry, transport linkages and marketing centres these phenomena are united by functioning and working together as part of an economic and social system.
- functional locations not only affect phenomena ~~that~~ at that very place but also phenomena of place away from it.
- According to followers of functional regions, causal relationships exist between complex and heterogeneous phenomena at one place and the causal connections among phenomena at different places.
- Homogeneous areas or habitats inhabited by societies, social groups or nations are known as formal regions.  
Two or more different societies combine to form a community in a functional area. By definition, almost similar to formal regions.
- Purpose of functional location is to study structure and functions of a community within a space.

### Formal region

- concerns with study of phenomena which exist in a region or place and their interdependence on each other.
- Basic philosophy is that uniform relief combined with uniform climate and uniform soil results into uniform land use, settlements and mode of life within a region.
- Accessibility and isolations measured in a special way, usually in terms of cost distance, time distance or mileage through a transport network, and these distances are measured from special nodes or axes in study of functional region

with adoption of quantitative techniques and computer technology, geographers are moving from the study of formal sites to that of functional locations and therefore the two are mutually interdependent. Therefore the dichotomy also looks illogical.

As per P.E. James, acceptance of many dichotomies is a semantic trap.

Dichotomies are not mutually contradictory.

Dichotomies ~~seizes~~ to cease to exist when one of the alleged forms a subordinate part of the other or when is derived from the other.

It may exist for some, may not for others based on certain basic attitudes of the culture.

All dichotomies have caused certain damage to geographical thinking.



## What is Human Development

- process of enlarging people's choices, increasing their opportunities for education, healthcare, income and empowerment and covering the full range of human choices from a sound physical environment to economic, social and political freedom.
- increasing the range of people's choices is the most significant aspect of human development

## Measuring Human Development

- The HDI ranks countries based on their performance in the key areas of health, education and access to resources.
- Rankings are based on a score between 0 to 1 that a country earns from its record in the key areas of human development.
- Indicators to assess health is life expectancy at birth
- Adult literacy rate and the gross enrolment ratio represent access to knowledge
- Access to resources is measured in terms of purchasing power (in US dollars)
- HDI measures attainments in human development
- Each dimension is given a weightage of  $\frac{1}{3}$ . Human development index is a sum total of the weights assigned to all these dimensions.
- not the most reliable measure. Because it does not say anything about distribution.

Pakistani economist Mahbub-ul-Haq created HDI in 1990. UNDP uses this index to publish HDR annually since 1990.

## HUMAN POVERTY INDEX

- related to HDI
- index measures the shortfall in human development
- non-income measure.
- following measures are taken into account
  - probability of not surviving till age of 40.
  - adult literacy rate
  - no. of people who do not have access to clean water
  - no. of small children who are underweight
- more revealing than HDI
- looking at both HDI & HPI gives an accurate picture of HD.

## International Comparisons

- Size and per capita income are not directly related
- smaller countries have done better than larger ones
- relatively poorer countries ranked higher than richer neighbours
- countries can be classified into 3

|        |               |    |
|--------|---------------|----|
| High   | $> 0.8$       | 57 |
| Medium | $0.5 < < 0.8$ | 88 |
| Low    | $0.5 >$       | 32 |

## HUMAN DEVELOPMENT IN INDIA

114

- with a composite HDI value of 0.547 India finds herself grouped with countries showing medium human development.

- Some reservations have been expressed about the approach as well as indicators selected to calculate index.

Lack of sensitivity to historical factors like colonisation, imperialism and neo-imperialism, socio-cultural factors like human rights violation etc.

### composite index

i) life expectancy → @ birth

ii) education → mean yrs of schooling + expected years

iii) income per capita - GNI per capita (PPP US\$)

India → 0.554

135 / 187

medium

world → 0.7 NASHU

Notes on other topics





- difficult to define in geography
- dynamic concept that changes in time and space
- Development of concept

Bernhard Varen  
Immanuel Kant  
Richtofen

Focus on methods  
and processes of  
study of region

Alexander Humboldt  
Carl Ritter

philosophical concept  
of region

Otto Schluter  
Carl O. Sauer  
Vidal de Lablache

- defined region
- refined concept
- addressed and established geography as study of region.

- Idea of region starts with Varenus formally, but Hecateus wrote book 'Gees Peridos' and Strabo wrote 'Geographica' with focus on region in pre-historic period.
- Varenus → said Geography must study the particulars of the place (did not use the word 'region' and did not define region)
- Kant → said Geography is the study of things, phenomena and locations that lie side by side. He focused on method of description for studying geography.
- Richtofen → said one must study inter-relationships in the region. But he did not elaborate on what 'inter-relations are to be studied.

### - Humboldt, Ritter

addressed philosophical basis of geographical study

addressed dualism, dichotomy of systematic and regional geography

settled focus of geographical study as

region  $\longrightarrow$  systematic

### - Otto Schlüter (1905-06)

- addressed dilemma of region

said 'Geography is study of landscape or landschaftskunde'

- defined landscape as visible expression on land

his idea of region is a concrete region

- 2 different meanings to these

a) A distinct territory with a definite boundary which has some uniformity of characteristic that defines it

b) Some aspect or extent of earth without any areal connotation (i.e. no boundary)

- both these ideas became basis of concept of regions.

Former called concrete / specific region and the latter was concept of generic region / thematic region

- In doing so he actually addressed and established geography as science of region.

### Carl O. Sauer

- refined concept of landscape and gave concept of cultural region

- added human / cultural imprint to natural landscape

## 1) Generic Region vs Specific Region

- words are given by Herbertson
- Generic Region
  - It is region with percept without any definite territory and elements of uniformity. ex. rainfall region, desert region
  - Generic regions are thematic regions and they are not contiguous territory with definite boundary
- Specific Region
  - Region with definite territory and elements of uniformity
  - Necessarily contiguous with a definite areal extent
- Historically, regions of Ritter, Hettner and regions under Reine geography were mostly the definite specific region
- Generic regions were a new concept after the ideas of Andrew Herbertson and that of Schluter

## 2) Concrete Region

- Geographical region that have definite boundary and that are not amenable to change because of human perception and subjective human definition are called concrete region
- the region must have identifiable boundary with a definite content.
- led to rejection of political region as concrete region.
- it was Reine geography that adopted drainage basins with continuous mountain ranges as relevant to geographical study and not the traditional political boundary based region



- concrete regions were implied in schluters' concept of Landschaft because schluter emphasized that geography should not be focusing on non-material aspects like religion, culture, political boundaries, economy in the study of regions.
- Eventually became the more popular type of region studied when geography was trying to assert itself in the objective logical sciences paradigm.

3) Formal Region - internal formality or ~~common~~ commonality in the region

4) Functional/ Nodal Region - region held together by a node

5) Natural Region - one of the major controversies in types of region could mean any of the following:

- ① It is an objective region which is outside subjective perception of man and whose border and areal extent is not determined by human subjectivity.
- ② It could be a region that exists inherently and not imposed and artificially constructed by a human percept.  
eg. Chotanagpur is natural, Jharkhand is imposed.
- ③ Any natural region, necessarily must exist with a combination of many factors that determine the regions identity together  
In nature there cannot be single element regions, therefore a natural region should be totality of temperature, rainfall, soils, vegetation, water, mineral, forest etc.



concept of agricultural region, rainfall region, mountain region are therefore not natural region.

- (iv) A natural region could also suggest a region considered in total exclusion of human elements. While there are others who believe man as inherent part of nature should also be inclusive to a natural region.

A. H. Herbertson defined natural region in this totality of regions that includes man and his imprints in the natural landscape.

Such regions are analogous to Carl O. Sauer's cultural landscape. This was also the concept of Whiteley's compage - total regions.

Such natural region therefore define the scope of geography as a synthetic science of man and environment without dichotomy of physical vs human geography.



## FRONTIER

- It means area lying at outer of the political unit. It is a zone

Difference given by Kristoff

- characteristic of rudimentary socio-economic relation marked by absence of laws
- outer oriented as lives and interest of frontier man are different than that of core area.
- presence of centrifugal forces
- it is an integrating factor because zone is liable to be integrated with the state
- they are zonal in nature
- they are immovable and are permanent features
- they are natural

## BOUNDARY

- It is a line indicating limit of political unit

- indicates that political community has reached a relative degree of maturity and is marked by presence of laws.
- inner oriented as they are created and maintained by the state.
- presence of centripetal forces
- it is a separating factor because it restricts free movement of people and goods across them and prevent integration.
- they are linear in nature
- they are movable and are usually temporary
- they are artificial

## Classification of International Boundaries

### I] EARLIER CLASSIFICATION

- a) Natural
- b) Artificial

### II] PRESENT CLASSIFICATION

#### 2 Types

#### a) Morphological

##### Four Types

- 1) Physical - marked by some prominent physical feature on ground like river, mountain, lake etc.

##### Mountain

Himalayas → China and India

Andes → Chile and Argentina

Pyrennes → France and Spain

Demarcation using highest crest line method

difficult to demarcate

- PROBLEMS:
- Mountain crest is a region
  - can disrupt socio-economic unity
  - transverse valleys and inhabitants become issue

##### River

Rio Grande → Mexico and USA

Orinoco → Venezuela and Colombia

Mekong → Laos and Thailand

Demarcation method is Thalweg principle

##### Lake

Lake Constance → Germany and Switzerland

Lake Victoria → Tanzania, Kenya, Uganda



## ii) Geometric - based upon

- i) lines of latitude or longitude
- ii) any other straight line that is oblique
- iii)

eg.  $141^{\circ}W \rightarrow$  Alaska and Canada  
 $49^{\circ}N \rightarrow$  USA and Canada  
 $22^{\circ}N \rightarrow$  Egypt and Sudan

## iii) cultural (Anthropogeographic)

- based upon social, linguistic, religious criterion  
 or any other criteria of cultural landscape

eg. boundaries of European countries Post-WW-II  
 drawn on basis of language.

- difficult to demarcate, can lead to forced  
 migration of minority groups.

## iv) Complex Boundary - based upon a mix of factors

ex. USA - Canada boundary

## b) Genetic classification

- given by Hartshorne, Jones and Whittlesey in 1936

- based on belief that there is strong relationship between  
 International and cultural landscape

- Four types

- i) Antecedent - demarcated and delimited before settlement  
 of an area.

Marked in undeveloped territories

These are enduring because any subsequent  
 settlement gets adjusted to the boundary

ex. International boundary between  
 Canada and Alaska.

ii) Subsequent - demarcated and delimited after settlement of an area

Established in a culturally developed region

Disrupts socio-economic unity of the region

eg. Indo-Pakistan

Russia-Ukraine

iii) Superimposed - demarcated in culturally developed regions

but unlike subsequent boundary they

do not follow administrative division

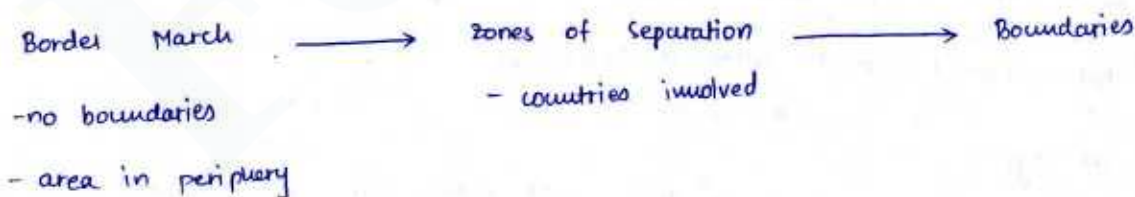
- eg. all ceasefire, truce lines

iv) Consequent - these divide an area either due to absence of population or presence of physical barrier.

dependent upon sparsity of pop<sup>n</sup> or presence of physical obstacle

ex. mountain boundary

#### Evolution of Boundaries



ex. Afghanistan and British India

mountainous region

In 1893 → Durand Line



### Problems of Deforestation and Conservation Measures

Deforestation, clearance or clearing is the removal of a forest or stand of trees where the land is thereafter converted to a non-forest use.

defn  
[clearance  
+  
non-forest use]

Examples of deforestation include conversion of forestland to farms, ranches, or urban use.

30% → forests

6.2 / 16 → present

2.3 → lost between  
2000-12

About 30% of Earth's land surface is covered by forests.

Tropical rainforests is where the most concentrated deforestation occurs.

Between 2000 and 2012, 2.3 million square kilometres (890,000 square miles) of forests around the earth were cut down. As a result of deforestation, only 6.2 million square kilometres (2.4 million square miles) remain of the original 16 million square kilometres (6 million square miles) of forest that formerly covered the earth.

### IMPACTS on

- \* Biosphere
- \* Hydrosphere
- \* Edaphic
- \* Atmosphere
- \* Humans

Deforestation causes extinction, changes to climatic conditions, desertification, and displacement of populations as observed by current conditions and in the past through the fossil record. More than half of all plant and land animal species in the world live in tropical forests.

Deforested regions typically incur significant adverse soil erosion and frequently degrade into wasteland

The removal of trees without sufficient reforestation has resulted in damage to habitat, biodiversity loss and aridity.

In temperate mesic climates, natural regeneration of forest stands often will not occur in the absence of disturbance, whether natural or anthropogenic. Furthermore, biodiversity after regeneration harvest often mimics that found after natural disturbance, including biodiversity loss after naturally occurring rainforest destruction.

More than half of all plant and land animal species in the world live in tropical forests

### CAUSES: ← UNFCCC

According to the United Nations Framework Convention on Climate Change (UNFCCC) secretariat, the overwhelming direct cause of deforestation is agriculture.

Subsistence farming is responsible for 48% of deforestation; commercial agriculture is responsible for 32% of deforestation; logging is responsible for 14% of deforestation and fuel wood removals make up 5% of deforestation.

Other causes of contemporary deforestation may include corruption of government institutions, the inequitable distribution of wealth and power, population growth and overpopulation, and urbanization. Globalization is often viewed as another root cause of deforestation, though there are cases in which the impacts of globalization (new flows of labor, capital, commodities, and ideas) have promoted localized forest recovery.

Some commentators have noted a shift in the drivers of deforestation over the past 30 years. Whereas deforestation was primarily driven by subsistence activities and government-sponsored development projects like transmigration in countries like Indonesia and colonization in Latin America, India, Java, and so on, during late 19th century and the earlier half of the 20th century. By the 1990s the majority of





deforestation was caused by industrial factors, including extractive industries, large-scale cattle ranching, and extensive agriculture.

The degradation of forest ecosystems has also been traced to economic incentives that make forest conversion appear more profitable than forest conservation.

- \* Brazil - cattle sector, soy, palm oil; Deforestation of the Amazon rainforest can be attributed to many different factors at local, national, and international levels. The rainforest is seen as a resource for cattle pasture, valuable hardwoods, housing space, farming space (especially for soybeans), road works (such as highways and smaller roads) and medicines.

- \* South-East Asia - palm oil cultivation

- \* India - colonization

- \* Mexico - avocado cultivation

Overall, a mix of local, national and global causes

### EFFECTS:

#### 1) Atmospheric

Deforestation is ongoing and is shaping climate and geography.

Deforestation is a contributor to global warming, and is often cited as one of the major causes of the enhanced greenhouse effect. Tropical deforestation is responsible for approximately 15% of world greenhouse gas emissions. According to the Intergovernmental Panel on Climate Change deforestation, mainly in tropical areas, could account for up to one-third of total anthropogenic carbon dioxide emissions.

Reducing emissions from deforestation and forest degradation (REDD) in developing countries has emerged as a new potential to complement ongoing climate policies.

The idea consists in providing financial compensations for the reduction of greenhouse gas (GHG) emissions from deforestation and forest degradation.

#### 2) Hydrological

The water cycle is also affected by deforestation. Trees extract groundwater through their roots and release it into the atmosphere. When part of a forest is removed, the trees no longer transpire this water, resulting in a much drier climate. Deforestation reduces the content of water in the soil and groundwater as well as atmospheric moisture. The dry soil leads to lower water intake for the trees to extract.

Deforestation reduces soil cohesion, so that erosion, flooding and landslides ensue.

Shrinking forest cover lessens the landscape's capacity to intercept, retain and transpire precipitation. Instead of trapping precipitation, which then percolates to groundwater systems, deforested areas become sources of surface water runoff, which moves much faster than subsurface flows. Forests return most of the water that falls as precipitation to the atmosphere by transpiration. In contrast, when an area is deforested, almost all precipitation is lost as run-off. That quicker transport of surface water can translate into flash flooding and more localized floods than would occur with the forest cover. Deforestation also contributes to decreased evapotranspiration, which lessens atmospheric moisture which in some cases affects precipitation levels downwind from the deforested area, as water is not recycled to downwind forests, but is lost in runoff and returns directly to the oceans.

- GHG Gas  
almost 15% as per  
IPCC
- tropical areas  
↳ 1/3rd CO<sub>2</sub>
- carbon sinks
- Amazon - lungs of  
the Earth

- evapotranspiration
- air moisture  
soil moisture
- groundwater
- runoff
- soil cohesion
- flash floods



As a result, the presence or absence of trees can change the quantity of water on the surface, in the soil or groundwater, or in the atmosphere. This in turn changes erosion rates and the availability of water for either ecosystem functions or human services.

The forest may have little impact on flooding in the case of large rainfall events, which overwhelm the storage capacity of forest soil if the soils are at or close to saturation.

Tropical rainforests produce about 30% of our planet's fresh water.

### 3) Soil

Undisturbed forests have a very low rate of soil loss (erosion), approximately 2 metric tons per square kilometer (6 short tons per square mile). Deforestation generally increases rates of soil loss, by increasing the amount of runoff and reducing the protection of the soil from tree litter.

China's Loess Plateau was cleared of forest millennia ago. Since then it has been eroding, creating dramatic incised valleys, and providing the sediment that gives the Yellow River its yellow color and that causes the flooding of the river in the lower reaches (hence the river's nickname 'China's sorrow').

Tree roots bind soil together, and if the soil is sufficiently shallow they act to keep the soil in place by also binding with underlying bedrock. Tree removal on steep slopes with shallow soil thus increases the risk of landslides, which can threaten people living nearby.

### 4) Biodiversity

integrity & genetic makeup

Deforestation on a human scale results in decline in biodiversity, and on a natural global scale is known to cause the extinction of many species. The removal or destruction of areas of forest cover has resulted in a degraded environment with reduced biodiversity. Forests support biodiversity, providing habitat for wildlife; moreover, forests foster medicinal conservation. With forest biotopes being irreplaceable source of new drugs (such as taxol), deforestation can destroy genetic variations (such as crop resistance) irretrievably.

Removal or destruction of significant areas of forest cover has resulted in a degraded environment with reduced biodiversity.

Tropical rainforest deforestation is contributing to the ongoing Holocene mass extinction.

### 5) Economic Impact ← CBD report

Damage to forests and other aspects of nature could halve living standards for the world's poor and reduce global GDP by about 7% by 2050, a report concluded at the Convention on Biological Diversity (CBD) meeting in Bonn.

Historically, utilization of forest products, including timber and fuel wood, has played a key role in human societies, comparable to the roles of water and cultivable land. Today, developed countries continue to utilize timber for building houses, and wood pulp for paper. In developing countries almost three billion people rely on wood for heating and cooking.

TRF → 30% fresh water

soil erosion

Loess Plateau  
↓  
Yellow River

Chambal ravines

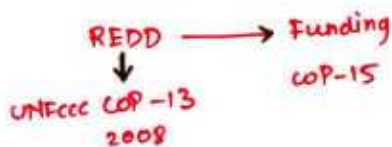
↓ biodiversity

- extinction
- contributing to Holocene
- taxol
- genetic loss

- halve living standards of poor

- reduce global GDP by 7% by 2050





### CONSERVATION MEASURES

#### 1) Reducing Deforestation

Main international organizations including the United Nations and the World Bank, have begun to develop programs aimed at curbing deforestation. Deforestation accounts for emissions equivalent to the transport sector. Deforestation and forest degradation account for 17-29% of global greenhouse gas emissions, the reduction of which is estimated to be one of the most cost-efficient climate change mitigation strategies. Regeneration of forest on degraded or deforested lands can remove CO<sub>2</sub> from the atmosphere through the build-up of biomass, making forest lands a sink of greenhouse gases. The REDD+ mechanism addresses both issues of emission reduction and enhanced removal of greenhouse gases. The blanket term Reducing Emissions from Deforestation and Forest Degradation (REDD) describes the sorts of programs, which use direct monetary or other incentives to encourage developing countries to limit and/or roll back deforestation. Funding has been an issue, but at the UN Framework Convention on Climate Change (UNFCCC) Conference of the Parties-15 (COP-15) in Copenhagen in December 2009, an accord was reached with a collective commitment by developed countries for new and additional resources, including forestry and investments through international institutions, that will approach USD 30 billion for the period 2010–2012.

United Nations Programme on Reducing Emissions from Deforestation and Forest Degradation (or UN-REDD Programme) is a collaborative programme of the Food and Agriculture Organization of the United Nations (FAO), the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP), created in 2008 in response to the UNFCCC decisions on the Bali Action Plan and REDD at COP-13.

REDD+ → FAO + UNDP + UNEP

REDD → REDD+  
 curbing deforestation → curbing deforestation + enhanced removal of GHGs

refers to "reducing emissions from deforestation and forest degradation in developing countries, and the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks in developing countries" → part of '+'  
 Essentially involves creating value for forests and incentivizing developing countries to maintain their forests.

#### Main elements of REDD+:

- (a) Reducing emissions from deforestation;
- (b) Reducing emissions from forest degradation;
- (c) Conservation of forest carbon stocks;
- (d) Sustainable management of forests;
- (e) Enhancement of forest carbon stocks.

} REDD monetary benefits to encourage developing to limit/roll back deforestation

reduce

+

cons + mgmt + enhance

- ⊕ Within its remit, REDD+ has the potential to simultaneously contribute to climate change mitigation and poverty alleviation, whilst also conserving biodiversity and sustaining vital ecosystem services. It is a framework through which developing countries are rewarded financially for any emissions reductions achieved associated with a decrease in the conversion of forests to alternate land uses. REDD provides a unique opportunity to achieve large-scale emissions reductions at comparatively low abatement costs. By economically valuing the role forest

incentive for developing



ecosystems play in carbon capture and storage, it allows intact forests to compete with historically more lucrative, alternate land uses resulting in their destruction

## 2) Farming

New methods are being developed to farm more intensively, such as high-yield hybrid crops, greenhouse, autonomous building gardens, and hydroponics. These methods are often dependent on chemical inputs to maintain necessary yields. In cyclic agriculture, cattle are grazed on farm land that is resting and rejuvenating. Cyclic agriculture actually increases the fertility of the soil. Intensive farming can also decrease soil nutrients by consuming at an accelerated rate the trace minerals needed for crop growth. [citation needed] The most promising approach, however, is the concept of food forests in permaculture, which consists of agroforestry systems carefully designed to mimic natural forests, with an emphasis on plant and animal species of interest for food, timber and other uses. These systems have low dependence on fossil fuels and agro-chemicals, are highly self-maintaining, highly productive, and with strong positive impact on soil and water quality, and biodiversity.

## 3) Forest Management

In 16th-century Germany, landowners also developed silviculture to deal with the problem of deforestation. However, these policies tend to be limited to environments with good rainfall, no dry season and very young soils (through volcanism or glaciation). This is because on older and less fertile soils trees grow too slowly for silviculture to be economic, whilst in areas with a strong dry season there is always a risk of forest fires destroying a tree crop before it matures. In the areas where "slash-and-burn" is practiced, switching to "slash-and-char" would prevent the rapid deforestation and subsequent degradation of soils. The biochar thus created, given back to the soil, is not only a durable carbon sequestration method, but it also is an extremely beneficial amendment to the soil. Mixed with biomass it brings the creation of terra preta, one of the richest soils on the planet and the only one known to regenerate itself.

## 4) Sustainable Practices

Using fuel from bamboo rather than wood results in cleaner burning, and since bamboo matures much faster than wood, deforestation is reduced as supply can be replenished faster.

Certification, as provided by global certification systems such as Programme for the Endorsement of Forest Certification and Forest Stewardship Council, contributes to tackling deforestation by creating market demand for timber from sustainably managed forests.

Example in India - Bamboo Wooden Laminates, Eco-mark scheme

## 5) Reforestation

In many parts of the world, especially in East Asian countries, reforestation and afforestation are increasing the area of forested lands. The amount of woodland has increased in 22 of the world's 50 most forested nations. Asia as a whole gained 1 million hectares of forest between 2000 and 2005. Tropical forest in El Salvador

Move towards  
intensive farming  
with

- permaculture
- hydroponics

- silviculture
- slash-n-char  
↓  
biochar to  
create terra  
preta

- using bamboo  
for fuelwood,  
paper
- using certification

expanded more than 20% between 1992 and 2001. Based on these trends, one study projects that global forest will increase by 10%—an area the size of India—by 2050.  
Example in India - Eco-Development Forces

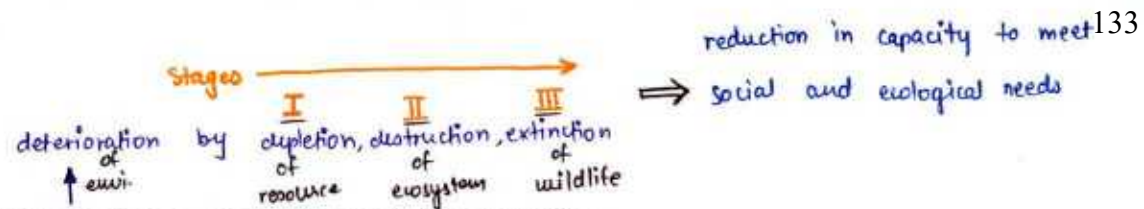
#### 6) Forest Plantations

To meet the world's demand for wood, it has been suggested by forestry writers Botkins and Sedjo that high-yielding forest plantations are suitable. It has been calculated that plantations yielding 10 cubic meters per hectare annually could supply all the timber required for international trade on 5% of the world's existing forestland. By contrast, natural forests produce about 1–2 cubic meters per hectare; therefore, 5–10 times more forestland would be required to meet demand. Forester Chad Oliver has suggested a forest mosaic with high-yield forest lands interspersed with conservation land.

In the country of Senegal, on the western coast of Africa, a movement headed by youths has helped to plant over 6 million mangrove trees. The trees will protect local villages from storm damages and will provide a habitat for local wildlife. The project started in 2008, and already the Senegalese government has been asked to establish rules and regulations that would protect the new mangrove forests.

to supply wood  
create protection





### Environmental Degradation, Management and Conservation

Environmental degradation is the deterioration of the environment through depletion of resources such as air, water and soil; the destruction of ecosystems and the extinction of wildlife.

It is defined as any change or disturbance to the environment perceived to be deleterious or undesirable.

As indicated by the I=PAT equation,

environmental impact (I) or degradation is caused by the combination of

1. an already very large and increasing human population (P),
2. continually increasing economic growth or per capita affluence (A), and
3. the application of resource depleting and polluting technology (T).

The United Nations International Strategy for Disaster Reduction defines environmental degradation as:

capacity to meet  
socio-ecological  
needs      "The reduction of the capacity of the environment to meet social and ecological objectives, and needs"

### Causes of Environmental Degradation

1. Land Disturbance: → extinction
  - a) Invasive species
  - b) Urbanization, growth of sprawl
  - c) Mining
2. Pollution: → destruction
  - a) Air
  - b) Water
  - c) Land
  - d) Noise
3. Overpopulation: → drives depletion
  - a) More strain on resources
  - b) More demand for food, clothing and shelter
  - c) More space required for growing
4. Landfills: → mixed
  - a) Scarification the land
  - b) Pollution of air and groundwater

### 5. Deforestation: → mixed → max impact

Deforestation is the cutting down of trees to make way for more homes and industries. Rapid growth in population and urban sprawl are two of the major causes of deforestation. Apart from that, use of forest land for agriculture, animal grazing, harvest for fuel wood and logging are some of the other causes of deforestation. Deforestation contributes to global warming as decreased forest size puts carbon back into the environment.

### 6: Natural Causes:

Things like avalanches, quakes, tidal waves, storms, and wildfires can totally crush nearby animal and plant groups to the point where they can no longer survive in those areas. This can either come to fruition through physical demolition as the result of a specific disaster, or by the long term degradation of assets by the presentation of an obtrusive foreign species to the environment. The latter frequently happens after tidal waves, when reptiles and bugs are washed ashore.

Environmental changes are based on many factors including:

- Urbanization - increased impact on all resources (land, water, air)
- Population growth - increased demand on sustainability
- Economic growth - increased demand on resources, breaching of ecological carrying capacity, violation of environmental equilibrium
- Intensification of agriculture - agricultural runoff, soil salinity, invasive species, reduction in biodiversity
- Increase in energy use - mining, acid rains
- Increase in transportation - GHG emission, fragmentation of habitats

The degradation impacts our wildlife, plants, animals and micro-organisms.

The various ways in which it affects these organisms are:

### IMPACT ON BIOSPHERE

- Habitat Fragmentation - Habitat fragmentation carries long term environmental impacts, some of which can destroy entire ecosystems. Examples include roads which may cut through forests or even trails which wind through prairies. The largest of these consequences are initially felt by specific plant and animal communities, most of which are specialized for their bio-region or require large areas of land to retain a healthy genetic heritage.
- Aggressive Plant Life - A more critical result of habitat fragmentation is land disturbance. Many weedy plant species, such as garlic mustard and purple loosestrife, are both opportunistic and invasive. A breach in the habitat gives them an opportunity to take hold. These aggressive plants can take over an environment, displacing the native flora. The result is habitat with a single dominant plant which doesn't provide adequate food resources for all the wildlife.
- Reduced Biodiversity - due to mono-culture, invasive species; also disturbed food chain
- Altered environment - due to pollutants, increased temperatures (Climate Change)

ex. water hyacinth  
cuckoo  
snowflake coral

### Impacts of Environmental Degradation:

Some residing in third-world countries are highly effected by the degradation.

These effects are:

- Illnesses
- Death in children



- Death in adults
- Poverty - In many countries in Africa, crop harvests are falling as consumption increases. People are finding less nutritious food to eat. One argument held is that while fields in wealthier nations are used to grow crops for biofuel, poorer countries, especially those around the Equator, are vulnerable to weather changes, water shortages, and urbanization. All of these factors are increasing the health and lives of thousands. Some scientists and environmentalists are asking that non-food items and agriculture waste be used as alternative fuel for vehicles instead.

### **Effects of Environmental Degradation(on all countries)**

1. Impact on Human Health: Human health might be at the receiving end as a result of the environmental degradation. Areas exposed to toxic air pollutants can cause respiratory problems like pneumonia and asthma. Millions of people are known to have died of due to indirect effects of air pollution. When factories produce harmful chemicals and toxic waste into bodies of water, humans suffer. Pesticides and fertilizers can also get into a region's water system and pollute it. Drinking water is contaminated.

2. Loss of Biodiversity: Biodiversity is important for maintaining balance of the ecosystem in the form of combating pollution, restoring nutrients, protecting water sources and stabilizing climate. Deforestation, global warming, overpopulation and pollution are few of the major causes for loss of biodiversity.

3. Ozone Layer Depletion: Ozone layer is responsible for protecting earth from harmful ultraviolet rays. The presence of chlorofluorocarbons, hydro chlorofluorocarbons in the atmosphere is causing the ozone layer to deplete. As it will deplete, it will emit harmful radiations back to the earth.

4. Economic Impact: The huge cost that a country may have to borne due to environmental degradation can have big economic impact in terms of restoration of green cover, cleaning up of landfills and protection of endangered species. The economic impact can also be in terms of loss of tourism industry.

Efforts to counteract this problem include environmental protection and environmental resources management.

### **How to Stop Degradation:**

There are ways which you can help to decrease degradation in our environment.

#### **Answering within the framework of I-PAT equation.**

For reducing population impact

- Reduce poverty
- Control population growth in developing countries by educating masses
- Educating public regarding environmentally safe practices

For reducing level of consumption (FOCUS ON CONSERVATION) *reduces affluence*

- Reduce, Reuse, Recycle of resources **3Rs**

- Conserving water through rainwater harvesting, water-use efficiency, water budget, pricing water use
- Mitigation of air pollution and climate change
- Shifting to environmentally safer alternatives (non-conventional energy, marine agriculture, marine fishery)

For reducing impact on environment (*FOCUS ON MANAGEMENT*) *reduce pollution*

- Reduce pollution and set stringent norms for pollution via effective legislation
- Scientific disposal of waste with focus on recycling and reducing degradation
- Legislation that emphasizes extended producer responsibility
- Shifting to organic farming practices, permaculture, sustainable practices
- Reducing migration and growth of urban sprawl
- Effective initiatives to plan urbanization sustainably
- Emphasis on EIA in all human activities

Success of efforts in reducing environment impact = (conservation efforts) x (management efforts)

#### Measuring environmental degradation

to measure environmental degradation on the basis of some selected indicators by the application of a simple multivariate technique known as Principal Component Analysis. For this purpose the study considered six variables, namely,

1. ✓ GDP per capita
2. ✓ fuel consumption
3. ✓ total fertility rate
4. ✓ water supply
5. ✓ sanitation, and
6. ✓ electricity.

However, because of unavailability of data, the variables such as technology relating to environment, waste disposal, air pollution, women/gender issues relating to environment, corruption, democracy etc. could not be considered.

The results show that principal components explain about 62% of the variations in the level of environmental degradation.



## INTER-DISCIPLINARY

→ more about development, less about environment

**Environmental Management** → addresses 1<sup>st</sup> stage of degradation → depletion and mitigates 2<sup>nd</sup> stage of destruction

optimal resource  
use emphasis

- It is a process/method of planning and decision-making to achieve sustainable development.
- It is a process of allocating resources for optimal use so as to meet the compulsions of human need on sustainable basis.
- It is a process that is undertaken as an inter-disciplinary exercise with involvement of professionals from social sciences, natural sciences, law, design along with developing and working institutions that implement, monitor and audit the development programmes and policy

Less about environment and more about development that is inclusive of environment concern because environment is deciding and determining factor in development

### Goals of Environmental Management

prevent  
limit  
identify  
improve  
tech + planning

- Preventing environmental problems and resolving them
- Establishing limits
- Identifying threats and opportunities
- Improving quality of life
- Incorporating environmentally sound technologies and development planning and execution
- Establishing and nurturing institutions that support environmental research, monitoring and management

##

### Principles guiding environmental management

1. Precautionary Principle - In order to protect the environment, a concept which includes peoples' ways of life and the integrity of their communities, the precautionary approach shall be applied. Where there are threats or potential threats of serious social impact, lack of full certainty about those threats should not be used as a reason for approving the planned intervention or not requiring the implementation of mitigation measures and stringent monitoring
2. Principle of Uncertainty - It must be recognized that our knowledge of the social world and of social processes is incomplete and that social knowledge can never be fully complete because the social environment and the processes affecting it are changing constantly, and vary from place to place and over time
3. Principle of Intra-Generational Equity - The benefits from the range of planned interventions should address the needs of all, and the social impacts should not fall disproportionately on certain groups of the population, in particular children and women, the disabled and the socially excluded, certain generations or certain regions
4. Principle of Inter-Generational Equity - Development activities or planned interventions should be managed so that the needs of the present generation are met without compromising the ability of future generations to meet their own needs.
5. Recognition and preservation of diversity - Communities and societies are not homogeneous. They are demographically structured (age and gender), and they

comprise different groups with various value systems and different skills. Special attention is needed to appreciate the existence of the social diversity that exists within communities and to understand what the unique requirements of special groups may be. Care must be taken to ensure that planned interventions do not lead to a loss of social diversity in a community or a diminishing of social cohesion.

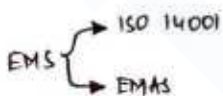
6. Internalization of costs - The full social and ecological costs of a planned intervention should be internalized through the use of economic and other instruments, that is, these costs should be considered as part of the costs of the intervention, and no intervention should be approved or regarded as cost-effective if it achieves this by the creation of hidden costs to current or future generations or the environment.
7. **Polluter-pays principle** - The full cost of avoiding or compensating for social impacts should be borne by the proponent of the planned intervention.
8. Principle of prevention - It is generally preferable and cheaper in the long run to prevent negative social impacts and ecological damage from happening than having to restore or rectify damage after the event.
9. **Principle of common but differentiated responsibilities**
10. Principle of non-discrimination
11. Principle of subsidiarity - Decision making power should be decentralized, with accountable decisions being made as close to an individual citizen as possible. In the context of SIA, this means decisions about the approval of planned interventions, or conditions under which they might operate, should be taken as close to the affected people as possible, with local people having an input into the approval and management processes

#### Scales and **levels of operation**

1. Identifying resources
2. Suggesting usage
3. Evaluating technologies
4. Actual implementation and monitoring of plant policy
5. Post-project evaluation

#### Tools of environmental management

- **EIA**
- **Environmental Management System** - enables a firm/company to manage its environmental affairs in a planned and systematic way and thus identifying ways of improving its environmental performance that most benefit its business performance. This section focuses on the requirements of two EMS schemes:
  - 1) **ISO 14001**, the international environmental management system standard and
  - 2) **EMAS**, the **European Community's Eco-Management and Audit Scheme**
- **Environmental Audit** - is a tool for checking whether a firm or an organization is doing what it should be doing. For instance a legislative compliance audit checks that those activities of the firm covered by environmental legislation (i.e. what it is doing) actually comply with that legislation (i.e. what it should be doing). An environmental audit will tell a firm or an organization whether its waste





management practices conform with the industry sector best practice guidelines it has committed itself to following (i.e. what it should be doing).

- **Environmental Indicators** - Environmental indicators allow a firm to measure both its environmental performance and its efforts to improve its performance. Indicators can be used within an environmental management system to check that a firm has met the targets it is required to set for itself, but can equally well be used in firms that have not developed an EMS.
- **Eco-balance** - A company eco-balance records the various raw materials, energy, resources, products and wastes entering, held within and leaving a company over a specified period of time. In other words, it provides a record of a company's physical inputs, stock and outputs. Once a company knows exactly what is coming in and going out, it can begin to assess the particular environmental impacts of those inputs and outputs. An eco-balance therefore enables a firm to undertake the comprehensive environmental review of its activities required by ISO 14001 and EMAS and to go on and set targets for improving its environmental performance.
- **Life-cycle Assessment** - is a tool for identifying and assessing the various environmental impacts associated with a particular product. LCA takes a "cradle to grave" approach looking at the impacts of the product throughout its life cycle i.e. from the raw materials acquisition (the "cradle") through its production and use to its final disposal (the "grave"). LCA allows manufacturers to find ways of cost-effectively reducing the environmental impact of a product over its life-cycle and to support their claims about the environmental impact of their products.
- **Environmental Labelling** - Environmental labeling schemes award an environmental label to those products that are judged to be less harmful to the environment than others within the same product group.
- **Environmental Reporting** - Having undertaken various environmental management initiatives to improve its environmental performance, a company or an organization may wish to communicate the results of these initiatives to the outside world. One way of doing this is by publishing an environmental report. Issuing an environmental report can improve a firm's public image and lead to improved relationships with stakeholders. To date, it is mainly large companies that have issued such reports but small and medium scale companies may also find environmental reporting a useful tool
- **Environmental Charters** - There are a number of environmental charters and guidelines to which a firm/company or an organization can subscribe in order to demonstrate its commitment to responsible environmental management.

### Global Level Initiatives

- UNFCCC
  - \* Kyoto
  - \* Paris
- REDD
- REDD+
- Stockholm Convention
- Basel convention
- UNCCD
- Vienna + Montreal

### Framework for conservation

- IPAT Equation



protection, preservation, management, restoration

## Environmental Conservation

What is the definition of environmental conservation?

The protection, preservation, management, or restoration of natural environments and the ecological communities that inhabit them. Conservation is generally held to include the management of human use of natural resources for current public benefit and sustainable social and economic utilization

- focused on later stages of environmental degradation } more about environment  
less about development
- II → destruction of ecosystems
- III → extinction of ecosystem

- key elements are preservation, restoration, rejuvenation

### ex-situ

- gene banks
- seed banks
- botanical gardens
- zoological parks

### in-situ

- Protected area network
- National parks
- wildlife sanctuaries
- gene sanctuaries

National level

- Biosphere reserves
  - community reserves
- local level

- species specific efforts → tiger, elephant, vulture, rhinoceros, snow leopard, crocodile, hangul, dolphin
- multi-level

- CBD
  - Ramsar
  - CITES
  - CMS
  - CAWT
- global



substance, state, event → potential to threaten/adversely affect

### Environmental Hazards and Remedial Measures

An environmental hazard is a substance, state or event which has the potential to threaten the surrounding natural environment and / or adversely affect people's health. This term incorporates topics like pollution and natural disasters such as storms and earthquakes.

Hazards can be categorized in three types:

1. Chemical
2. Physical
3. Biological

#### Chemical hazards

persistence × toxicity

They are defined in the Globally Harmonized System and in the European Union chemical regulations. They are caused by chemical substances causing significant damage to the environment. The label is particularly applicable towards substances with aquatic toxicity. An example is zinc oxide, a common paint pigment, which is extremely toxic to aquatic life.

Toxicity or other hazards do not imply an environmental hazard, because elimination by sunlight (photolysis), water (hydrolysis) or organisms (biological elimination) neutralizes many reactive or poisonous substances. Persistence towards these elimination mechanisms combined with toxicity gives the substance the ability to do damage in the long term. Also, the lack of immediate human toxicity does not mean the substance is environmentally nonhazardous. For example, tanker truck-sized spills of substances such as milk can cause a lot of damage in the local aquatic ecosystems: the added biological oxygen demand causes rapid eutrophication, leading to anoxic conditions in the water body.

$$\text{Level of Hazard} = (\text{Persistence in environment}) \times (\text{toxicity})$$

All hazards in this category are mainly anthropogenic although there exist a number of natural carcinogens and chemical elements like radon and lead may turn up in health-critical concentrations in the natural environment:

- ❖ Anthrax
- ❖ Antibiotic agents in animals destined for human consumption
- ❖ Arsenic - a contaminant of fresh water sources (water wells)
- ❖ Asbestos - carcinogenic
- ❖ DDT
- ❖ Carcinogens
- ❖ Dioxins
- ❖ Endocrine disruptors
- ❖ Explosive material
- ❖ Fungicides
- ❖ Furans



- ❖ Haloalkanes
- ❖ Heavy metals
- ❖ Herbicides
- ❖ Hormones in animals destined for human consumption
- ❖ Lead in paint
- ❖ Marine debris
- ❖ Mercury
- ❖ Mutagens
- ❖ Pesticides
- ❖ Polychlorinated biphenyls
- ❖ Radon and other natural sources of radioactivity
- ❖ Soil pollution
- ❖ Tobacco smoking
- ❖ Toxic waste

#### Physical Hazards

Can be due to both anthropogenic as well as natural causes. The level of hazard varies depending upon the following formulation

**Level of Hazard = (difficulty in reducing/mitigating effects) x (size of area affected)**

- Cosmic rays
- Drought
- Earthquake
- Electromagnetic fields
- E-waste
- Floods
- Fog
- Light pollution
- Lighting
- Lightning
- Noise pollution
- Quicksand
- Ultraviolet light
- Vibration
- Wildfires
- X-rays

#### Biological Hazards

Can be due to both anthropogenic as well as natural causes. The causes can aggravate the natural causes. The level of hazard varies depending upon the following formulation

**Level of Hazard = (difficulty in controlling spread) x (mortality rate)**

- Allergies
- Arbovirus
- Avian influenza
- Bovine spongiform encephalopathy (BSE)
- Cholera
- Ebola
- Epidemics
- Food poisoning
- Malaria
- Molds
- Onchocerciasis (River blindness)
- Pandemics
- Pathogens
- Pollen for allergic people
- Rabies
- Severe acute respiratory syndrome (SARS)
- Sick building syndrome

General f/w → i) Preventive (v) During hazard  
 ii) Curative  
 iii) Institutional

### Remedial Measures

#### For Chemical hazards

1

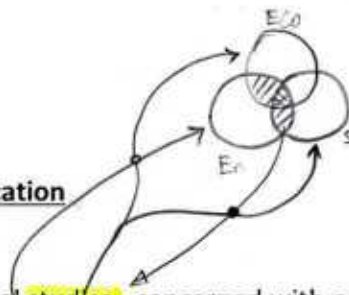
#### For Physical hazards

|                      | NATIONAL                                     | LOCAL |
|----------------------|----------------------------------------------|-------|
| iii) Institutional → | NDMA<br>NDRF<br>Funding<br>Regulatory regime |       |
| iv) Curative →       | response code                                |       |

#### For Biological hazards

- Quick response
- Dedicated strategies for all three levels(global, national, state, local)
-





### Environmental Education

Four components:

1. Environmental studies - concerned with environment and society → interlinkage study
2. Environmental science - concerned with scientific study of environment → component study
3. Environmental engineering - technical study to utilise science+studies to get → applied aspect  
desirable results
4. Sustainability science - is the study of sustainable development and → holistic aspect  
environmental science

Environmental education focuses on:

1. Engaging with citizens of all demographics too;
2. Think critically, ethically, and creatively when evaluating environmental issues;
3. Make educated judgments about those environmental issues;
4. Develop skills and a commitment to act independently and collectively to sustain and enhance the environment; and,
5. To enhance their appreciation of the environment; resulting in positive environmental behavioural change

### Major principles of environmental education

- must involve everyone
- must be lifelong
- must be holistic and about connections
- must be practical
- must be in harmony with social and economic goals  
and accorded equal priority



1<sup>st</sup> step towards management + enables alignment of goals, coordination, collaboration

↑  
**Environmental Policy** sets out overall aims, intention wrt environment  
 WHAT IS AN ENVIRONMENTAL POLICY?

An environmental policy is a document prepared by a company or an organization which clearly sets out its overall aims and intentions with respect to the environment.

An environmental policy provides a sense of direction for a company and shows that it is committed to managing its environmental affairs in a responsible way. The policy should be endorsed by the company's senior management and should be publicly available. It should be an integral part of the business strategy and be compatible with company's other policies (e.g. on quality and on health and safety).

#### NEED TO FORMULATE AN ENVIRONMENTAL POLICY

There are a number of reasons for producing and formulating an environmental policy:

1. Producing a policy is an important first step towards achieving effective environmental management.  
 Setting out your aims and intentions with respect to the environment is an important first step towards achieving effective environmental management. Having done this, a company can then take the measures necessary to achieve them. By taking appropriate measures i.e. by carrying out effective environmental management, a company can gain the benefits that such management brings.
2. An environmental policy provides important information to external stakeholders on company's aims and intentions with respect to the environment.  
 Having an environmental policy can enhance company's reputation with external stakeholders such as customers and the local community. It shows that an organization have made a start on dealing with environmental performance. However, to make sure a company's reputation isn't tarnished in any way, it is important that all stakeholders see evidence that a company is taking action to realize the aims and intentions set out in environmental policy

not done  
 ga @ SC





considers long term future impact + course



### Environmental Policy and Legislation

**Environment** refers to the physical ecosystems, but can also take into consideration the social dimension (quality of life, health) and an economic dimension (resource management, biodiversity)

**Policy** can be defined as a "course of action or principle adopted or proposed by a government, party, business or individual".

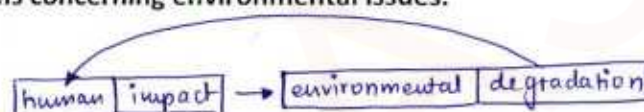
Thus, **environmental policy focuses on problems arising from human impact on the environment**, which retro-acts onto human society by having a (negative) impact on human values such as good health or the 'clean and green' environment.

**Environmental policy refers to the commitment** of an organization to the laws, regulations, and other policy mechanisms concerning environmental issues.

These issues generally include:

- air and water pollution
- solid waste management
- ecosystem management
- maintenance of biodiversity
- the protection of natural resources, wildlife and endangered species
- preservation of these natural resources for future generations
- policies concerning energy
- regulation of toxic substances including pesticides and many types of industrial waste
- Relatively recently also attended to the communication of environmental issues

All are part of the topic of environmental policy. This policy can be deliberately taken to direct and oversee human activities and thereby prevent harmful effects on the biophysical environment and natural resources, as well as to make sure that changes in the environment do not have harmful effects on humans.



### HISTORY

The 1960s marked the beginning of modern environmental policy making. Although mainstream America remained oblivious to environmental concerns, the stage had been set for change by the publication of Rachel Carson's New York Times bestseller *Silent Spring* in 1962. Earth Day founder Gaylord Nelson, then a U.S. Senator from Wisconsin, after witnessing the ravages of the 1969 massive oil spill in Santa Barbara, California. Administrator Ruckelshaus was confirmed by the Senate on December 2, 1970, which is the traditional date used as the birth of the agency. Five months earlier, in July 1970, President Nixon had signed Reorganization Plan No. 3 calling for the establishment of EPA in July 1970. At the time, Environmental Policy was a bipartisan issue and the efforts of the United States of America helped spark countries around the world to create environmental policies. During this period, legislation was passed to regulate pollutants that go into the air, water tables, and solid waste disposal. President Nixon signed the Clean Air Act in 1970 which set the USA as one of the world leaders in environmental conservation.

In the European Union, the very first Environmental Action Programmed was adopted by national government representatives in July 1973 during the first meeting of the Council of Environmental Ministers.[15] Since then an increasingly



dense network of legislation has developed, which now extends to all areas of environmental protection including air pollution control, water protection and waste policy but also nature conservation and the control of chemicals, biotechnology and other industrial risks. EU environmental policy has thus become a core area of European politics.

Overall organizations are becoming more aware of their environmental risks and performance requirements. In line with the ISO 14001 standard they are developing environmental policies suitable for their organization.

### Environmental Policy Instruments

Environmental policy instruments are tools used by governments to implement their environmental policies. Governments may use a number of different types of instruments. For example, economic incentives and market-based instruments such as taxes and tax exemptions, tradable permits, and fees can be very effective to encourage compliance with environmental policy. Bilateral agreements between the government and private firms and commitments made by firms independent of government requirement are examples of voluntary environmental measures.

Another instrument is the implementation of greener public purchasing programs.

Several instruments are sometimes combined in a policy mix to address a certain environmental problem. Since environmental issues have many aspects, several policy instruments may be needed to adequately address each one. Furthermore, a combination of different policies may give firms greater flexibility in policy compliance and reduce uncertainty as to the cost of such compliance.

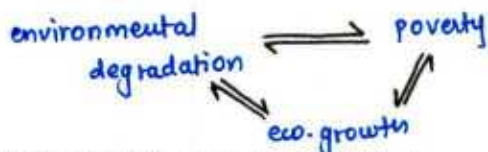
### Environmental Policy Integration

The concept of environmental policy integration (EPI) refers to the process of integrating environmental objectives into non-environmental policy areas, such as energy, agriculture and transport, rather than leaving them to be pursued solely through purely environmental policy practices. This is oftentimes particularly challenging because of the need to reconcile global objectives and international rules with domestic needs and laws. EPI is widely recognized as one of the key elements of sustainable development. More recently, the notion of 'climate policy integration', also denoted as 'mainstreaming', has been applied to indicate the integration of climate considerations (both mitigation and adaptation) into the normal (often economically focused) activity of government.

India is one of the parties of the Convention on Biological Diversity (CBD) treaty. Prior to the CBD, India had different laws to govern the environment. The Indian Wildlife Protection Act 1972 protected the biodiversity. It was amended later multiple times. The 1988 National Forest Policy had conservation as its fundamental principle. In addition to these acts, the government passed the Environment (Protection) Act 1986 and Foreign Trade (Development and Regulation) Act 1992 for control of biodiversity.

- carbon credits
- carbon tax
- Kyoto
- greener procurement
- green GDP

### Key challenge



### National Environment Policy 2006

National Environment Policy 2006 is a response to India's national commitment to a clean environment, mandated in the Constitution in Articles 48 A and 51 A (g), (DPSP) strengthened by judicial interpretation of Article 21.

It is recognized that the maintenance of the Healthy environment is not the responsibility of the state alone. It is the responsibility of every Citizen and thus a spirit of partnership is to be realized through the environment Management of the country.

### Key Environment Challenges:

The key environmental challenges that India faces are related to the nexus of environmental degradation with poverty in its many dimensions, and economic growth.

Challenges are intrinsically connected with the state of environmental resources, such as land, water, air, and their flora and fauna.

### Drivers of Degradation:

Proximate drivers of environmental degradation are population growth, inappropriate technology and consumption choices, and poverty, leading to changes in relations between people and ecosystems, and development activities such as intensive agriculture, polluting industry, and unplanned urbanization.

Other drivers of degradation are the lack of clarity or enforcement of rights of access and use of environmental resources, policies which provide disincentives for environmental conservation (and which may have origins in the fiscal regime), market failures (which may be linked to shortcomings in the regulatory regimes), and governance constraints.

### Impact on Health

Poor environmental quality has adversely affected human health.

Environmental factors are estimated as being responsible in some cases for nearly 20 percent of the burden of disease in India, and a number of environment-health factors are closely linked with dimensions of poverty (e.g. malnutrition, lack of access to clean energy and water).

Interventions such as reducing indoor air pollution, protecting sources of safe drinking water, protecting soil from contamination, improved sanitation measures, and better public health governance, offer tremendous opportunities in reducing the incidence of a number of critical health problems.

### Objectives of the Policy

1. Conservation of Critical Environmental Resources
2. Intra-generational Equity: Livelihood Security for the Poor
3. Inter-generational Equity
4. Integration of Environmental Concerns in Economic and Social Development:
5. Efficiency in Environmental Resource Use
6. Environmental Governance
7. Enhancement of Resources for Environmental Conservation



### Principles of National Environment Policy 2006

The Policy evolved from the recognition that only such development is sustainable, which respects ecological constraints, and the imperatives of justice. The Objectives stated above are to be realized through various strategic interventions by different public authorities at Central, State, and Local Government levels. They would also be the basis of diverse partnerships. The principles followed in the policy are:

- I. **Human Beings are at the Centre** of Sustainable Development Concerns:
- II. **Right to development** must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations.
- III. In order to achieve sustainable development, **environmental protection shall constitute an integral part of the development process and cannot be considered in isolation** from it.
- IV. Where there are credible threats of serious or irreversible damage to key environmental resources, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.
- V. In various public actions for environmental conservation, economic efficiency would be sought to be realized
- VI. **"Polluter Pays" principle:**  
Impacts of acts of production and consumption of one party may be visited on third parties who do not have a direct economic nexus with the original act. Such impacts are termed "externalities". The National Environment Policy promotes the internalization of environmental costs, including through the use of incentives based policy instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest, and without distorting international trade and investment.
- VII. **The Doctrine of Public Trust**  
As per this doctrine, the State is not an absolute owner, but a trustee of all natural resources, which are by nature meant for public use and enjoyment, subject to reasonable conditions, necessary to protect the legitimate interest of a large number of people, or for matters of strategic national interest.

### Legislative Reforms

A judicious mix of civil and criminal processes and sanctions will be employed in the legal regime for enforcement, through a review of the existing legislation. The policy calls for identification of the emerging areas for new legislation, due to better scientific understanding, economic and social development, and development of multilateral environmental regimes, in line with the National Environment Policy. It also calls for review the body of existing legislation in order to develop synergies among relevant statutes and regulations.

### Environment Impact Assessment

The policy focuses on encouraging the regulatory authorities, Central and State, to institutionalize regional and cumulative environmental impact assessments (R/CEIAs) to ensure that environmental concerns are identified and addressed at the planning stage itself.

### CRZ

The policy aims to revisit the Coastal Regulation Zone (CRZ) notifications to make the approach to coastal environmental regulation more holistic, and thereby ensure protection to coastal ecological systems, coastal waters, and the vulnerability of some coastal areas to extreme natural events and potential sea level rise. In pursuance with the Policy CRZ Notification 2011 was released recently.

### The Problem of LMOs

LMO refers to the Living Modified Organisms. Living modified organisms (known as LMOs) result from modern biotechnology is broadly equivalent to genetically modified organisms. The difference between an LMO and a GMO is that a Living Modified Organism is capable of growing, and typically refers to agricultural crops. Genetically Modified Organisms include both LMOs and organisms which are not capable of growing, i.e. are dead. The National Environment Policy says that Genetically Modified Organisms require evaluation of their potential benefits and risks as part of relevant regulatory processes. The subset of LMOs, may, however, owing to their potential for replication, involve environmental concerns in addition. LMOs may pose significant risks to ecological resources, and perhaps, human and animal health. In order to ensure that development of biotechnology does not lead to unforeseen adverse impacts, the policy aims to review the regulatory processes for LMOs so that all relevant scientific knowledge is taken into account, and ecological, health, and economic concerns are adequately addressed.

### ESZs

The Environmentally Sensitive Zones are the areas with identified environmental resources having "Incomparable Values" which require special attention for their conservation. In order to conserve and enhance these resources, without impeding legitimate socio-economic development of these areas, the National Environment policy aims to identify and give legal status to Environmentally Sensitive Zones in the country having environmental entities with "Incomparable values" requiring special conservation efforts. The policy also envisages formulating area development plans for these zones on a scientific basis, with adequate participation by the local communities.

### Desert Habitats

The arid and semi-arid region of India covers 127.3 mha (38.8%) of India's geographical area and spreads over 10 states. The Indian desert fauna is extremely rich in species diversity of mammals and winter migratory birds. However the pressures of a rapidly increasing population on the natural resource base necessitate adoption of innovative and integrated measures for conservation of desert ecosystems. The policy aims at measures such as Intensive water and moisture conservation through practices based on traditional and science based knowledge, and relying on traditional infrastructure.

### Panchayats & Women Participation

The policy aims at working towards giving the legal recognition of the traditional entitlements of forest dependent communities taking into consideration the



provisions of the (PESA). This would remedy a serious historical injustice, secure their livelihoods, reduce possibilities of conflict with the Forest Departments, and provide long-term incentives to these communities to conserve the forests.

#### Wild life

The policy aims to expand the Protected Area (PA) network of the country, including Conservation and Community Reserves, to give fair representation to all bio-geographic zones of the country. In doing so, develop norms for delineation of PAs in terms of the Objectives and Principles of the National Environment Policy, in particular, participation of local communities, concerned public agencies, and other stakeholders, who have a direct and tangible stake in protection and conservation of wildlife, to harmonize ecological and physical features with needs of socio-economic development.

#### Wetlands

The Ramsar Convention defines wetlands as, 'areas of marsh, fen, peat land or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters', thereby giving a wide scope to the term. Wetlands are under threat from drainage and conversion for agriculture and human settlements, besides pollution. The policy aims at setting up a legally enforceable regulatory mechanism for identified valuable wetlands, to prevent their degradation and enhance their conservation. Develop a national inventory of such wetlands.

#### **National Forest Policy of India 1988**

The main plank of the revised forest policy of 1988 is protection, conservation and development of forests.

#### Its aims are:

1. Maintenance of environmental stability" through preservation and restoration of ecological balance;
2. Conservation of natural heritage;
3. Checking soil erosion and denudation in catchment areas of rivers, lakes and reservoirs;
4. Checking extension of sand dunes in desert areas of Rajasthan and along coastal tracts;
5. Substantially increasing forest/tree cover through massive afforestation and social forestry programmes;
6. Taking steps to meet requirements of fuel, wood, fodder, minor forest produce, soil and timber of rural and tribal populations;
7. Increasing productivity of forests to meet the national needs;
8. Encouraging efficient utilization of forest produce and optimum substitution of wood; and
9. Taking steps to create massive people's movement with involvement of women to achieve the objectives and minimize pressure on existing forests.

### **Draft National Forest Policy**

#### **Notable Points:**

- The draft National Forest Policy (NFP) proposes the levy of a green tax for facilitating ecologically responsible behaviour and supplementing financial resources essential to address forestry woes. "The budget of the forestry sector should be appropriately enhanced so that the objectives enshrined in this policy can be achieved. Environmental cess, green tax, carbon tax may be levied on certain products and services for facilitating ecologically responsible behaviour, garnering citizen's contribution and supplementing financial resources," the draft policy says.
- The policy proposes to launch a new Community Forest Management Mission, bringing government, community and private land under the new proposed management system. It aims to bring one-third of the government-owned forests under the Community Forest Management regime by the end of the next decade. The policy recommends contracts between forest-dependent industries and farmers to fix price and quantity to ensure supply for the wood industry. The policy says, "Large-scale expansion of agro-forestry and farm forestry should be encouraged through commensurate incentives and operational support systems such as lowering the input costs and enabling access to reasonably priced quality planting material."
- The policy states that forest land diversion projects related to mining, quarrying, construction of dams, roads and other linear infrastructure need to adopt special caution. Use of state-of-the-art technology which causes minimum pollution and damage should be promoted.
- The policy states that a National Board of Forestry and State Boards of Forestry are to be established to ensure monitoring of the spread of the forest areas and management of forest cover.
- It calls for developing "sound ecotourism models" with the focus on conservation while supplementing the livelihood needs of local communities. "Ensure that tourism is responsible, does not negatively impact wildlife and its habitat and maximises the income of the local community," the policy says.
- Climate change concerns should be effectively factored into all the forest and wildlife areas management plans and community ecosystem management plans, the policy states.
- The draft policy indicates that CAMPA funds from diversion of forest land by industry are to be used for purchasing wildlife corridors from people.
- The policy also asks for management plans for city forests, parks, garden and woodlands to nurture and sustain urban health, clean air and related benefits.

**Policies to protect environment in India**

- \*Environment Protection Act, 1986
- \*National Conservation Strategy and Policy Statement on Environment and Development, 1992
- \*Policy Statement for the Abatement of Pollution, 1992
- \*National Environment Policy, 2006
- \*Vision Statement on Environment and Health

**Legislations and Rules for the protection of environment in India**

- \*Water pollution
- \*Air Pollution
- \*Land Degradation
- \*Environment Protection
- \*Wildlife
- \*Forest Conservation
- \*Biodiversity
- \*National Green Tribunal
- \*Animal Welfare





## **RELATED CONCEPTS**

**"Ecosystem"** means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit".

**The ecosystem approach** is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. Application of the ecosystem approach will help to reach a balance of the three objectives of the Convention. It is based on the application of appropriate scientific methodologies focused on levels of biological organization which encompass the essential processes, functions and interactions among organisms and their environment. It recognizes that humans, with their cultural diversity, are an integral component of ecosystems.

## **Ecosystem Management**

Ecosystem management is a process that aims to conserve major ecological services and restore natural resources while meeting the socioeconomic, political and cultural and needs of current and future generations. The principal objective of ecosystem management is the efficient maintenance and ethical use of natural resources. It is a multifaceted and holistic approach which requires a significant change in how the natural and human environments are identified.

The definitions of ecosystem management are typically vague. Several core principles define and bound the concept and provide operational meaning:

- ecosystem management reflects a stage in the continuing evolution of social values and priorities; it is neither a beginning nor an end;
- ecosystem management is place-based and the boundaries of the place must be clearly and formally defined;
- ecosystem management should maintain ecosystems in the appropriate condition to achieve desired social benefits;
- ecosystem management should take advantage of the ability of ecosystems to respond to a variety of stress, natural and man-made, but all ecosystems have limited ability to accommodate stress and maintain a desired state;
- ecosystem management may or may not result in emphasis on biological diversity;
- the term sustainability, if used at all in ecosystem management, should be clearly defined—specifically, the time frame of concern, the benefits and costs of concern, and the relative priority of the benefits and costs; and
- scientific information is important for effective ecosystem management, but is only one element in a decision-making process that is fundamentally one of public

Stakeholders are individuals or groups of people who are affected by environmental decisions and actions, but they also may have power to influence the outcomes of environmental decisions relating to ecosystem management. The complex nature of decisions made in ecosystem management, from local to international scales, requires stakeholder participation from a diversity of knowledge, perceptions and values of nature. Stakeholders will often have different interests in ecosystem services. This means effective management of ecosystems requires a negotiation process that develops mutual trust in issues of common interest with the objective of creating mutually beneficial partnerships.

Several approaches to effective ecosystem management engage conservation efforts at both a local or landscape level and involves:

1. adaptive management,
2. natural resource management,
3. strategic management, and
4. command and control management.

**Adaptive management** is based on the concept that predicting future influences/disturbance to an ecosystem is limited and unclear. Therefore, the goal of adaptive management is to manage the ecosystem so it maintains the greatest amount of ecological integrity, but also to utilize management practices that have the ability to change based on new experience and insights.

The term **natural resource management** is frequently used when dealing with a particular resource for human use rather than managing the whole ecosystem. A main objective of natural resources management is the sustainability for future generations, which appoints ecosystem managers to balance natural resources exploitation and conservation over long-term timeframe. The balanced relationship of each resource in an ecosystem is subject to change at different spatial and temporal scales. Dimensions such as, watersheds, soils, flora and fauna, need to be considered individually and on a landscape level. A variety of natural resources are utilized for food, medicine, energy and shelter.

The ecosystem management concept is based on the relationship between sustainable resource maintenance and human demand for use of natural resources. Therefore, socio-economic factors significantly affect natural resource management. The goal of a natural resource manager is to fulfill the demand for a given resource without causing harm to the ecosystem, or jeopardizing the future of the resource. Partnerships between ecosystem managers, natural resource managers and stakeholders should be encouraged in order to promote a more sustainable use of limited natural resources.

Human populations have been increasing rapidly, introducing new stress to ecosystems, such as climate change and influxes of invasive species. As a result, the demand for natural resources is unpredictable. Although ecosystem changes may occur gradually, the cumulative changes can have negative effects for humans and wildlife. Geographic Information Systems (GIS) and Remote Sensing Applications can be used to monitor and evaluate natural resources by mapping them in local and global scales. These tools will continue to be highly beneficial in natural resources management.



**Strategic management** encourages the establishment of goals that will benefit the ecosystem while keeping socioeconomic and politically relevant issues in mind. Strategic management differs from other types of ecosystem management because it keeps stakeholders involved and relies on their input to develop the best management strategy for an ecosystem. Similarly to other modes of ecosystem management, this method places a high level of importance on evaluating and reviewing any changes, progress or negative impacts and prioritizes flexibility in adapting management protocols as a result of new information.

**Landscape level conservation** is a method that considers wildlife needs at a broader landscape level scale when implementing conservation initiatives. This approach to ecosystem management involves the consideration of broad scale interconnected ecological systems that acknowledges the whole scope of an environmental problem. In a human-dominated world, weighing the landscape requirements of wildlife versus the needs of humans is a complicated matter.

Landscape level conservation is carried out in a number of ways. A wildlife corridor, for example, is a connection between otherwise isolated habitat patches that are proposed as a solution to habitat fragmentation. In some landscape level conservation approaches, a key species vulnerable to landscape alteration is identified and its habitat requirements are assessed in order to identify the best option for protecting their ecosystem. However, lining up the habitat requirements of numerous species in an ecosystem can be difficult, which is why more comprehensive approaches to further understand these variations have been considered in landscape level conservation.

Human-induced environmental degradation is an increasing problem globally, which is why landscape level ecology plays an important role in ecosystem management. Traditional conservation methods targeted at individual species need to be modified to include the maintenance of wildlife habitats through consideration of both human-induced and natural environmental factors.

**Command and control management** utilizes a linear problem solving approach where a perceived problem is solved through controlling devices such as laws, threats, contracts and/or agreements. This top-down approach is used across many disciplines and works best with problems that are relatively simple, well-defined and work in terms of cause and effect. The application of command and control management has often attempted to control nature in order to improve product extractions, establish predictability and reduce threats. Some obvious examples of command and control management actions include: the use of herbicides and pesticides to safeguard crops in order to harvest more products; the culling of predators in order to obtain larger, more reliable game species; and the safeguarding of timber supply, by suppressing forest fires.

#### POSSIBLE ISSUES

-Ecosystems Management and aspects of human life

- Human health
- Food security
- Famine

- Migration
- Tribals
- Agriculture
- Watershed

**What is conservation of the ecosystem?**

Conservation is the scientific study of the nature and of Earth's biodiversity with the aim of protecting species, their habitats, and ecosystems from excessive rates of extinction and the erosion of biotic interactions.

The main function of ecosystem conservation is protecting or restoring the structure, function and species compilation within the system.