

POPULATION: The sum total of all individuals of a species in a specific geographical area.

POPULATION DYNAMICS

The study of how and why populations changes in size and structure over time.

IMPORTANT FACTORS

- 1) **BIRTH / NATALITY RATE**: The number of births per 1,000 individuals of a population per year.
- 2) **DEATH / MORTALITY RATE**: The number of deaths per 1,000 individuals of a population per year.
- 3) **SEX RATIO**: The number of females per 100 males of a population in given time.
- 4) **GROWTH RATE**
- 5) **SIZE**
- 6) **AGE**

DEMOCOLOGY

- ⇒ Study of population irrespective of any criteria.

BIOTIC FACTORS

1. The LIVING THINGS in an eco-system.

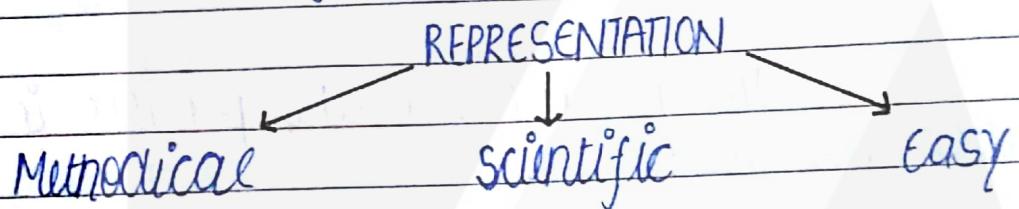
EG: Plants, bacteria, animals

ABIOTIC FACTORS

The NON-LIVING parts of an ecosystem.

EG: Sunlight, temp., soil

DEMOGRAPHY: It talks about the life cycle and its different stages.



MIGRATION

→ Responsible for dispersion patterns done by a group of people.

IMMIGRATION

1) It is the number of individuals of same species ADDED to a habitat in a given period of time.

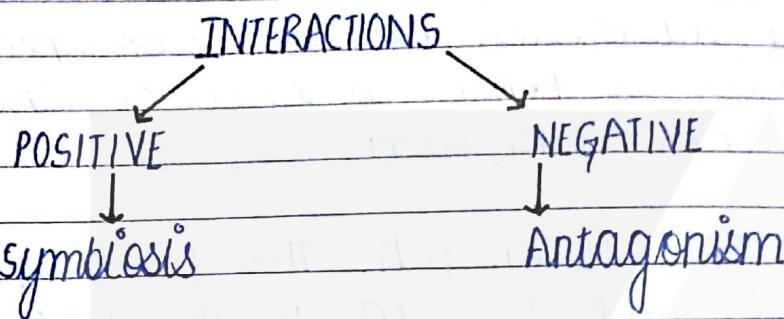
2) It INCREASES the population density.

EMMIGRATION

It is the number of individuals of same species that MOVE TO A DIFF. HABITAT in a given period of time.

It DECREASES the population density.

FATHER OF ECOLOGY → ODUM



EVEN DISPERSION

RANDOM DISPERSION

1] RESULTS : social interactions
FROM

Results : seed dispersal
FROM

2] EG: Waterfall Migration

EG: forests, wildflowers

3] It is the tendency for population
to be found EVENLY DISTRIBUTED
about their habitat.

It is the tendency for population
to be found RANDOMLY
DISTRIBUTED about their
habitat.

POPULATION INTERACTION + POSITIVE EFFECT - NEGATIVE EFFECT ONEUTRAL

SPECIES A	SPECIES B	INTERACTION
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+	+	MUTUALISM
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-	-	COMPETITION
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+	-	PREDATION
---	---	-----------

+	-	PARASITISM
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+	0	COMMENSALISM
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-	0	AMENSALISM
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POSITIVE INTERACTIONS

- 1) COMMENSALISM: The interaction between two species where one species is **BENEFITTED** and the other is **NEITHER harmed nor benefitted**.
- EG: Sea Anemones and clown fish. The fish is **protected** from predators whereas sea anemones are neither harmed nor benefitted.
- 2) MUTUALISM: Interspecific interaction in which both the species are **BENEFITTED**.
- EG: Plant-animal relationships. Plants take help for **pollination** and **dispersal of seeds** and animals are **rewarded** in the form of **nectar or oviposition**.
- 3) PROTO-COOPERATION: The **NON-OBLIGATORY** interaction between two species where both the species are **BENEFITTED**.

EG:

NEGATIVE INTERACTIONS

- 1) PARASITISM: The interaction between two species where one organism (**PARASITE**) is **BENEFITTED** while the other (**HOST**) is being **HARMED**.
- EG: Malaria parasite needs a vector (mosquito) to complete its life cycle.

PREDATION: It is an interspecific interaction where an animal called **PREDATOR** kills and consumes the other **WEAKER ANIMAL** called **PREY**.

EG: A **TIGER** (**PREDATOR**) eating a **DEER** (**PREY**).

THEORIES OF POPULATION DYNAMICS

1) LAW OF MINIMUM FACTORS (LIEBIG , 1840)

⇒ It states that GROWTH IS

NOT
CONTROLLED
by the total amount
of resources available

CONTROLLED
BY
scarcest resource
(LIMITING FACTOR)

The law has been applied in biological populations and ecosystem models for various factors such as sunlight.

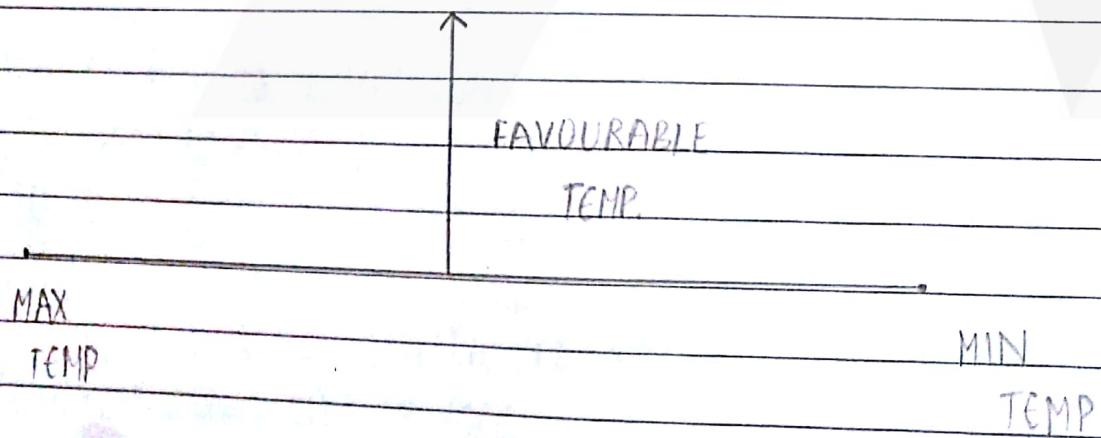
2) LAW OF TOLERANCE (SHELFORD , 1952)

⇒ A law stating that DISTRIBUTION OF ORGANISMS CAN BE CONTROLLED BY CERTAIN FACTORS

climatic biological

where levels of these exceeds the LIMITS of tolerance of that organism.

Max. Min.



3) LAW OF LIMITING FACTORS (SHELFORD, 1952)

→ According to this law, when a process depends on a number of factors, its rate is limited by the pace of the slowest factor.

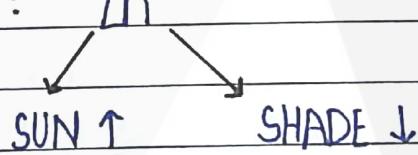
→ This law of Blackman's determines the rate of photosynthesis.

FACTOR-FACTOR INTERACTION

→ i) DETERMINATION OF PRIMARY AND SECONDARY LIMITING FACTOR

→ ii) FACTOR SUBSTITUTION: Decides the limit of one limiting factor.

→ iii) ENVIRONMENTAL INFLUENCE : Zn



→ iv) FACTOR COMPENSATION: In this process, individuals do the changes instead of the factors.

FORMAT FOR CASE STUDY

- TITLE
- DATE & TIME
- HABITAT
- KEYWORDS

CASE STUDY : 1

SEA OTTERS in aquatic ecosystem

Endemic Bear like

HABITAT : Pacific coast of northern America

KEYWORDS : 1) KEystone SPECIES \Rightarrow A dominant predator whose removal allows a prey population to explode and often decrease the diversity.

2) DECLINE IN POPULATION SIZE \Rightarrow killer whales were more to compete for food with sea otters. Due to increased competition, population size decreased. It is a THREAT TO BIODIVERSITY.

3) OVERHUNTING

4) ENVIRONMENTAL LAWS

5) INTERACTION AMONG ORGANISMS

6) BIOMAGNIFICATION \Rightarrow Increasing the concentration of a substance in the tissue of organisms at relatively higher levels in the food chain.

CASE STUDY : 2

FLYING FOXES (SPECIES OF BAT) & DURIAN

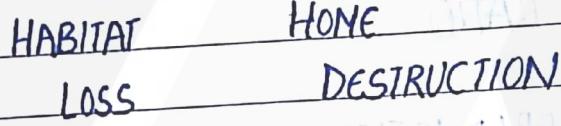
HABITAT : Tropical rain forests

KEYWORDS : 1) MUTUALISM

2) MAINTAINING BIODIVERSITY

3) VULNERABLE SPECIES \Rightarrow The one which is likely to become endangered unless the threatening circumstances improve.

It is majority caused by :



4) DEFORESTATION \Rightarrow The removal of a forest, where the land is converted to a non-forest use.
Eg: conversion of FORESTLAND TO FARM.

5) OVERHUNTING \Rightarrow When hunting causes damage to population of a species.

Unsustainable hunting of a population of species.

6) PEST CONTROL \Rightarrow The management of a species (PEST) that impacts adversely on human activities.

7) LINKED EXTINCTION

8) ECONOMIC EFFECTS

CASE STUDY : 3

POLAR BEAR POPULATION AND GLOBAL

HABITAT : Snow-covered artic region

KEYWORDS : 1) GREEN HOUSE EFFECT

2) GLOBAL WARMING

3) HABITAT SHRINKAGE \Rightarrow The process in which natural habitat is unable to support the species present.

4) FOOD SCARCITY \Rightarrow Insufficiency of amount of food.

5) CHANGE IN SEX RATIO

6) CHANGE IN REPRODUCTION PATTERN

7) CHANGE IN DISPERSION PATTERN \Rightarrow The observation of where individuals are found in a habitat.
'How individuals disperse themselves'

8) DECLINE IN GROWTH RATE