

Pmfias.com Environment: Detailed Breakdown of Contents

Solved Environment Prelims Questions (2011-15)

2011-2012

2013

2014

2015

Environment

Habitat

Difference between Habitat and Environment?

Biosphere

Ecosystem

Difference Between Ecology, Environment & Ecosystem

Components of an Ecosystem

Abiotic Components

Limiting factor

Effect Of Abiotic Components On Terrestrial Primary

Producers – Plants

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Ecology

Levels Of Organizations In Ecology

Principles of Ecology

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Variation

Speciation

Mutation

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Evolution

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Mutualism

Neutralism

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Pyramid of Numbers

Pyramid of numbers – upright

Pyramid of numbers - inverted

Pyramid of Biomass

Pyramid of Biomass – Upright

Pyramid of Biomass – Inverted

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Chlorinated Hydrocarbons (CHC) or Organochloride

Applications of CHC

Effects of CHC

Bioaccumulation

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Biogeo Chemical Cycling or Nutrient Cycling

Nutrient Cycles

Carbon Cycle [Gaseous Cycle]

Nitrogen Cycle [Gaseous Cycle]

Nitrogen Fixing – Nitrogen to Ammonia (N_2 to NH_3)

Nitrification – Ammonia to Nitrates

Ammonification – Urea, Uric Acid to Ammonia

Denitrification – Nitrate to Nitrogen

Phosphorus Cycle [Sedimentary cycle]

Sulphur Cycle [Sedimentary cycle]

Natural Ecosystem

Biomes or Terrestrial Ecosystems

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Taiga or Boreal Biome

Temperate Deciduous Biome [North Western Europe]

Temperate Rainforest Biome

Sub-Tropical Deciduous Biome in Eastern China, South Eastern USA

Steppe or Temperate Grassland Biome

Temperate Deciduous Biome [Mediterranean Region]

Tropical Deciduous Biome [Monsoon Climate]

Savanna or Tropical Wet and Dry Biome

Tropical Rain Forest Biome

Desert Biome

Eutrophication – Algal Bloom

Effects of Eutrophication

Mitigation of Eutrophication

Harmful Algal Blooms

Red Tide

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Aquatic Organisms

Factors Limiting the Productivity of Aquatic Habitats

Sunlight

Dissolved oxygen

Temperature

Lake Ecology

Ageing of Lakes

Wetland Ecosystem

Distinction from Lakes

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Reasons for depletion

Mitigation

Measures to Protect Wetlands

Ramsar Convention on Wetlands

What is wetland

COP

Ramsar Site

The Montreux Record

International Organization Partners

Transboundary Ramsar Sites

Criteria for Identification of Wetlands under Ramsar Convention

Ramsar Sites in India

Wetlands International

National Wetlands Conservation Programme (NWCP)

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Importance of Estuaries

Differences between Lagoon and Estuary

Estuarine Vegetation

India Estuarine Ecosystem

Issues of Indian Estuarine Ecosystem

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Mangroves in India

Importance of Mangroves

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Major Causes of Environmental Degradation

Consequences of Environmental Degradation

Human Modified Ecosystems and Environmental Degradation

Characteristics of human modified ecosystems

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Aquaculture

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Importance of Himalayan Region

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Role in Indian climate

Economic importance

Degradation of Himalayan Environment

Biotic pressure

Pollution and solid waste

Hydroelectric power projects

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Infrastructure development

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Participatory Conservation of Lakes in the Region

Assam Hill Land and Ecological Sites Act, 2006

Sikkim's Ecotourism Policy

Measures That Can Be Taken to Protect Himalayan Ecosystem

Harnessing Religious Sentiments for Conservation

Promoting Ecotourism and Regulation of Commercial Tourism

Soil erosion

Water Erosion

Raindrop erosion

Sheet erosion

Rill erosion
Stream bank erosion
Landslide
Coastal erosion
Consequences of water erosion
Prevention of water erosion

Wind erosion

Consequences of wind erosion
Prevention of wind erosion

Soil Erosion Caused By Human Activities

Deforestation
Farming
Overgrazing
Economic activities
Developmental activities

Desertification

Over Cultivation
Overgrazing
Deforestation
Salting due to Irrigation

Pollution

Air Pollution

Classification of Pollutants

Particulate pollutants

Fly ash
Lead
Metallic Oxides

Nanoparticles – NPs

Effects of Nanoparticles on the environment

Major Gaseous Air Pollutants, Their Sources & Effects

Carbon monoxide (CO)
Carbon dioxide (CO₂)
Chlorofluorocarbons (CFCs)
Ozone (O₃)
Nitrogen oxide (NO_x)

Sulphur dioxide (SO₂)
Volatile organic compounds (VOCs)
Benzene and Ethylene
Tobacco Smoke
Biological pollutants
Asbestos
Radon

Prevention and Control of air Pollution

Indoor Air Pollution

Prevention and control of indoor air pollution

Control of Industrial Pollution

Filters
Electrostatic precipitators (ESP)
Inertial collectors
Scrubbers
Catalytic converter

Steps Taken to Control Vehicular Pollution

Government Initiative

National Air Quality Monitoring Programme

National Ambient Air Quality Standards (NAAQS)

National Air Quality Index (AQI)

Smog

Primary and secondary pollutants

Sulfurous smog

Photochemical smog

Haze

Effects of Smog

Question: UPSC Mains 2015

Ozone Hole – Ozone Depletion

Halogen atoms like chlorine destroy ozone

But how does a chlorine atom reach to such high levels of atmosphere?

Polar Vortex

Polar Stratospheric Clouds (PSCs)

Nacreous clouds

Harmful Effects of Ozone Depletion

Effects on Humans

Effects on terrestrial plants

Effects on aquatic ecosystems

Effects on air quality

Effects on materials

Measures to Prevent Ozone (O₃) Layer Depletion

Vienna Convention for the Protection of the Ozone Layer

Montreal Protocol

Acid Rain – Acidification

The pH scale

Acidic gases and their emission sources

Types Of Acid Deposition

Wet Deposition

Dry Deposition

Chemistry of Acid Rain

Harmful effects of acid rain

Trigger Effect of Acid Rain on Pollutants

Acid Rain Areas

Acid Rain Control

Ocean Acidification

Effects of Ocean Acidification

How ocean acidification effects calcifying ability

Saturation horizons

Impact of Ocean Acidification on Cloud Formation

Water Pollution

Point and non-point sources of pollution

Causes of Water Pollution

Sewage Water

Dissolved Oxygen (DO) – Biological Oxygen Demand (BOD) – Chemical oxygen demand (COD)

Industrial Wastes

Agricultural sources

Thermal and Radiation Pollution

Oil Spills

Invasive species

Underground water pollution

Marine pollution

Ground Water

Groundwater Contaminants and Their Effects

Major Water Issues Of India

Water Pollution Control Measures

Bioremediation

In situ bioremediation

Ex situ bioremediation

Advantages and Disadvantages of bioremediation

Phytoremediation

Effects of Water Pollution

Effects of Water Pollution on Human Health

Water Borne Diseases

Vector borne diseases related with water

Effects of Water Pollution on Environment

Effects of Water Pollution on Aquatic Ecosystem

Water Conservation and Management

EcoSan toilets

Bio-Toilets

Terms associated with Bio-Toilets

Anaerobic biodegradation system

Aerobic biodegradation Vs Anaerobic biodegradation

Contour farming

Ground water conservation

Inter-basin transfer of water

Adoption of drip sprinkler irrigation

Management of growing pattern of crops

Selection of crop varieties

Nutritional management

Role of antitranspirants

Reducing evapotranspiration

Recycling of water

Reuse of wastewater

Reduce the loss of water due to evaporation

Water Treatment for Domestic Use

Watershed Management

Individual And Community Role

Government's efforts on water conservation

Radioactive Pollution

Sources

Effects of Radioactive pollution

Ionizing and Non-Ionizing Radiation

Biological Damage Due to Ionizing Radiations

Radiation dose

Damage due to radiation particles

Half-Life - Period of Radioactivity

Accidents at nuclear power plants

Safe Disposal Of Nuclear Wastes

Preventive/Control Measures

Impact Of Radiation From Mobile Phone Towers

Health Impacts

Impact on birds

What are the responsibilities of Stakeholders?

MoEF

State/Local Bodies:

State Environment and Forest Department

Department of Telecommunications

Soil Pollution

Causes and Sources of Soil Pollution

Effects of soil pollution

Control measures

Noise Pollution

Prevention and control of noise pollution

Ambient Noise Level Monitoring

Solid Wastes

Effects of Plastic Waste

Remedy for Plastic Waste

Industrial solid waste

Recoverable Matter

Concept Of Cleaner Technologies

Hazardous Waste

Stockholm Convention on Persistent Organic

Pollutants

Basel Convention

Rotterdam Convention

Electronic waste | E – WASTE

Source and health effects

E — Waste in India

Heavy Metal Toxicity And Methods Of Their Prevention

Lead

Mercury

Arsenic

Cadmium

Other Heavy Metals

Occupational Health Hazards

Black lung disease

Noise

Chemicals and Biological Agents

Treatment and disposal of solid waste

Waste Minimization Circles (WMC)

Environmental Impact Assessment

Benefits of EIA

Environmental Components Of EIA

EIA Process And Procedures

Steps in EIA process

Composition of the expert committees for EIA

Environmental Appraisal Procedure In India

Environmental Clearance/Rejection Letter

The Main Participants Of EIA

Salient Features of 2006 Amendment to EIA

Notification

Procedure For Public Hearing

Shortcomings of Environmental Impact Assessment

Recommendations to improve EIA process

Biodiversity

Genetic diversity

Species diversity

Why tropics have greater biological diversity?

The importance of Species Diversity to the Ecosystem

Keystone species and Foundation Species

Flagship species

Ecological diversity

Services provided by Biodiversity

Biodiversity of India

Realms

Biomes of India

Bio-geographic Zones

Bio-geographic provinces

Wildlife Diversity Of India

Himalayan mountain system

Himalayan foothills

Western Himalayas (High altitude region)

Eastern Himalayas

Peninsular - Indian sub-region

Peninsular India

Indian desert

Tropical rain forest region

Andaman and Nicobar Islands

Mangrove swamps of Sunderbans

Loss of Biodiversity

Cause for the loss of biodiversity

Habitat loss and fragmentation

Over-exploitation

Alien species invasions

Co-extinctions

Poaching

Diseases that spread from cattle to wild animals

Man - Animal Conflict

Causes

Impacts

Preventive and Mitigation strategies

Culling of animals – Conservation or Biodiversity loss?

Natural culling

Culling by humans – controlled culling

Why did controlled culling become necessary?

The practice of Culling worldwide

Animal welfare activists vs. Pro culling lobby

Invasive Alien Species

Invasion and Species Richness?

Effects

Some Invasive fauna in India are

Some Invasive Alien Flora Of India

Needle Bush

Black Wattle

Goat weed

Alternanthera paronychioides

Prickly Poppy

Blumea eriantha

Palmyra, Toddy Palm

Calotropis / Madar, Swallo Wort

Datura, Mad Plant, Thorn Apple

Water Hyacinth

Impatiens, Balsam

Ipomoea / the pink morning glory

Lantana camara / Lantana, Wild Sage

Black Mimosa

Touch-Me-Not, Sleeping Grass

4 'O' clock plant.

Parthenium / Congress grass, Parthenium

Prosopis juliflora / Mesquite

Townsend grass

Species Extinction

Natural extinctions

Artificial Extinction

Biodiversity Conservation

Benefits of Biodiversity conservation

In situ conservation

Protected Area Network in India

Reserved & Protected Forests

Wildlife Sanctuaries or wildlife refuges

National Park

Eco-Sensitive Zones

Biosphere Reserve

Biosphere Reserves in India

Man and Biosphere Programme (MAB programme)

Tiger Reserves

Conservation Reserves

Community Reserves

Sacred Groves

Ex situ Conservation

Botanical garden

Zoo

Historic Citizen Movements to Conserve Biodiversity

Chipko Movement

Appiko Movement

Biodiversity Hot Spots

Biodiversity Hotspots Across the World

Indian Biodiversity Hot Spots

Indo-Burma Region

Biodiversity of Indo-Burma Region

The Eastern Himalayas

Biodiversity of the Eastern Himalayas

Western Ghats and Sri Lanka

World Heritage Sites

Criteria

International Union for Conservation of Nature

BirdLife International

CITES

TRAFFIC

IUCN Red List or Red Data List or Red Book

2015 IUCN Red List India [As of April 24, 2016]

'Critically Endangered' Mammals

Himalayan Brown/Red Bear (*Ursus arctos isabellinus*)

Pygmy Hog (*Porcula salvania*)

Andaman White-toothed Shrew (*Crocidura andamanensis*)
Kondana Rat (*Millardia kondana*)
Large Rock Rat or Elvira Rat (*Cremnomys elvira*)
Namdapha Flying Squirrel (*Biswamoyopterus biswasi*)
Malabar Civet (*Viverra civettina*)
Sumatran Rhinoceros (*Dicerorhinus sumatrensis*)
Kashmir stag/hangul (*Cervus elaphus hanglu*)

'Endangered' Mammals

Red Panda
Wild ass/ khur (*Equus hemionus khur*)
Dhole/ Asiatic wild dog or Indian wild dog (*Cuon alpinus*)
Eld's deer/ thamin or brow-antlered deer (*Panolia eldii*)
Golden langur (*Trachypithecus geei*)
Himalayan / White-bellied Musk Deer
Hispid hare/ Assam rabbit (*Caprolagus hispidus*)
Hog deer
Lion-tailed macaque/ wanderoo (*Macaca silenus*)
Chita / Tibetan Antelope
Nilgiri langur/ Nilgiri leaf monkey (*Trachypithecus johnii*)
Nilgiri tahr

'Endangered' Marine Mammals

Freshwater / river dolphin

'Vulnerable' Mammals

Great Indian one horn Rhinoceros
Gaur/Indian Bison
Four-horned antelope, Chousingha
Takin
Nilgiri marten
Barasingha or swamp deer (*Rucervus duvaucelii*)
Oriental small-clawed otter/ Asian small-clawed otter (*Aonyx cinerea*)
Clouded leopard (*Neofelis nebulosa*)
Asian black bear/ moon bear or white-chested bear (*Ursus thibetanus*)

'Vulnerable' Herbivorous Marine Mammals

Dugong/Sea Cow

'Near Threatened' Mammals

Marbled cat (*Pardofelis marmorata*)
Blackbuck (Salman Khan)
Himalayan tahr
Markhor (*Capra falconeri*)

'Not Evaluated' Mammals

Himalayan wolf

'Critically Endangered' Birds

The Jerdon's Courser (*Rhinoptilus bitorquatus*)
Forest Owlet (*Heteroglaux blewitti*)
White-bellied Heron (*Ardea insignis*)
Bengal Florican (*Houbaropsis bengalensis*)
Himalayan Quail (*Ophrysia superciliosa*)
Pink-headed Duck (*Rhodonessa caryophyllacea*)
Sociable Lapwing (*Vanellus gregarius*)
Spoon Billed Sandpiper (*Eurynorhynchus pygmeus*)
Siberian Crane (*Grus leucogeranus*)

'Critically Endangered' Reptiles

Gharial (*Gavialis gangeticus*)
Hawksbill Turtle (*Eretmochelys imbricata*)
Leatherback Turtle (*Dermochelys coriacea*)
Four-toed River Terrapin or River Terrapin (*Batagur baska*)
Red-crowned Roofed Turtle or the Bengal Roof Turtle (*Batagur kachuga*)

'Near Threatened' Reptiles

Sispara day gecko (*Cnemaspis sisparensis*)

Vulnerable Reptiles

Olive ridley sea turtle

'Critically Endangered' Fish

The Pondicherry Shark (*Carcharhinus hemiodon*)
The Ganges Shark (*Glyphis gangeticus*)
Large-tooth Sawfish (*Pristis microdon*)
Long-comb Sawfish or Narrow-snout Sawfish (*Pristis zijsron*)

'Endangered' Fishes

Knife-tooth Sawfish (*Anoxypristis cuspidata*)

'Critically Endangered' Spiders

Rameshwaram Ornamental or Rameshwaram Parachute Spider (*Poecilotheria hanumavilasumica*)
Gooty Tarantula, Metallic Tarantula or Peacock Tarantula (*Poecilotheria metallica*)

'Critically Endangered' Corals

Fire corals (*Millepora boschmai*)

In News

Flying squirrel
Guadalupe Fur Seal
Iberian Lynx
Lion
Tiger and Bengal Tiger
Black-Necked Crane (*Grus nigricollis*)
Migratory Birds
Migratory birds of India

Steps Taken by the Government for Wildlife Protection

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Egg Laying Mammals

Marsupials

Insectivorous Plants

Insectivorous plants of India

Drosera and Aldrovanda

Insect trapping mechanism of Drosera
Insect trapping mechanism of Aldrovanda

Pitcher Plants Family: Nepenthaceae

Insect trapping mechanism of pitcher plant

Utricularia and Pinguicula

Utricularia or Bladderworts
Pinguicula or Butterwort

Medicinal Properties of Insectivorous Plants

Conservation Status of Indian Insectivores

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Indian Vulture Crisis

Diclofenac

Consequences of Depopulation of Vultures

Diclofenac Alternative

Conservation Status of India Vultures [As of April-2016]

Critically Endangered
Endangered
Near Threatened
Least Concern

Vulture Safety Zones

VSZ's provide
Zones
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Vulture Restaurants

Major Global Environmental Issues

Climate Change

Greenhouse Effect

Importance of Natural Greenhouse Effect

Greenhouse Effect And Global Warming Due to Greenhouse Gases

Greenhouse Gases

Carbon dioxide

Ozone

Water vapour

Methane

Nitrous Oxide (N₂O)

Carbon Monoxide

Fluorinated gases

Black Carbon or Soot

Global Warming Potential (GWP) & Lifetime of Green House Gases

Global Warming – Impacts

Melting of the ice caps

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Deterioration of Carbon sinks

Some methods to reduce CO2 in atmosphere

Clean coal technology

Carbon capture and storage

Carbon Sink

Carbon Sink vs Carbon Source

Carbon sequestration

Forests as carbon Sinks

Major International Conventions to Protect Environment

UNCED - Earth Summit 1992, Rio De janeiro Brazil

Landmark Agreements

Convention on Biological Diversity

Cartagena Protocol

Nagoya Protocol

International Treaty on Plant Genetic Resources for Food and Agriculture

United Nations Convention to Combat Desertification (UNCCD)

UNFCCC: United Nations Framework Convention on Climate Change

Conferences of the Parties (COP) – UNFCCC

List of UNFCCC Summits

Criticisms of the UNFCCC

Kyoto Protocol

What is Common But Differentiated Responsibilities – Kyoto Protocol?

Classification of Parties and their commitments – Kyoto Protocol

What is commitment period – Kyoto Protocol?

The Kyoto Protocol emission target gases include

Flexible Market Mechanisms – Kyoto Protocol

Clean Development Mechanism (CDM) – Kyoto Protocol

Carbon Credits Trading [Carbon Trading] – Kyoto Protocol

Carbon credit – Kyoto Protocol

Emission trading/'cap-and-trade'

Offset Trading/Carbon Project/'baseline-and credit' trading

Carbon tax (related concept but not related to Kyoto Protocol)

Non-Compliance of Kyoto And Penalties

Joint Implementation (JI) – Kyoto Protocol

Benefits of Flexible Market Mechanisms

Criticism of Kyoto Protocol

Important Summits Post Kyoto

Bali Summit, 2007

Copenhagen Summit, 2009

Cancún Summit, 2010

Durban Summit, 2011

Doha Summit, 2012

Green Climate Fund

Warsaw Summit, 2013

Lima Summit, 2014

Last-minute deal to end the impasse at Lima Summit

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India's position

What India must do other than blaming developed nations

Paris summit, 2015

China-U.S. deal on emission cuts

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The main points of contention on INDCs

India's INDC objectives

Money required to meet India's INDC

National Adaptation Fund on Climate Change (NAFCC)

Tax free infrastructure bonds

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Forest Carbon Partnership Facility

Objectives

BioCarbon Fund Initiative

Intergovernmental Panel on Climate Change

Global Environment Facility

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India's National Action Plan On Climate Change

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National Mission For Enhanced Energy Efficiency (NMEEE)

National Mission On Sustainable Habitat

National Water Mission (NWM) Mission

National Mission For Sustaining The Himalayan Ecosystem (NMSHE)

National Mission For A Green India

Mission Objectives

National Mission on Seabuckthorn

National Mission For Sustainable Agriculture (NMSA)

The National Mission on Strategic Knowledge for Climate Change (NMSKCC)

National Bio-Energy Mission

Indian Network On Climate Change Assessment

National Environmental Legislation

Pollution Related Acts

The Water (Prevention and Control of Pollution) Act of 1974 and Amendment, 1988

The Water (Prevention and Control of Pollution) Cess Act of 1977

The Air (Prevention and Control of Pollution) Act of 1981 and amendment, 1987

Environment and Biodiversity Related Acts

Environment (Protection) Act of 1986

Genetic Engineering Approval Committee (GEAC)

The Ozone Depleting Substances Rules

National Ganga River Basin Authority (NGRBA)

Composition of NGRBA

Wild Life (Protection) Act of 1972 and Amendment, 1982

Forest (Conservation) Act of 1980

Biodiversity Act 2000

The Scheduled Tribes And Other Traditional Forest Dwellers (Recognition Of Forest Rights) Act, 2006

National Green Tribunal Act, 2010

Acts for Protecting Coastal Environment and Wetlands

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Wetlands (Conservation And Management) Rules 2010

Animal Welfare Board of India

Bombay Natural History Society

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Reasons for slightly increased tiger population recently

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Indian (One Horn) Rhino Vision 2020

Project Snow Leopard

Sea Turtle Project

Indian Crocodile Conservation Project

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Ganges Dolphin

Green Revolution – Modern Agriculture

What is Green Revolution?

Green Revolution involves

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Use of Chemical Fertilizers and Pesticides

Mechanization Of Agriculture

Irrigation

Second Green Revolution For Sustainable Livelihood

Why we need Second Green Revolution

What we want from Second Green Revolution

Bringing Green Revolution in Eastern India (BGREI)

Objectives of BGREI

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How to Make Second Green Revolution a Success

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Advantages of Mixed cropping

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Mixed Farming

Soil Management

Nutrient Management

Macronutrients

Micronutrients

Bio-Fertilizers And Their Use In Agriculture

Rhizobium biofertiliser

Azotobacter biofertiliser

Azospirillum biofertiliser

Blue green algae

Azolla biofertilisers

Phosphorus solubilizing biofertiliser

Mycorrhizal fungi biofertiliser

Compost Tea

Bio char

Organic Farming

Vermicomposting

Integrated Pest Management (IPM)

Disadvantages of Integrated Pest Management (IPM)

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Mushroom culture

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Crop Classifications

Classification based on climate

Classification Based on growing season

Agronomic Classification of Crops

Classification based on cultural method/water

Classification based on root system

Classification based on economic importance

Classification based on No. of cotyledons

Classification based on length of photoperiod required

for floral initiation

Cropping pattern

Cropping system

Intercropping

Permaculture

Micro Irrigation

Sprinkler Irrigation

Drip irrigation

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Sustainable Sugarcane Initiative (SSI)

Tillage - Advantages

Biomass [Conventional Source]

Petro crops (Plants)

Geothermal Energy

Hydrogen Energy

Fuel Cell Technology

Solar Energy

Tidal energy

Hydropower Energy

Ministry of New and Renewable Energy (MNRE)

Initiatives

Jawaharlal Nehru National Solar Mission (JNNSM)

Domestic content controversy

Indian Renewable Energy Development Agency (IREDA)

Non-Renewable Sources Of Energy

Coal

Formation of coal

Problems with Coal Mining

Petroleum Or Mineral Oil

Natural Gas

Nuclear Energy Sources

Nuclear fission

Nuclear breeder reactor

Nuclear fusion reactor

Problems related to nuclear energy generation

Location of radioactive mineral ore in India

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Renewable & Non-Conventional Sources Of Energy