



CONTENTS

Previous Year UPSC Question paper analysis (2011 to 2018) xiii

PART-I ENVIRONMENTAL ECOLOGY

S.No	Chapter	Page No.
1.	ECOLOGY	3-9
	History of Ecology.....	3
	Environment and its Components	3
	Levels of Organisation	4
2.	FUNCTIONS OF AN ECOSYSTEM	11-21
	Energy Flow	11
	Food Chain	11
	Food Web	12
	Ecological Pyramid	13
	Pollutants and Trophical Level	15
	Biotic Interaction	16
	Bio-Geochemical Cycle	16
	Ecological Succession	20
3.	TERRESTRIAL ECOSYSTEM	23-32
	Tundra	23
	Forest Ecosystem	23
	Indian Forest Types	25
	Deforestation.....	27
	Grassland Ecosystem.....	28
	Desert Ecosystem (Thar & Cold).....	29
	Desertification.....	31
	State of forest report, 2017.....	32
4.	AQUATIC ECOSYSTEM	33-53
	Aquatic Organism	33
	Lake Ecology	35
	Eutrophication.....	36
	Harmful Algal bloom.....	38
	Wetland Ecosystem.....	39
	National Wetland Conservation Programme	42



Montreux Record	43
Estuary Ecosystem	43
Mangrove Ecosystem	45
Coral Reefs	47
Coral Bleaching	49
Initiatives to Protect Coastal Environment	50
Ganga Action Plan	51
Namami Ganga Program	51
Clean Ganga Fund	52
Recent Measures	53
5. ENVIRONMENTAL POLLUTION	55-82
Pollutants	55
Air Pollution	55
Smog	56
Indoor Air Pollution	57
Fly Ash	58
NAMP & NAAQ	60
Air Pollution in India	61
Water Pollution	62
Soil Pollution	65
Noise Pollution	66
Radio Active Pollution	67
E-Waste	69
Solid Waste	71
Thermal Pollution	73
Plastics Pollution	74
Bio-Remediation	76
Environmental Pollution and Health	77
Acid Rain	78
6. RENEWABLE ENERGY	83-91
Solar Energy	83
International Solar Alliance	84
Luminescent Solar Concentrators	84
Wind Energy	85
Hydro Power	86
Ocean Thermal Energy	87
Cogeneration	88
Waste to Energy	89
Geothermal Energy	89
Fuel Cells	90
7. ENVIRONMENTAL ISSUES	93-108
Indian Himalayan Region	93
Sand Mining in India	97
Palm Oil - Environmental Issues	100
Colony Collapse Disorder	102



Wildlife Deaths Due to Collision With Trains	104
Impact of Radiation	105
Genetically Engineered Trees	106
MoEFCC Banned Dolphin Captivity	106
Prohibition of Removal of Shark Fins in the Sea	107
Cost of Environmental Degradation in India	108
8. ENVIRONMENTAL IMPACT ASSESSMENT	109-119
The Need for EIA.....	109
EIA Cycle and its Procedures	110
Components of EIA.....	113
Procedure of Public Hearing.....	116
Drawbacks and Recommendations of EIA.....	116
Environmental supplemental plan	119
PARIVESH	119

PART-II

BIODIVERSITY

S.No	Chapter	Page No.
9.	BIODIVERSITY	123-127
	Biodiversity.....	123
	Levels of Biodiversity.....	123
	Measurement of Biodiversity	124
	Biodiversity Services.....	124
	Modes of Conservation.....	125
	Botanical Garden and Zoo	125
	Red Data Book.....	126
10.	INDIAN BIODIVERSITY	129-137
	Indian Bio-Geographical Classification.....	129
	Fauna Diversity	131
	Flora Diversity.....	133
	Indian Wildlife	136
11.	SCHEDULE ANIMALS OF WPA, 1972.....	139-152
	Schedule List - WPA.....	139
12.	ANIMAL DIVERSITY OF INDIA	153-159
	Mammal Critically endangered	153
	Marine Mammals.....	155
	Egg Laying Mammals.....	155



Marsupial.....	155
Birds Critically endangered	156
Corals.....	158
Bird Migration.....	158
Wild Life Disease.....	158
Species Extinction.....	158
Man- Animal Conflict.....	159
13. PLANT DIVERSITY OF INDIA.....	161-169
Plant Classification.....	161
Effect of Abiotic Components on Plants	161
Insectivorous Plant	162
Invasive Alien Species.....	164
Invasive Alien Flora of India	164
Medicinal Plants.....	166
Tree Characters.....	167
14. MARINE ORGANISM	171-173
Plankton.....	171
Phyto-Plankton.....	171
Zoo-Plankton.....	172
Sea Grass	172
Sea Weed.....	173
15. PROTECTED AREA NETWORK.....	175-185
National Initiative	
Wildlife Sanctuary and National Parks	175
Conservation Reserves and Community Reserves	177
Coastal Protected Areas	177
Sacred Groves of India	178
Export Prohibited Items.....	179
Global Initiative	
Man And Biosphere	179
Biosphere Reserves.....	180
National Biosphere Reserve Programme.....	181
World Network of Biosphere Reserves.....	182
Biodiversity Hotspots	183
World Heritage Sites.....	184
16. CONSERVATION EFFORTS.....	187-199
Project Tiger	187
Project Elephant.....	190
Vulture.....	192
One Horned Rhinoceros	195



Project Snow Leopard.....	196
Secure Himalaya.....	197
Sea Turtle Project.....	197
Crocodile Conservation Project	197
Project Hangul	198
Captive Breeding.....	198
Dolphin	198
Government Measures	199
India Adopt SAWEN.....	199

PART-III

CLIMATE CHANGE

S.No	Chapter	Page No.
17.	CLIMATE CHANGE	203-210
	Global Warming.....	203
	Green House Effect	204
	Green House Gases	205
	Climate Forcing.....	208
	Global Warming Potential	209
	Receding Glaciers. A Symptom of Global Climate Change.....	210
18.	OCEAN ACIDIFICATION	211-213
19.	OZONE DEPLETION.....	215-220
20.	IMPACT OF CLIMATE CHANGE – INDIA.....	221-226
	Agriculture and Food Security	221
	Water Stress and Water Insecurity	222
	Sea Level Rise.....	223
	Ecosystem and Biodiversity	224
	Climate Change and Health	225
21.	MITIGATION STRATEGIES.....	227-231
	Carbon Sequestration	227
	Carbon Sink.....	228
	Carbon Credit.....	228
	Carbon Offsetting	229
	Carbon Tax	229
	Geo-Engineering.....	230
22.	INDIA AND CLIMATE CHANGE	233-250
	India's Position on Climate Change	233
	Observed Climate and Weather Changes in India	233
	Current Actions for Adaptation and Mitigation	234
	National Action Plan on Climate Change.....	235



Indian Network on Climate Change Assessment	241
National Communication (NATCOM)	242
India's Policy Structure Relevant to GHG Mitigation.....	243
Green Building	244
Griha	245
National Initiative on Climate Resilient Agriculture	247
BSE Greenex	248
Fame-India Programme	249
Long Term Ecological Observatories (LTEO)	249
The National Adaptation Fund for Climate Change (NAFCC).....	249
Other Critical Entities	249

23. CLIMATE CHANGE ORGANISATIONS 251-271

UNFCCC.....	251
KYOTO Protocol	251
Conference of Parties.....	258
Other Mechanism of UNFCCC.....	260
REDD and REDD+	261
Global Environment Facilities	262
Climate Smart Agriculture	262
Inter Governmental Panel on Climate Change.....	263
National Green House Gas Inventories Programme	264
Green Economy	265
Climate Finance Architecture.....	267

PART-IV AGRICULTURE

S.No	Chapter	Page No.
24.	AGRICULTURE.....	275-293
	Agriculture	275
	Crop and its Classification	276
	Tillage	279
	Cropping System and Pattern.....	280
	Farming System.....	282
	Sustainable Agriculture.....	283
	Organic Farming.....	284
	Integrated Farming System	285
	Soil Science.....	288



PART-V

S.No	Chapter	Page No.
25.	ACTS AND POLICIES	297-311
	Wild Life Protection Act 1972	297
	Environmental Protection Act 1986	298
	National Forest Policy 1988	299
	Biological Diversity Act 2002	299
	Schedule Tribes and Other Forest Dwellers Act 2006	299
	Coastal Regulation Zone	302
	Bio-Medical Waste Management Rules, 2016	307
	E-Waste Management Rules, 2016	308
	Plastic Waste Management (PWM) Rules, 2016	309
	Wetland Rules 2010	310
	Nation Green Tribunal	311
	The Ozone Depleting Substances Rules	311
26.	INSTITUTION AND MEASURES	313-319
	National Wide Life Action Plan	313
	National Afforestation And Eco-Development Board	313
	CAMPA	314
	Joint Forest Management	314
	Social Forestry	315
	National Bamboo Mission	315
	CEPI	316
	Lighting a Billion Lives	316
	Eco-Mark	317
	USERS	317
	BCRLIP	317
	National Clean Energy Fund	317
	National Mission for Electric Mobility	318
	Science Express - Bio Diversity Special	318
	Mangrove for Future	319
27.	ENVIRONMENTAL ORGANISATIONS	321-324
	Animal Welfare Board	321
	Central Zoo Authority	322
	National Bio Diversity Authority	322
	Wildlife Crime Control Bureau	323
	National Lake Conservation Plan	323
	National Ganga River Basin Authority	324
28.	INTERNATIONAL ENVIRONMENTAL CONVENTIONS	325-340
	United Nations Conference on Environment and Development	325
	Convention on Biological Diversity (CBD)	326



Ramsar Convention On Wetlands	330
CITES	332
The Wildlife Trade Monitoring Network (TRAFFIC)	332
Convention on the Conservation of Migratory Species (CMS)	333
Coalition Against Wildlife Trafficking (CAWT)	333
International Tropical Timber Organization (ITTO)	334
United Nations Forum on Forests (UNFF)	334
IUCN	335
Global Tiger Forum (GTF)	335
Stockholm Convention	336
Basel Convention	337
Rotterdam Convention	337
United Nations Convention to Combat Desertification	338
International Whaling Commission (IWC)	338
Vienna Convention and Montreal Protocol	339
Kigali Agreement	349
Globally Important Agriculture Heritage Systems	340
Minamata Convention	340
29. ENVIRONMENT ISSUES AND HEALTH EFFECTS.....	341-346
Toxicology Effects	341
Lead in Paints	342
Transfat	342
High Caffeine in Energy Drinks	342
Pesticide in Human Blood	342
Testing of Pesticide Toxicity	342
Diseases Caused by Environmental Degradation	343
Miscellaneous Topics - CHIPKO Movements	344
APPIKO Movements	344
The National Wastelands Development Board	345
GLOSSARY	347-354
APPENDIX	355-363
Ramsar Wetland Sites in India	355
Tiger Reserves of India	355
Elephant Reserves in India	356
Mike Sites in India	357
Biosphere Reserves	357
List of India's Biosphere Reserves in UNESCO's Map List	358
Natural World Heritage Sites	358
List of Sacred Groves	359
Mangrove Sites in India	359
List of Key Activities and Likely Associated Air Pollutants	360
Respiratory Irritants and Toxic Chemicals	361

