

Solar Dynamics Observatory - NASA

Solar Mission - NASA, LI Joint
Parker Solar Probe

Solar orbiter - ESA

MUSE and heliowarm missions - NASA

Multi-slit solar explorer

Special theory

1) both space-time relative

2) 'c' constant in all frames

3) $E = mc^2$

LIGO (USA), LISA (ESA)

General theory

1) gravity

2) gravitational waves c

3) black hole + universe expanding

Black hole - Sagittarius A (Milky way)
Messier 87 (M87), Gria

Ergosphere - rotation of space time around black hole



singularity
event horizon
accretion disk

55 chuan zhi chao xian

Event Horizon Telescope

not of one agency

very very Baseline interferometer

Satellite - 1-40 GHz

LI band (GPS)

1-2 GHz

NAVIC - (y+3), 1500 km

GLONASS (Russia)

Galileo (Europe)

Beidou (China)

QZSS (Japan)

LEO - 180 - 2000 km

MEO - 2000 - 35,786 km

GEO - $\geq 35,786$ km

GPS ≈ 30 satellites

UN committee on Peaceful outer space (COPUOS)

1) Moon Agreement - not by US, Russia, China
2) Outer space treaty

Shadens - space docking station experiment
ISRO

Relativistic jet - star hit black hole 2017 9, 10 11

Tidal disruption events = shaghtification of star

Moon - lunar look
current
come from
virtual

Missions

NASA - lunar orbiter, Apollo,
lunar Reconnaissance orbiter
- Artemis - Orion, Retrograde
orbit, skip entry

Russia - Luna

China - Chang'e

Japan - Hiten, Hakuto-R
Clear Moon Chasid rover

Venus - hot test, CO_2 , O_2 , H_2SO_4

↳ DAVINCI, VERITAS, Maverick,
Pioneer, Magellan - NASA

↳ Venera, Vegas - Russia

↳ Akatsuki - Japan

↳ Venus Express - Europe

Venus
Earth Planets → Clockwise spin

ISS - NASA + Russia + Europe +
Canada + Japan

Tiangong - China

↳ Tianhe, Wentian, Mengtian

↳ lunar gateway - she

↳ Starlab - private SS

Jupiter - moon - Io, Europa,
Ganymede, Callisto

Hayabusa 2 - Japan on
Ryugu

JW Telescope - NASA + ESA + CSA
LGR, L2 point (1.5 mm
km)
↳ Halo orbit

Hubble - visible, UV

Herschel - ESA, L2 point IR

POEM - PSLV orbital
experimental
module

Mission Parameters - Vikram-S
first private rocket

SEED - space entrⁿ SS
↳ Startups etc.

SPIN - space innovation w/
Leap second - antⁿ Earth

Rotation and
reference systems
service

Chandler wobble

Trojan asteroids - share orbit
with Planet

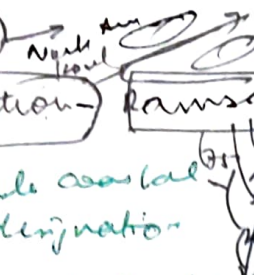
Comets - also orbit Sun
↳ WIS

rogue planets - galactic
centre
↳ WASP - Kepler
(hot Jupiters)
Exoplanets - WASP

Galaxy - Stephan's quintet,

Einstein Ring, Carina Nebula

Carandell - known distant
star

Bansagar - Son 

Chuhan declaration - Ramsar

CRZ - vulnerable coastal areas designation

EPA

Aridjan Convention → Atlantic
 heart of
 Americas
 coast protection

Coral mesh technique - coral regeneration

Starfish eats corals

Beach corals → Silver leader
 → tiny zooplankton

Champions of Earth Award

UNEP
 → Dr. P. D. Barman Hangila Army
 (Assam)
Achutan stock

IPBES - independent

→ UNEP secretariat centres

Following Gove → UNEP

Breathe Life

Photobioreactor - algae based fuel

Supply chain Ministerial Forum

→ US - led, India +

Rankalp se Siddhi Initiative

→ TRIFED = Mission Van Dhan

SPU (PT) scheme → Scheme

for fund of Traditional

industries (MSME)

11 Vimalaprabha - Asthalogy
Ayurveda

2) Tasik-e-khandan - Timur sultan
 → Akbar

Maitreyavakranga
 10th century - Buddhist

Manasollasa / Abhilashitartha

Chintamani

→ king Someshvara III
 of Western Chalukya
 (12th century)

Later Chalukyas

Sangitaratnakar
 (13th century) → Shrangadatta

CHZ

CHZ → CHZ → CHZ

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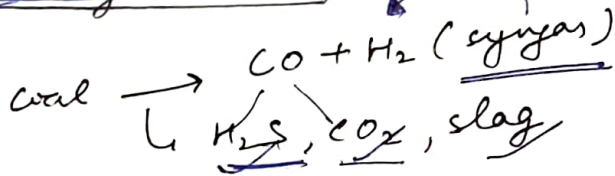
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CHZ → CHZ → CHZ

Sindhya - I - ocean wave energy
converter, IIT Madras

coal gasification



Andhra Renewable Energy
development Agency

(Company under MNRE)

National Bioenergy Programme
(MNRE - IREDA)

organic solar cells - 3rd Gen
(lightweight)
(low cost)
(better efficiency)

~~Solar energy target - 280 GW~~

~~first OTEC plant - Cuddalore~~

~~Geological survey - Ministry of Mines~~

Geothermal potential sites
 → Tuga $\rightarrow$ Ladakh
 Chumathang
 Katnagiri
 Khammam - Telangana
 Mattapani - Chhattisgarh
 Cambay - Gujarat

~~Asia's largest CBI plant - Langar, Punjab~~

Global Offshore Wind

Alliance - GWEC + IRE Agency
 + Denmark
 (Intertek, UAE)

Mahadayi - ~~tributaries~~
 ~~river~~ (Kalsi)
 (Bandari)

Ribany - Ashupani,
 Dibr, Tanyon
 rivers
 |
 Etalin
 HE

Chenab HE projects
(Kwaro, Baglikar,
Dulhasi, Salal, Pakhal, Dul,
Kinn, Kirtalai)

UN
 GA
 Security Council
 ECOSOC
 Trusteeship Council
 ICTJ
 UN Secretariat

Cholera - diarrhoea,

Meningitis

admission

Yellow fever - dengue

PEP Plus strategy → Africa, NCDs.

Shigella - bacterial, diarrhoea, no vaccine, food/water,
human-to-human contact

Type-1 diabetes - insulin dependent, Type-2 *

non-insulin dependent

Trachoma

→ bacterial, eye infection,

India - eliminate, contagious

Malaria - Plasmodium parasite, Anopheles.
↳ vaccine ⁹⁸/₈ (protozoa)

Kala-azar - black fever, Leishmania parasite

↳ protozoa parasite, sandfly bites.

↳ not eliminated in India

↳ curable ⁹⁸/₈ with treatment

Asian influenza - Type A

(bird flu)

(H5N1)

↳ swine influenza (H1N1, H3N2)

White spot syndrome virus - crustaceans

Lumpy skin disease

FICAR vaccine

not zoonotic

↳ viral

Tomato flu → virus, no treatment (vaccine)

African swine fever → viral, not human.

↳ no vaccine.

Marburg virus disease - [fruit bats], contagious ⁹⁸/₈
no vaccine, no treatment

1) [delimitation
commⁿ
member → retired
SC judge + CEC + state
election
commissions]

ECI ~~Attorneys~~ → not charged expenditure.

FC rules 2012 { Forest advisory committee (state level)
Project screening committee (state)

Uththomas judgement → 'disqualification'

[Sodium - Glucose cotransporters] → heroin's
intensive use

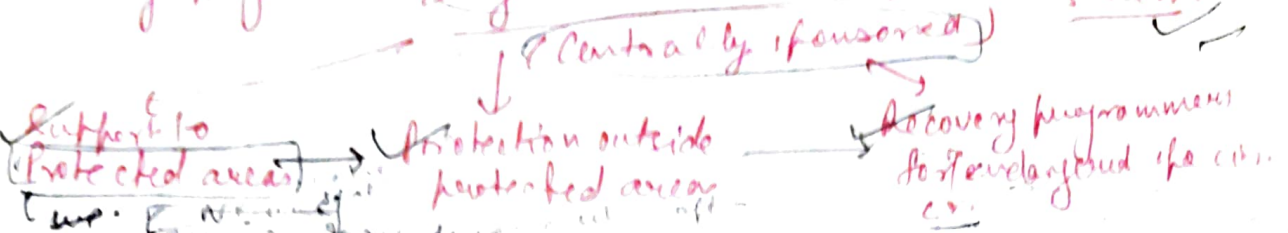
Epsstein Barr virus - cancer causing,
human

monkey from

small pox - variola virus

West Nile virus → Japanese Encephalitis.
bird → mosquito → human
house

Recovery programmes & integrated development of wildlife habitats scheme



Project Elephant - Centrally sponsored, also include domesticated elephants, 22 states / UTs

NB for wildlife meet once every month

Recovery programmes for saving ex. Endangered species

(Asian)

Snow Leopard

Bustard (including florians) * AIB

Dolphin

Gangul (Endemic)

Malgosi Tiger

Marine Turtles

Bugongs * (ASN AIAA)

Edible Nest Swiftlet

Asian Wild Buffalo

Nicobar Megapode (424)

Manipur Brown - antlered deer (Langur)

Vultures

Malabar Civet * - CE

Indian Rhino

Asiatic Lion (Endemic) - Sri Lanka malleusara

Swamp deer - WLS Andhra

Tordon's Courser - CE

Northern River Terrapin

Clouded Leopard (NE India)

Arabian Sea Hump back whale

Red Panda * (IUCN: least concern)

Barical

200 eco regions

IUCN

WWF

GTF

TRAFFIC

WPA

NTCA

UNDP

AFF

WII

Secure Himalayas

Intⁿ Threatened Taxa → Threatened

Conas Project Cheetah - 8 (5F + 3M)

IN Namibia → Kuno Journal

Na Acinonyx jubatus (stay hunter)

For (Africa & Asia tigers)

N- Carnival - sigahash (percent)

Na Warrior Intⁿ mechanism

Na CUNECCE (Loss and Damage)

Pos Chakrashila WLS - Assam

cos Effie, Nuncho Gra - mammoth

smi remains

cos name

ind Ramsar Convention - (UNESCO)

f India - 40% inland natural

25% coastal wetlands

v Pichavaram - Vellar + (colliding river)

h Pala (Mizoram) - Maria tribe

ae Sakhye Sagar - Madhav NP

O₃ Singalila N.P. → Sandakphu, Phalut Peak

N Rammam, Srikhola river

su Chenkerinjji - Agathambalai

B BR

P Gires (WRT) Forest Initiative - voluntary

coalition of cities around world

India - Kochi, Mumbai, Hyderabad

As Water Atlas - Mo EFCC - tiger areas

FI Asian waterbird Census - wetlands

Intⁿ + BNHS

FI Biodiver cities by 2030 - WEF + Columbia

L T

Endays for future - climate justice movement

Alkhanur oil field - Saudi

Registry of fossil fuels - Carbon Tracker + Global Energy Monitor

Coastal Clean Seas campaign

India, India +

leaders in climate change

training of urban ppl

NI of Urban Affairs + WRI

India Forum for Nature-based Solutions

UNB Norway supports

A. Kanthambore chambal

+ Kailadewi WLS

Kuno NP

Panna TR

WP A

A IEEE framework - TRs (Management Effectiveness Evaluation)

Yellow Him. Fritillary

Invasive Species

Parthenium

Lantana - America

Utricularia - America

American - snake

Senna spectabilis - plant

forked - Sanwort

A CF25 - Cloud Forest + investment initiative

A MISHTI initiative (Budget)

(Mayaguez for shoreline habitats & Tangible incomes)

Climate Change 2022: Impacts, Adaptation and Vulnerability → IPCC ✓

Facility for Low Carbon Technology Deployment Project → BEE + UNIDO, GEF
SIMBA - marking based Analytic. Uan Identification software

Bugong - litchi, Mannar, ABA, Glycosmis albicaarpa → Western Ghats, Plant
Northeast India Terrapin (CE), Syllipemphedi bideni → fossil (octopus like)

Heat waves - plains - $> 45^{\circ}\text{C}$, ($4.5-6.4^{\circ}\text{C}$), National Afforestation and
(2 days) hills - $> 30^{\circ}\text{C}$, Eco-development Board
coastal $> 37^{\circ}\text{C}$

Mukundra TA - Damoh, Touhara, Sagar, Chambal WLS → Keoladiah NP man made wetland
↳ Mukundra, Grayola → red-rishi

BNT Treaty → Marine biodiversity beyond National Jurisdiction, UNCLOS
↳ Treaty of High Seas

High Seas Alliance → NGOs Fit, WHO - chemicals of public health concern

Frontiers 2022: Noise, Blazes and Mismatches - UNEP

Ghatmatta → Dhamra river

Earth Hour → WWF

Central Ground water Board - non-statutory, MoJal, private for-profit cannot become member
Authority → EPA Act

IUCN → Green list of Protected and Conserved Areas
↳ Green status of species

↳ Ext. Add list Pola Vatta → Fish (carangid)

Kashyapa Zero Dumpsites - MoHUA Legacy waste remediation

Kankarwadi Fort - Sausha TR, DRIP, C Water - C + World Bank + AIB

Prakriti - Plasert, MoEPCL Plastic waste Jal Shakti, Non-statutory
single use Plastic - ban

Balli (in PJBK) → carbon-neutral Sakura - Japanese name of cherry
forhose - Mammal Panda of sea Anisoma indicum - eel fish Blossoms

Jacobson forest → Onisa - Asia layer Teah & Sal forest → Kardai, Khair, Palai, Sapwan
Chilika Water Day - 22nd March

Nasikabatrachus sehyadrensis - Frog endemic Western Ghats
Palming - butterfly (endemic)

Snorkullam - largest Nilgiri Tahr, Rajmalla Hills, Kannan Devan Hills,
SECURE Himalayas - (GEF, UNDP)

Himal Sanjayhak - Snow leopard Nilgiri Hills
Summit Trust - NGO Lewis - SL capital

Landalwood spike disease - Bacteria by insect

Stockholm conference - UN conference on Human Environment

Bugun liochichla - bird, India Bugs - mots, smuts, mildews

Molluscs - Abalone, Ormer

Fish - gourami, cheomide, mullet, anchoviet, sardinis, saury, hampans
hake, Wallago attu, ailia, bacracuda, torphon, snook, snapper
(catfish)

Birds - pentail, garganey, grey wagtail, blue-winged teal, minivet,
tree tile, Turaco, Babaz, shoveler, Cormorant, Coat, Malco,
Petrel

Reptiles - Tamistoma (crocodile)

WPA - IT - ...

Intⁿ Coral Reef Initiative - govt + NGOs

(India member)

Coral Triangle - Indo + Malay + Timor + Solomon + Papua; Philippines

INCOIS - Coral bleaching Alert system

National Coral Reef Research Centre - Port Blair

Force Blue Project - coral conservation

N-Testing - Fertⁿ required by plant

Natural riparian buffers - wetlands, estuaries

Pollutants - CO - short lived, flammable

cooking $\rightarrow$ $\text{NO}_x, \text{CO}, \text{VOCs} \xrightarrow{\Delta} \text{O}_3$

smoking $\rightarrow$ $\text{C}_x\text{H}_y\text{O}_z + \text{NO}_2 \rightarrow \text{PAN}$

Cosmetics $\rightarrow$ (VOCs) O_3

industries $\rightarrow$ formaldehyde

Photochemical

NO_x
vehicular
Los Angeles

Industrial/Classical

SO_x
industries
London
coal
fossil fuel
acid sulphur
rich

aerosol sprays $\rightarrow$ CFCs

O_3 - GHG

NO, NO_2 - not GHG, $\text{N}_2\text{O} \rightarrow$ GHG (nitrous)

sulfide $\rightarrow$ pyrite, sphalerite, cinnabar

Benzene $\rightarrow$ gasoline, cancer, bone marrow failure

Polyl(ethene) = ethylene + oxide = cancer

Asbestos (silicate) $\rightarrow$ chrysotile, crocidolite, amosite, anthophyllite, tremolite, actinolite
(mesothelioma, asbestosis, lung cancer)

Radon $\rightarrow$ soil

Persistent aerosols $\leq 0.02 \mu\text{m}$
($> 10 \mu\text{m}$) $\rightarrow$ settle. $\frac{g}{m^3}$ $\frac{g}{m^3}$

Fly ash $\rightarrow$ silica, alumina, $\text{SiO}_2, \text{CaO}, \text{Fe}, \text{Mg}, \text{Pb}, \text{As}, \text{Co}, \text{Cu}$

Lead $\rightarrow$ petrol, diesel, paints, hair dye

TEL $\rightarrow$ anti-knocking agent

Catalytic converter $\rightarrow$ palladium, rhodium, platinum
(unleaded petrol use cat)

BSVI $\rightarrow$ Sulphur, NOx, CO, Hydrocarbons (PM)

Real time Emission
analysis

Onboard Diagnostics

Normal rainfall - $\text{pH} < 5.6$

heavy metals $5 \mu\text{g/cm}^3$

Acid rain - leaching of metals

acidic	neutral	basic
fungi	bacteria protozoa	bacteria protozoa
Soil - acidic - lime (CaO)		blue-green algae
	alkaline - Gypsum (CaSO_4)	

NAAQS - $\text{CO}, \text{NO}_2, \text{SO}_2, \text{PM}_{2.5},$

$\text{PM}_{10}, \text{O}_3, \text{Pb}, \text{As}, \text{Ni},$

NH_3 , benzene, benzophenone

AQI - $\text{CO}, \text{NO}_2, \text{SO}_2, \text{PM}_{2.5},$

$\text{PM}_{10}, \text{O}_3, \text{NH}_3, \text{Pb}$

NCAI $\rightarrow$ $\downarrow$ PM by 20-30% in 102 cities by 2024
2017 base

Eco-sensitive $\rightarrow$ EPA by Zones Union

CAQM in NCR and adjoining areas
(Punjab, Haryana, UP, Rajasthan)

SAFAR $\rightarrow$ MoES, IITM + IMD

Air Quality Early warning system

weather parameters +

$\text{CO}, \text{NO}_x, \text{SO}_2, \text{PM}_{2.5}, \text{PM}_{10},$

O_3 , Benzene, Toluene, xylene, Mercury.

WAYU - CSIR, NEERI

CaSO_4

TiO_2 + activated carbon

Autotrophic bacteria
bacteria vs. Algae vs. fungi
Phagotrophs, saprotrophs

Gene. sanctuary - in-site
Meghalaya, Garo
Hills

nematodes, arthropods, crustaceans, mollusks, clams, mussels

phytoplankton - dinoflagellates, diatoms, algae, cyanobacteria
POA - DDT, PCB, Endosulfan, heptachlor (insecticides)

Reed swamp → marsh meadow → scrub
Psammose - sandy, Seric - microorganisms on decomposed material

Eosere → eca
reaction → change of envⁿ by community

• Penicillium (fungi) vs. bacteria

Penicillin (antibiotic)

skimmer, scaup, Avocet, Oystercatchers, Dowitchers, Knot, Ruddy turnstone, Piping Plover, warbler, egret, waders

commensalism → epiphytes

barnacles on whale
sea anemone (animal) + clownfish

Mycorrhizal → fungi + roots of plants
cellulose, glucose
(oceans > atmosphere) CO₂

ATP produced during respiration

Phosphorus → ATP
biological membranes
↓
nucleic acids
bones, shells, teeth

Rhizobium, Nostoc, Cyanobacteria, Azotobacter

(NH₄⁺ → NO₃⁻) → Nitrosomonas

(NH₄⁺ → NO₂⁻) → Nitrococcus

(NO₂⁻ → NO₃⁻) → Nitrobacter

Pseudomonas → denitrifying
Boreal / Taiga → percolic soil → weathering slow in cold

lemming, pika → mouse

Lynx - cat

Hyla, Rana - frog

Temperate deciduous

Autecology → species fit, synecology - communities fit

niche cannot be shared by two species

Grassulacean Acid Metabolism (CAM) pathway - stomata at night

Karuvu (Kerala), Law Kyntangs (Meghalaya)

Gene Bank, Indian seed vault → Chengla, Tadateh

CZA → WPA (1992) → N.E. Chai's

Meloxicam → Diclofenac (anti-inflammatory drug)

Kariranga (S) → Manas (N)
Pobitora (S) → Lakhowa (S)
Orang (N)
Bumachaphori (S)
Kochmora
Dibru Saikhowa (S)

Coral reefs - ENSO

N₂ fixation
bacteria
- Rhizobium
- Frankia
- Azospirillum
- Rhodospirillum
- Azotobacter
- Mycobacterium
- Clostridium
- Bacillus
- Klebsiella
- Chlorobium
- Proteus
cyanobacteria
- Nostoc
- Anabaena
- Anabaenopsis
- Tolypothrix
- Aulosira
- Cylindrocapsa
- Calothrix
- Rivularia

ASTEP (12) interpart.

trout → freshwater fish

ascentic zone
cnidaria - coral, hydra, jellyfish, sea anemone

Wilkeson Report
Global Coral Reef Monitoring Network

starfish → invasive to corals

predators of

starfish

predators of

autotrophic bacteria
bacteria vs. Algae vs. fungi

Pho
DO < 4 mg/L → polluted
Phy < 8 mg/L → contaminated
POI Trout, Perch, bass, Trout → fish
Acc BOD - organic waste
Pca Chlorinated HC → PCBs
Eas Radioactive Iodine → thyroid cancer
ven Nitrates → methemoglobinemia / blue baby syndrome
• P Fluoride → skeletal fluorosis
↳ knock-knee syndrome
sk Mercury bacteria Methyl Mercury Rotterdam → pesticides + industrial chemicals
Pit Sal - Itoi - Itoi / Ouch - Ouch
car Pb - blue gum

DDT → ↓ bird popⁿ → ca metabolism x
M₁ Tubefern, water hyacinth → western
cel humbler
OC Oil raffia + Oilivorous - S → TER /
AT Biosparging - P O₂ in ground water
Pho Bioventing - P O₂ + nutrients in
S₁TEXN - benzene, toluene, soil
ethyl benzene, xylene,
naphthalene
Rh Phytoremediators - Indian mustard,
N Sunflower, Indian grass, poplar tree,
N White willow
NC

Al SO₄, Fe SO₄, Na Aluminate - coagulants
Chlorine - disinfectant (fluoridation)
lime / Na₂CO₃, bleaching powder / Alum
[Ca(OCl)₂]
↓ defluoridation -

Water Act - industrial pollution, not agri / house hold
city improvement
city extension
Smart cities mission
city renewal
National Green Council (PM) - statutory
↳ NMCGR society.
AVC - electronics plastic
↳ dioxins on burn
ABS plastic
↳ less harmful non-
toxic

Gene. sanctuary - in-site
Meghalaya, Garo

Plastic burning → Phosgene, dioxins, chlorinated compounds
Noise Pollution Rules → EPA
Radium - 224, U - 238, Th - 232, K - 40, C-14
radio frequency - 30 kHz - 30 GHz
Microwave - 30 GHz - 300 GHz
Global E-waste Monitor -
Guang, China - Environmental
Calamity (UN)
e-waste disposal
Greene - MoEITY, e-waste

Stockholm convention
↳ Pesticides - Aldrin, Chlordane, DDT, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, toxaphene
↳ Industry - Hexachloro, PCB C₆H₆
↳ By Products - Hexachloro, PCBs, polychlorinated dibenzo-p-dioxins, polychlorinated dibenzofurans
Other - endosulfan, lindane, dicofol

Arctic Oscillation → Polar
↳ methylchloroform vortex
ODS → CFCs, HCFCs, halons, methyl bromide, CCl₄, HFCs
(binding)
Vienna - no steps for ODS
specific action
↳ Montreal → specific actions (binding)
UNEP, Multilateral Fund under Vienna Convention
↳ UNEP, UNDP, UNIDO, World Bank
Jajali (2019) - HFCs
↳ 80-85% ↓ GMA
NTCA chair = MoE, WPA
NBWL - PM, WPA

New Delhi Intⁿ Arbitration
Centre / India Intⁿ Arbitration

↳ Centre → Statutory
↳ Instⁿ of national importance

Bhadla Solar Park - world's largest
(Rajasthan)

Ramagundam solar ^{first} floating B
hatch Telangana

~~Others → Kamathi (TN), Paragada (KN)~~

Postal ballot → senior citizens 80 yrs >

Central forces
disabled journalists allowed by EC I

Ascher Act

(3) 2 days in last 12 months
(4) 1 $\frac{9}{11}$ release

~~1. No data archive policy~~

✓ Mission SMART (women)

SABTAL (distress type)

Renamed Public distribution
Scheme - Power Fin. Corp +
Rural Elec. Corp -

↳ non private Discrete.

Tripura - child birth sex ratio > 1000

Inland vessels Act, 2021 → ~~also~~

↳ central govt - list of chemicals as pollutants

2. Waterway — only by Act of Parliament
as national waterway

Plastic waste

↳ carry bags $\rightarrow$ 120 microns

Inch - 5 min to new green H₂
by 2030 market

Social cost of Carbon + non-market both

^c Marginal cost of impacts
by 1 extra tonne of GHGs

Global Silk City Network

1 Bengaluru - 1st & from
only India

by Silknet's initiative
(independent of.)

IT-BPM - largest employers in organised private

1, IT > Software > BPM > Hardware
Eng. services

Port of Awas (urban) → not by

by self declaration

- 1. LI or MIG not having
luxury house
- 2. Affordable rental housing
complexes

SAMARTH - Agro Residue
Co-Brng. in the most
plants

WTO - 24th period India

Agreement on
fisheries → IUU fishing
subsidy → illegal, unregulated,
unreported

- ✓ (unregulated high seas)
- (over-exploited stocks)

New Delhi Declaration - 12 HYDRACIS Summit, 2021

Sagar Parikrama Initiative

↳ Ministry of Fisheries
↳ navigational journey in all coastal states

General Data Dissemination

Standards / Special Data Dissemination

Standards - IMF
↳ India $\frac{17}{8}$

Facility for low carbon deployment

Technology - UNIDO + BEE

↳ annual innovation challenges

↳ fund by GEF

GEF - 1992 Rio Summit

↳ independent operating

~~Gulf Cooperation Council~~ ~~Iraq vs USA~~ ~~Arab League~~

Vienna convention - diplomatic relations

New York convention - intⁿ arbitration

Geneva Convention

- 1) soldiers on land
- 2) soldiers at sea
- 3) POWs
- 4) civilians protection

Temporary Protection directive

↳ EU, migrant protection from non-EU countries

'Responsibility to Protect' Doctrine

↳ Intⁿ Committee on Intervention and state sovereignty to prevent war crime

Digital Markets Act - EU to curb tech giants

Master Plan for Transport connectivity

BINSTECH - BINSTECH charter
↳ 25th Summit at Colombo, 2022

(2006) UNHRC - elected by General Assembly - 50% ballot

↳ UNGA can suspend council member - 2/3rd votes

↳ Russia suspended

(Summit) Bucharest nine - Bulgaria, Czech, (2015) Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia

2) child during inter-country adoption - protection

Hague convention - UNESCO

↳ Protection of cultural property during armed conflicts

↳ Blue shield emblem by NGO → Blue shield

Biological and Toxin Weapons Convention

→ conference of Committee on Disarmament

- India +
- no implementation body and no exception to any country

ISA - world solar bank

↳ The solar Facility

UN world summit, 2005

2nd Plan for Sustainable Finance → 50% commission

Global food policy
~~Report~~
 State of global inequality in India
 SAC - PM

Intⁿ Food Policy Research Institute

PM - Vikas - Vishwakhanna
 Koushal
 Traditional craftsmanship

Logistic Performance Index

Investing in carbon neutrality → EBRD + FAO

~~IPCC synthesis report~~ → UNFCCC

Climate and Development → World Bank

Climate Investment Opportunities in India's cooling sector

Global Ocean Observing System Report Card → WMO + IOC of UNESCO

State of Global Climate Report - WMO

~~Iceberg~~ ~~crisis~~ ~~Mauritius~~

Congo Ice shelf
 Wilkes → Antarctica
 Basin

Market based carbon trading under Paris

Intⁿ Transferred Mitigation Outcomes (country)

Sust. Devⁿ Mechanism (private sector)

~~ACT - Accelerating CCS Technology~~

Cochin - fully solar powered

DMH-11 Mustard (Punjab University)
 Hybrid + GM (Centre for GM of crops)
 Genes → Barnase, barstar (Varna) (Early Heera)
 Bacillus amyloliquefaciens (Glufosinate)
 Herbicide tolerant (Bar) (Strawberry gene)
 Varna x Early Heera 2
 Indian European

UNEP - no secret to UNFCCC and COP

Climate Adaptation summit 2021

Global Commission on Adaptation → India member
 Netherlands start
 Principles for locally led adaptation

Mission Innovation (2015)

- Clean H₂ (India's founding member)
- Green Powered Future
- zero-emission shipping
- CO₂ removal
- Urban Transitions
- Net zero Industries
- Mission Integrated Bio-refineries

at Global Clean Energy Action Forum

India + Netherlands, Brazil, Canada, UK, EC

Intⁿ Transferred Mitigation Outcomes (country)

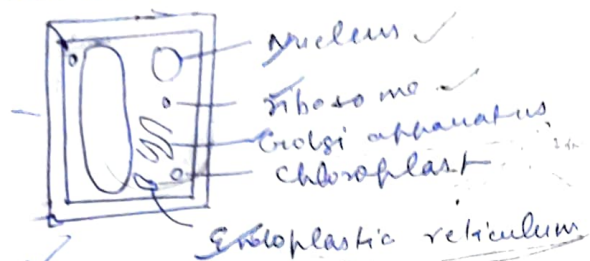
Sust. Devⁿ Mechanism (private sector)

ACT - Accelerating CCS Technology

Cochin - fully solar powered

New Delhi Declaration - 13 HYBRICS Summit, 2001

Biophiles → Ex-situ mitochondria



Lysosomes (acidic bags)
Rough → Smooth
protein, lipid

animal cell → no cell wall
no chloroplast
centrioles
cell division

microplastics ≤ 5 mm

LEO ≈ 2000 km

RO → remove bacteria + salts

OS ≈ 500 mg/L
small Grants Programme - NO ERCC + UNDP + TERI
for civil society
decision

GEA → consensus

Leaders' Pledge for Nature
species loss ↓

Modi, Kishida, Stockholm
Rahul, UNCTAD, Montreal

Special CCFund → all developing countries
LDC Fund

Chicago convention - civil aviation

ChatGPT - open AI
BAKO - Google
LAMDA → BERT
GALL-E - open AI

Digital Markets Act - EU to push back

Edible oil
India - largest imported, 2nd consumer

halm oil → soyabean → rapeseeds
sunflower → cottonseed → ground nut

SDN-1 } no foreign gene
SDN-2 }
SDN-3 - foreign gene

BTAC - public sector enterprise

Therapeutic cloning - embryo lab

5G - [band] (4-8 GHz)
high 24 GHz
low band 1-6 GHz

Microwaves - 3-300 GHz
WiFi - 2.4-5 GHz

Fluorescent tubes - UV rays

Hydra Market → darkness of Russia

The Onion King (TOR) → ransom browser

Curry of India → MOST

Supercomputers - 'Brahm'

Gotta AI - Datacenter

Transformer - Neural N/w Architecture by Google

Pyneet Sagar Abhiyan
 UNEP + NAC ^{side winners}
 tackle plastic pollution at coasts

Markets

Lat & proteins & fibres & carbs

India largest producer but not exporter

Pearl millet > Sorghum (Jowar) > Bajra (Rajni)
 (Rajni) 80%

(Rajni) UP > Haryana > Gujarat > MP

Typhus

Major	Minor	Pseudo
Bajra	Kodo	Buckwheat
Jowar	Kutki/Shevan	Amaranth (Ramdana/Rajni)
Rajni	Lanwa	
	Chenna/Barni	
	Kakum	

DSR — more seed regn
 Early crop maturity
 Land levelling compulsory

SRI → Single transplant rice
 not intercropped only moist

WMO financing
 Voluntary contributions
 Assessed contributions
 Sustainable financing

Talaj initiative

NMCG — livelihood opportunities for locals

2008 — exempted under FCA

SD solutions network (NBO)

1. Six Transformations Network
 2. Int Skillover Index — SD report

Sustainable cities integrated Approach Pilot project

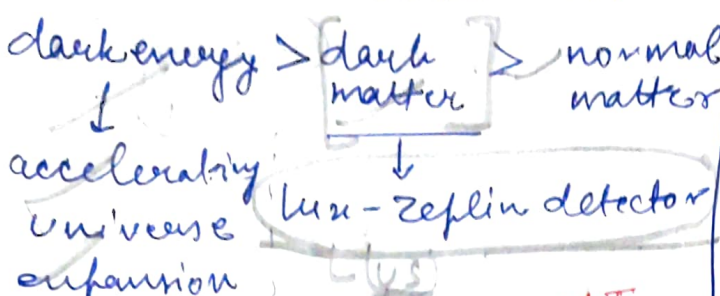
MOHUA + UNIDO + UN-Habitat
 (fund GEF)
Urban Sustainability Assessment Framework

UN Human Settlement Programme (UN-Habitat)

1. State of world's cities
 2. Global report on human settlements
 3. SDG and urban
 4. Local bodies — The Future we want
 5. 'New Urban Agenda' — want

India forum for Nature based Solutions → NIVA — Climate center for cities
 + WRI

GRINA — Green Rating for buildings
 (TERI) govt & adopt
CITIS — NIVA + Green
 City investments to integrated sustain



EOS - 04 - Inspire SAT student

NISAR - Nasa + ISRO
LSAR → EOS

Anomaly detection method - 'Earth' like planets

Clarias farias

↳ African cat fish invasive in Keoladeo Ghana

E. crassipes - water hyacinth

Ficus elastica - rubber tree
↳ living root bridge E.

NASA

↳ DART mission - Didymos + Dimorphos asteroids

↳ SOFIA - stratospheric
↳ Infrared
↳ NASA + Germany

Under cover - Farming X allied allowed fishery dairy

Launch vehicles

SLV, ASLV - solid

PSLV → S-L-S-L

↳ NAVIC, Chandra, MOM

GSLV Mk II - S-L-Cr

↳ HS200 booster

GSLV Mk III / LVM3

↳ 8000 kg in LEO
4000 kg GTO

SSLV - LEO,

↳ 3 stage - all solid
↳ liquid velocity trimming module

Liquid fuel → unsymmetrical dimethyl hydrazine (UDMH)

Vikas engine

oxidiser - Nitrogen tetroxide

Solid fuel - hydroxyl - terminated polybutadiene (HTPB)

Inflatable Aerodynamic decelerator - kevlar fabric

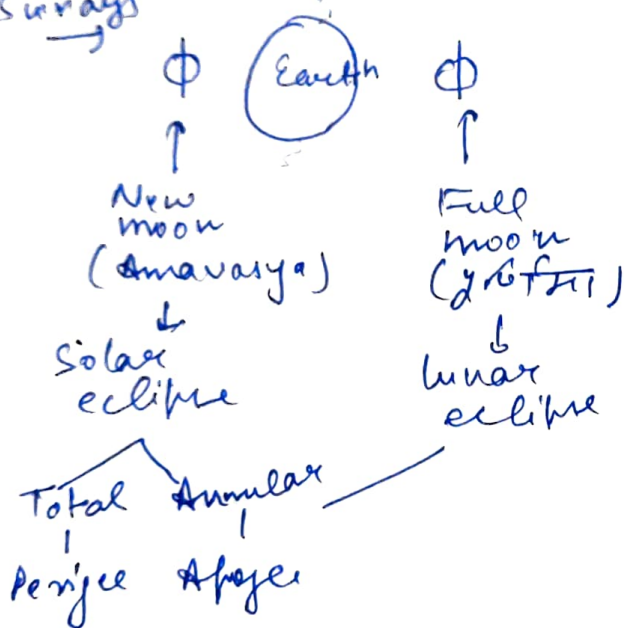
Radar → not affected by clouds
↳ day / night

Core $T_{\text{core}} \approx 1.5 \times 10^7 \text{ } ^\circ\text{C}$

Photosphere $1.5 \times 10^4 \text{ } ^\circ\text{C}$

Chromosphere

→
Surveys
←



'Blood Moon' = Total lunar eclipse

Nebula → Star → Red Giant → Planet → White Dwarf

1.4 times
Chandrasekhar
limit

↓
"Ветелгені"

जब अकार की वी
20 तल है

2011 E
↓
Quasar - energy source
Blazar - light

Talaj initiative

Saturn) Moon $\rightarrow$ Chrysalis

A rabidopsis thaliana

Lunar soil $\frac{9}{11}$ $\sqrt{1121}$ Plant

guan + bacteria + urea + nitrile

markah soil - sphere
drich

LMT → Hg

6. India + Belgium + Canada

↳ Uttarakhand

- ↳ Renasthal, ARIES

SARAS - radio telescope

↳ Landiga vabali lahe

Cherawati river (Toy Falls) 12N

Indian Astronomical

Obscenatory - Hanle Valley, Ladakh

{ (NAGAR, VACE,
(GROWTH)

1. Telescopes

hulsar
magnetar

neutron

Black hole

Chemicals

Pesticides - Dieldrin, DDT, Aldrin, Endosulfan, Fipronil, atrazine, Paraquat

POPs - dieldrin, DDT, Aldrin, Endosulfan, Fipronil, atrazine, Paraquat

medium chain chlorinated
paraffins, long-chain
perfluorocarboxylic acids,
chlorophenols → pesticides

Single-use Plastics - Polyethylene

↳ Polystyrene, PVC

↳ Polypropylene, PET etc.

biodegradable
plastics

→ PLA

↳ Polylactide

Food packaging

↳ ethylene, carboxylic,
ethylene, acetylene

toxic - cyclohexyl group

Organophosphate ether

↳ flame retardant

lion - Aortic valve disease
↳ longitudinal
belly fold.

Harmful food preservatives

- ↳ Sodium Nitrite
- ↳ high fructose corn syrup
- ↳ Aspartame
- ↳ Butylated hydroxyanisole
- ↳ Butylated hydroxytoluene
- ↳ Olestra
- ↳ Propyl Gallate
- ↳ Potassium bromate
- ↳ Acesulfame-K
- ↳ Chlorophenols

HDPE - easiest plastic to recycle

PVC - not recyclable

polystyrene - inflammable
(worst)
not biodegradable

UNEP

Climate and Clean Air Coalition

Global CH₄ Assessment 2030

IUCN + UNEP

World Conservation Monitoring Centre

GEM + UNEP

Sustainable Public Procurement Policy

NIFund - DIPAM

Public account

25% Capital investment

75% Social Sector

World Bank IFI member

GATS - Uruguay Round

2 sector net: Govt services
Air Transport Services

MFN to all services

Schedules of commitments

MNREGA - 113rd women

100% social audit

CPI - AL

PM DAKSH - MOSTBE

Shilldive of vulnerable to sections except STs

Smile Scheme - transgender + beggars

Central Sector

LLP - No IPOs

Adhi - cannot loan to companies

External debt - ECB > NRI deposits

US\$ > ₹ > SOR > Yen

Medium-term Fiscal Policy

statement - fiscal deficit, deficit

Revenue deficit, tax & non-tax

Iron - largest reserve in Asia - India

haematite → red-ochre

Magnetite → black ore (> 70%)

limonite - hydrated Fe₂O₃

siderite → carbonated

Top Export Partners

USA > UAE > China > Hong Kong > Singapore

Top Import

China > USA > UAE > Saudi > Russia

SPRINT Initiative

indigenous tech in Navy

QIPs

only listed company
only QIBs can invest domestic without standard regulatory compliance

WMA

normal → repo rate

special → < repo, collateral involve

(Special Drawing Facility)

UPI 123PAY - 3 step

PCA framework - not on RABs, PBs, SFBs

not allowed to bond no NRI

ARCS

regulated by RBI under SARFAESI Act

no lending activities

NIP - foreign cost ≥ 100 cr

22% private

Remittances → Public account, not CFI

NIDHI companies →

AL.

AL. 12 HOURS

Original Markets Act

Tropical forest → orchids, bromeliads, vines (lianas), ferns, mosses, palm

Southern oscillation index → P. Tahiti - P. Darwin
+ve → La Nina
-ve → El Nino

UNOceano conference (2022)

(Lisbon Declaration) on ocean conservation
Kenya + Portugal India +

(30% maritime zones by 2030)

MLE

CITES

supporting sustainable management of endangered tree species

Intⁿ consortium on combating wildlife crime (ICWC)

Calamaglossus - invertebrate

('living fossil') in Gulf of Mowee

~~Ebola~~

~~Swine (H1N1)~~

~~Dalio~~

~~Zika~~

Panna Biosphere Reserve

↳ Ganges Sanctuary

Asian Giant Tortoise → CE

yeast → single cell fungi

molluscs → snails, slugs

(invertebrates > vertebrates) animal

jelly fish → can survive in dead zone

Northern river terrapin → South East Asia native

(CE) large river turtle
(omnivorous)

Indian Grey Hornbill - only Indian subcontinent

(least concern (female < male))

Nasikabatrachus sahyadrensis

↳ pig nose frog / hump frog

↳ endemic to Western Ghats

↳ fossorial → underground round year, only once

Shigella bacteria

↳ in intestine

↳ shigellosis disease - diarrhoea

↳ Shigella fluor dis ease good ho is ing

Bamboo-dwelling bat

(Megalaya (largest bat diversity))

Truncatoflabellum (genus)

(a zooxanthellate corals (ABN))

Monkey pox - viral zoonotic

lymph nodes swell not in small pox

Orthopox (Africa) (no treatment) (same genus as small pox) (orthopox)

Vilavanasana / WLS INP
 Sunabeda WLS - Orissa
 Nale Mahadeshwara - K N
 WLS

Kiskampur WLS - UP
 Kataraniaghat WLS - UP

Kangra Ghati NP (GH)
 Kutumbasar, Kailash, Pandah
 Tirthgarh water fall

Paria WLS, Mitihyala WLS
 Gir / Girvanah

~~deers~~ snow leopard
 Gheeta

Vasaiadu - N. Taber
 endemism

Rhino - eyesight poor

Singai - endemic

Chital - diurnal
 Great Indian Hornbill
 Fishing cat - w. Ghate
 India's Girly slender leop can't jump.

Teykore Ground Gecko - endemic
 peninsula

Khairmor → linear Florican endemic
 (same habitat as GIBI)

~~the birds~~ - crow family
~~the really~~ - many smallest

Red-crowned
 roofed turtle - In India, only
 in Chambal

Galuthiana - neelkurings

NITI

Coringa WLS - Andhra

Dhamra
 Brahmani (Gahirmahal)
 Mohana

Chikla
 Muthuleya

Dudhsagar waterfall
 Mandovi

Shivasamudram
 Cauvery

'In our lifetime' campaign
 UNDP + National Museum
 of Natural History

Climate Transparency - G20

G20
 India, Indonesia, Brazil
 Curve previous visit

Monarch butterfly → longest
 migration

Blue duke - butterfly
 (Banswara)
 durga

Endemic
 Wilsonia leithii
 leith soft shell turtle
 Red-crowned roofed - Fresh
 turtle

Ambition on Melting Ice Group

- ↳ COP27, Chile + Ice land lead
- ↳ India not founding

Lead IT Initiative

- ↳ Leadership group for Industry Transition (HR)
- ↳ India + Sweden + WEF
- ↳ UN Climate Action Summit 2019

CC Performance Index

- ↳ Germanwatch, New Climate Institute, Climate Action Network (NGOs)

Global Shield Plan - G7 + V20

- ↳ COP27
- ↳ Funding for climate disasters

V20 - vulnerable 20

- ↳ 20 nations
- ↳ India not member
- ↳ climate vulnerable Forum (S-S cooperation)

Intⁿ CH₄ Emission Observatory strategy - UNEP

- ↳ MANS - methane Alert and Response System
- ↳ multi-stakeholder

CDRI - India, Climate Action Summit 2019

- ↳ Infrastructure Resilient Accelerator Fund (UNDP + UNDRR)
- ↳ risk reduction

IRIS - Infra for Resilient Island States

Global Methane Pledge - COP26

- ↳ 30% by 2030 (2020 base)
- ↳ US + EU
- ↳ India X

Global CH₄ Initiative - India Yes (PPP)

World H₂O Developⁿ Report - UNESCO

Mission LiFE - India, COP26

- ↳ P3 model - Pro Planet People

Global Ecosystem Typology - IUCN

- ↳ hierarchical classification of Ecosystems → function
↳ structure

Worldwide Biodiversity Conservation Award

- ↳ BBVA Foundation, Madrid

Food Animal tag - FSSAI

- ↳ (Yak)
- ↳ BASIC = BRICS - Russia
- ↳ climate change (UN)

Bayasse bio mass - bio fuel

- ↳ Non-bayasse biomass - pellets

Biorefraction - thermochemical

- ↳ biowaste - biochar

Mission Innovation - clean energy

- ↳ interjout, India → India + Netherlands

Mission Integrated bio-refineries

- ↳ cooling Emission and Policy synthesis
- ↳ Emission Gap

UNEP

- ↳ Adaptation Gap
- ↳ Global Envⁿ Outlook

Beat pollution UN75

- ↳ Frontiers
- ↳ Invest into healthy planet

WorldEnv say Wild for life

Disaster Recovery Framework

- ↳ Post - Disaster Needs Assessment

- ↳ EU + World Bank + UNDP

World Green City Award - Hyderabad

- ↳ Intⁿ Association of Horticulture Producers

Green Crocheters - CSIR

- ↳ Low emission, free of chemical

- ↳ SWAS, STAR, SAFAL

Global Alliance for Industry decarbonization - IRENA

- ↳ Bali declaration

Rangmati TR - MP
Ranikhet TR - UP
Bishkek Declaration - Amangorkh
 ↳ GISLEP (snow leopard)
 ↳ 12 Asian countries

Black corals - Scleropatharians
 (thorn corals)
 ↳ deep-water + shallow water
 ↳ filter feeder
 (some are ~~asexual reproduction~~)

Grammatina ^{Brachyura}
Vannuata ^{Phumra}
 ↳ Pacific Island country

Chanderachona Mts. (Baber Budhni Gini)
 ↳ Mullayanagiri peak, 1st

Sulphur → plant ^{both males + females horn}

Antelope vs Deer vs Gazelle
 ↳ permanent horns
 ↳ shed their horns

Trees outside Forests in India
initiative - 7 states, USAID

Red-Eared Slider Turtles (USA member 21)
 ↳ invasive species

Tree City of World - FAO
 ↳ Mumbai + Hyderabad

Vanikavan Project - Kerala

Glasgow Declaration on Forests and Land Use
 Leaders

Global Mangrove Alliance
 (NGOs etc)
 ↳ 'State of Mangroves'
 ↳ 'Mangroves for the Future' program
 ↳ India is 1st

Red-crowned Roofed Turtle - Chitra
Leith's softshell turtle - Chitra
 ↳ Panama India

Catadromous snapper - fish live in fresh water but went to salt water to spawn eg - Eel, offshore - anadromous
sea cucumber - echinoderm,
coral ecosystem, garbage recycling
ocean

Olive Ridley Sea Turtle - smallest + abundant

Great Knot - wading bird

Muli Bamboo (Mantak) - NE,
Mantak phenomenon - flowering, fruiting,
colobine → leaf-eating monkeys
 ↳ eg - langur

Mangroves → W.B. > Guy > AOM
 ↳ 1% Earth surface

Mangrove Alliance for Climate (MAAC)
 (COP27, UAE + Indonesia
 India member)

Ahi Kamjodan - Black Honey Bee, W. Ghats.

Tolkiz Emoy Bird count - Nagaland
 ↳ Festival

Seena spectabilis - invasive tree
 ↳ vertebrate species Species in Nilgiris

Living Planet Report - WWF

Kaduvur Sundarban's Sanct. - TN

Mettur Dam - Kerala (TN)
 ↳ Pangasius Ictalia - catfish

Sonawadi WLS - Tim Corbett

Kappathycus Alvarezii - invasive seaweed species - corals x F12 (algae)
 ↳ Carrajeenan polymer (commercial food products)

Strobilanthes kunthiana - Neelakurinchi
 ↳ Karvy, Kunthi → flowers
 ↳ Shamb