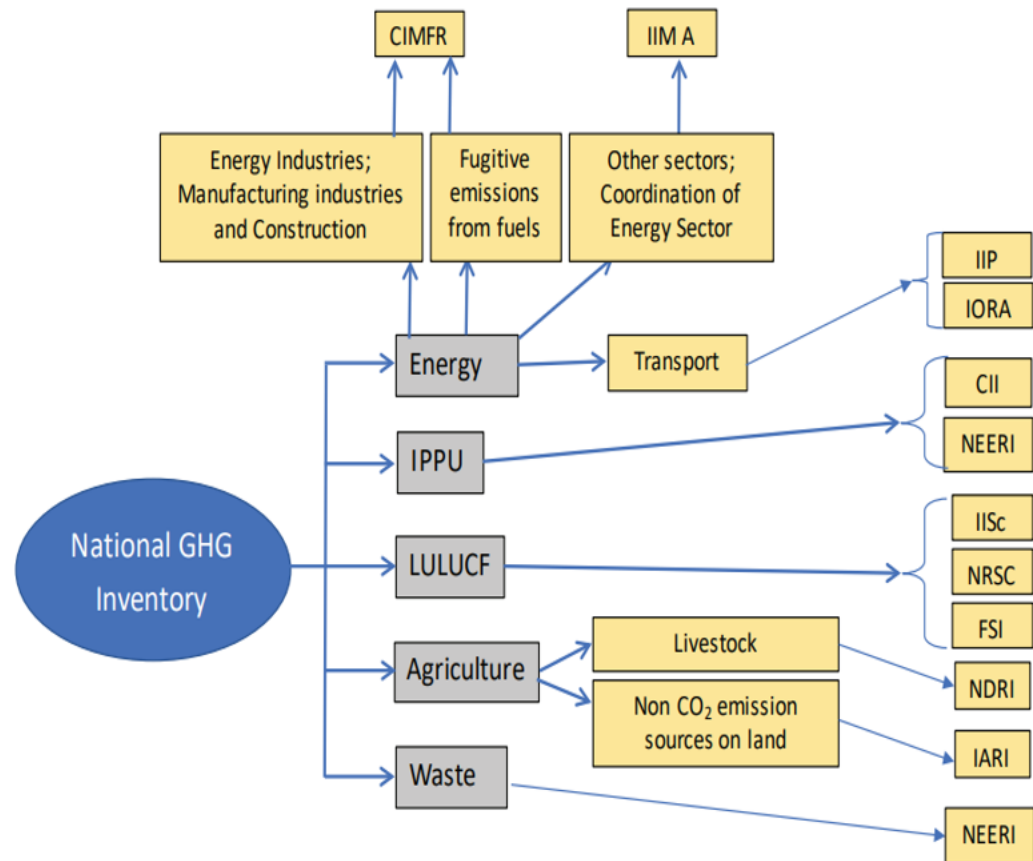


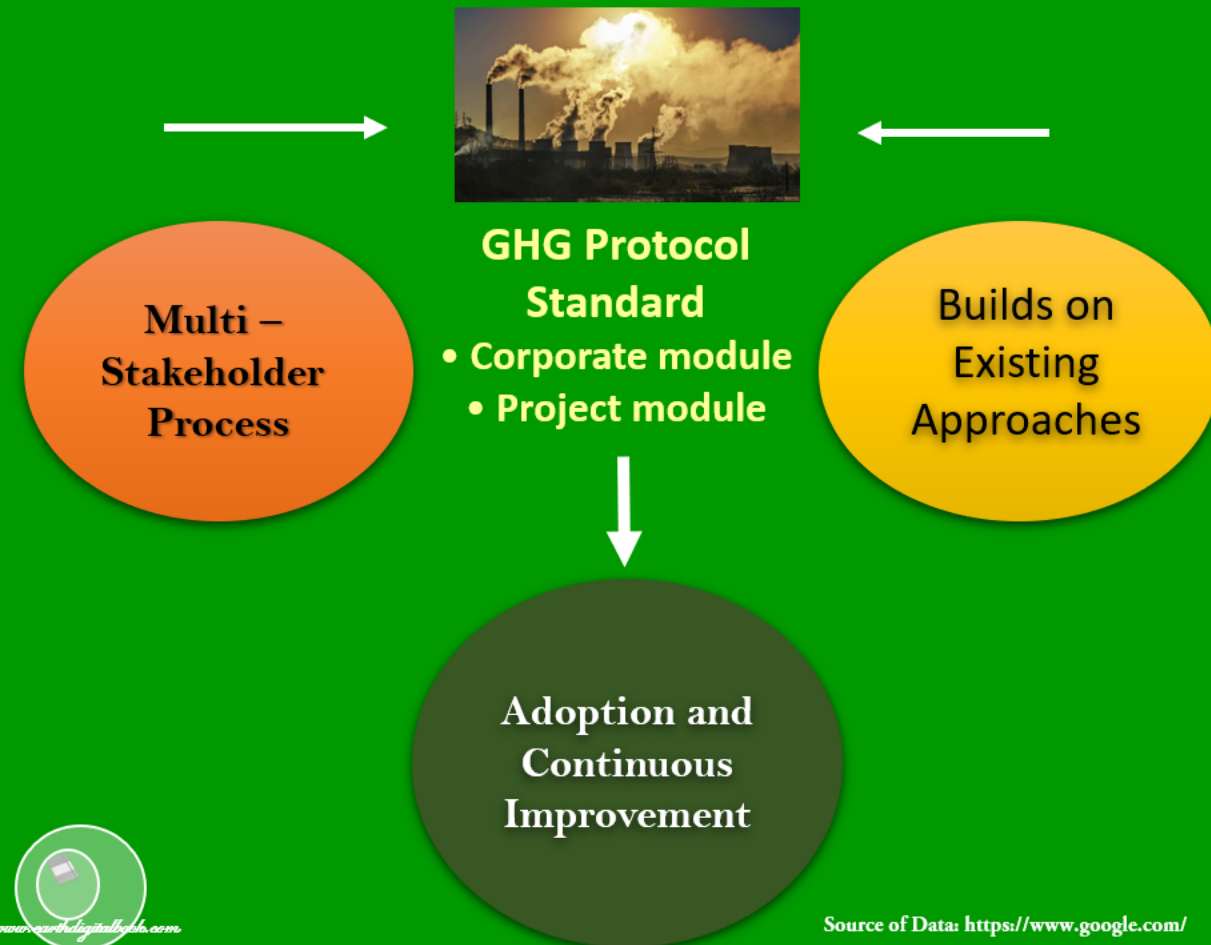
Greenhouse Gas Inventory Systems in India

- ❖ India is the world's third largest emitter of CO₂
- ❖ India has comparatively low emissions per capita

Indian Institutions involved in GHG Inventory Preparation



- Convened in 1998 by WBCSD and WRI
- Mission: to develop international GHG accounting & reporting standards for business through an inclusive and transparent multi-stakeholder process
- *Corporate inventories & GHG mitigation projects*





Standards



Principles

Organizational Boundaries

Operational boundaries

Historic Datum

Reporting GHG emissions

•Carbon dioxide (CO₂):

Fossil fuel use is the primary source of CO₂

•Methane (CH₄), Nitrous oxide (NO_x), Fluorinated gases (F-gases)

: Agricultural activities, waste management, energy use and biomass burning all contribute to CH₄ emissions.

- Accounting emissions from subsidiaries, JVs, etc.
- Based on financial accounting practices

• Overall framework remains same: two main accounting options for consolidation: Equity and Control

• Companies now have a choice to use either the control or the equity share approach

• More accurate definition of/criteria for control

• Some new/simpler definitions which need to be decided on

• Guidance on contractual arrangements and leasing provided

❖ Businesses using GHG Protocol in INDIA

❖ Godrej & Boyce, HCC Limited, Ford Motor Company (India), Mahindra Sanyo Steel, Jet Airways, Tata Teleservices, Bayer Group, Infosys Technologies, Tata Chemicals, NTPC, ITC, Yes Bank, Cummins India, Forbes Marshall, JK Tyres, Shree Cements, United Technologies, Ambuja Cement and GAIL



Building Universal Standard

1. Business Goals
2. Accounting Principles
3. Organizational Boundaries
4. Operational Boundaries
5. GHG Reductions and Offsets
6. Tracking Emissions Over Time (formerly "Setting a Historic Performance Datum")
7. New Chapter: Voluntary GHG Targets
8. Identifying and Calculating GHG emissions
9. Managing inventory quality
10. Reporting GHG emissions
11. Verification

Sectoral Toolset

- Adipic Acid
- Aluminium
- Ammonia
- Cement
- HCFC-22
- Iron and Steel
- Lime
- Nitric Acid
- Pulp and Paper
- Refrigeration and Air-conditioning
- Semiconductors
- Wood Products

Three scopes guarantee transparency:

- Scope 1: Direct emissions (must report)
- Scope 2: Indirect Emissions - imported electricity, heat, or steam (must report)
- Scope 3: Other relevant indirect emissions (voluntary)

Why set a GHG target?

Steps in setting and reporting progress towards a GHG target

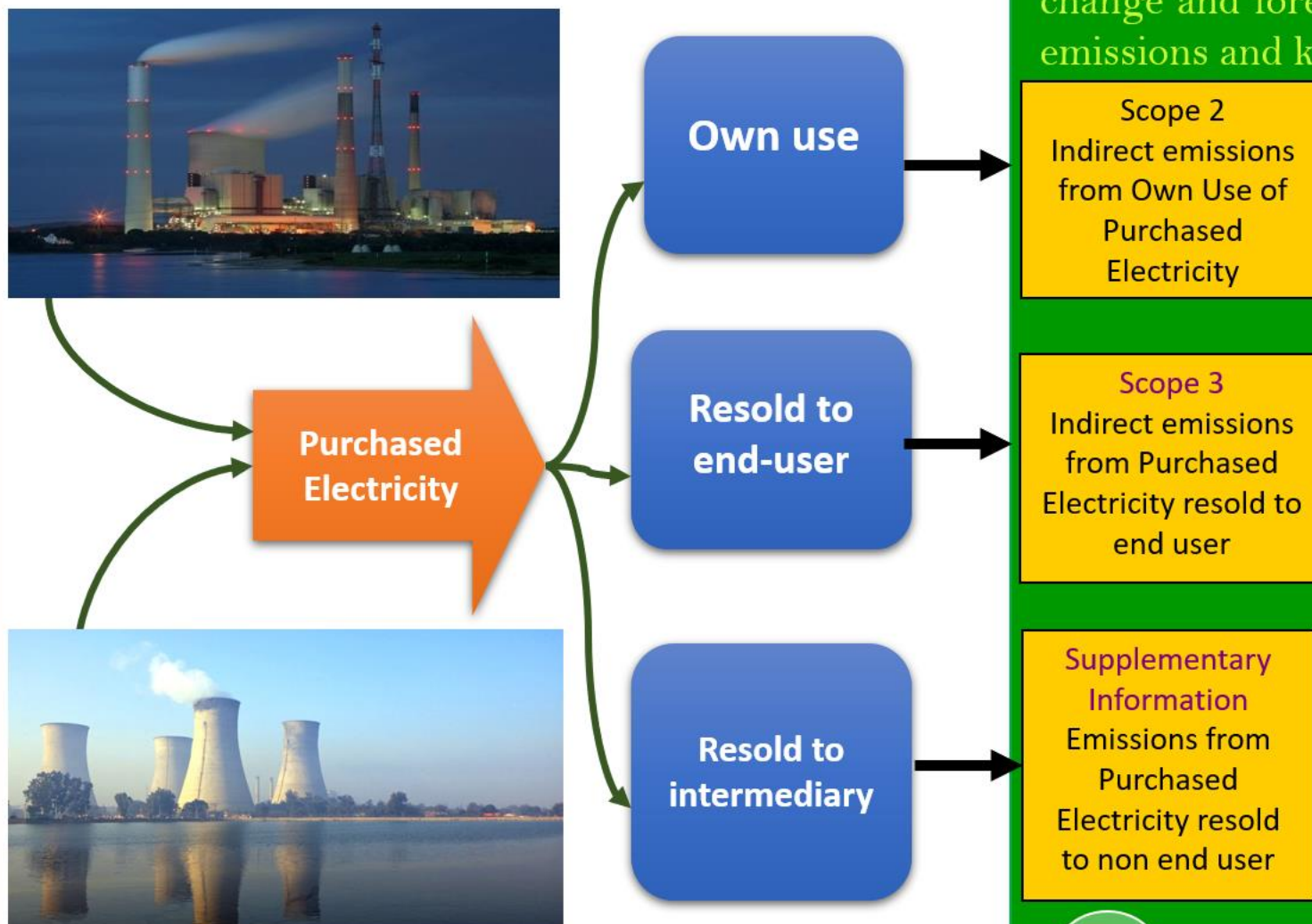
1. Obtain senior management commitment
2. Choose the target type (absolute vs. intensity)
3. Decide on the target boundaries
4. Decide on the use of external offsets
5. Choose a type of base year (fixed vs. rolling base year)
6. Decide on the level of reduction
7. Tracking GHG performance against target

Selection of scope/s depends on objectives of inventory (e.g. internal risk management vs. trading markets).



Source of Data: <https://www.google.com/>

- National Mission for Sustaining the Himalayan Eco-system
- National Mission for a Green India
- National Mission for Sustainable Agriculture
- National Mission on Strategic Knowledge for Climate Change



Energy makes up nearly three-quarters of global emissions, followed by agriculture. Within the energy sector, the largest emitting sector is electricity and heat generation, followed by transportation and manufacturing. Land use, land use-change and forestry (LULUCF) is both a source and sink of emissions and key sector to get to net-zero emissions.

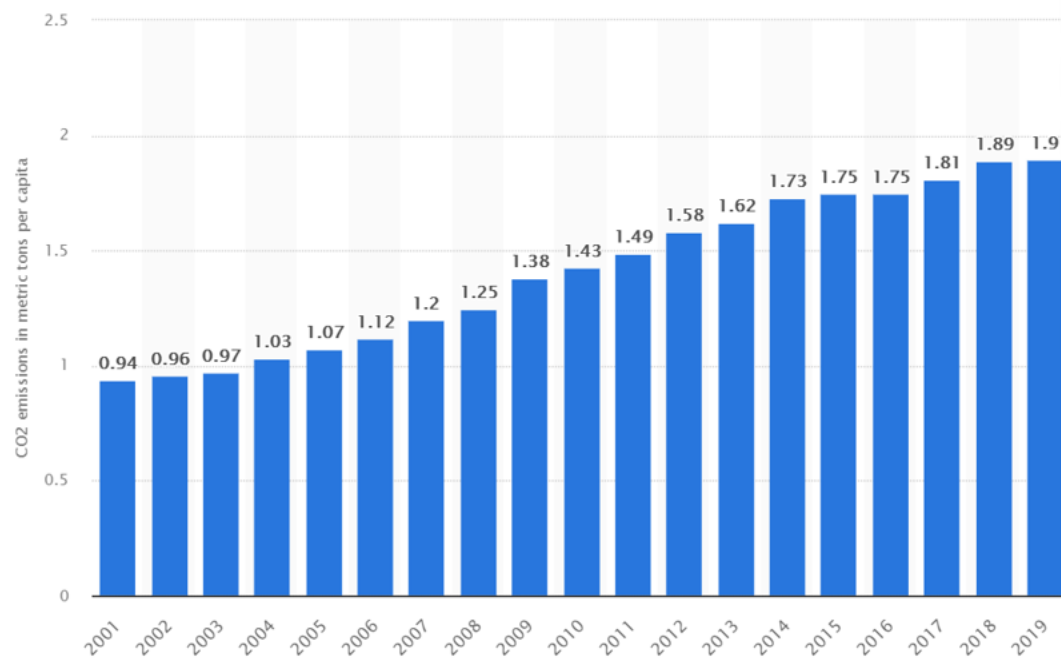


Gujarat Solar Park, Gujarat, India, in 2013. It now has an installed capacity of 1637 MW.



India Specific Tools

Carbon Dioxide Emissions per Capita in India
2001 - 2019



Road transport sector accounted for 90% of the total GHG emissions from the transport sector, followed by civil aviation (6%), railways (3%) and water borne navigation (1%).

Source of Data: <https://www.google.com/>

Transport Emission Factors

The dependence of business on the transport sector is relatively higher as compared to other sectors (6.4% share of India's GDP)

Green House Gas Emission in India



Source of Data: <https://www.climatewatchdata.org/ghg-emissions>

Power Sector Tool

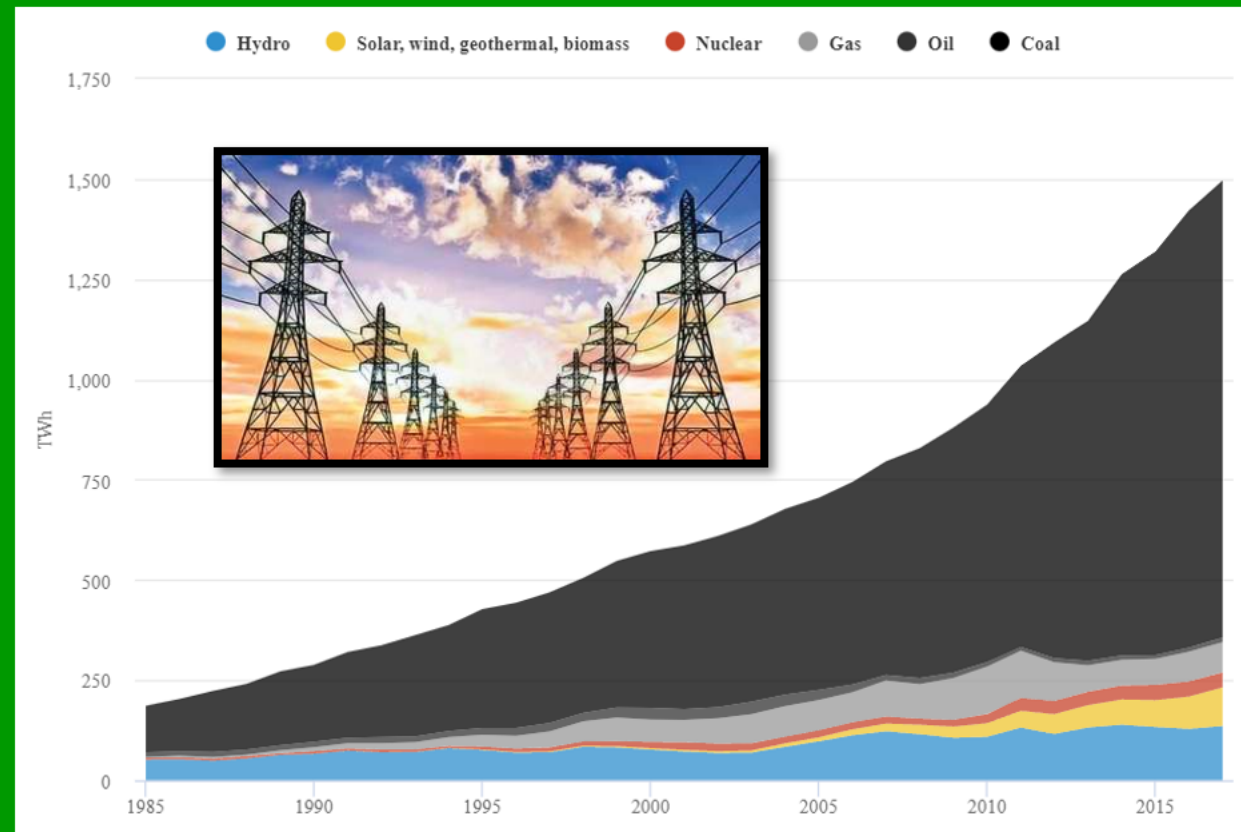
Global Warming Potential (GWP)

Carbon dioxide	1
Methane	21
Nitrous oxide	310
HFC- 23	11,700
Perfluoromethane	6,500
Perfluoroethane	9,200
Sulphur hexafluoride	23,900

Source of Data: IPCC, Second Assessment Report

The electricity generation target of thermal, hydro, nuclear & Bhutan import for the year 2021-22 has been fixed as **1356 Billion Unit (BU)**. i.e. growth of around 9.83% over actual generation of 1234.608 BU for the previous year (2020-21)

Electricity Production in India 1985 - 2017



The power sector tool has been developed by The Energy and Resources Institute (TERI), New Delhi for the India GHG Programme, through a multi-stakeholder consultative process involving interaction with different experts in the field.

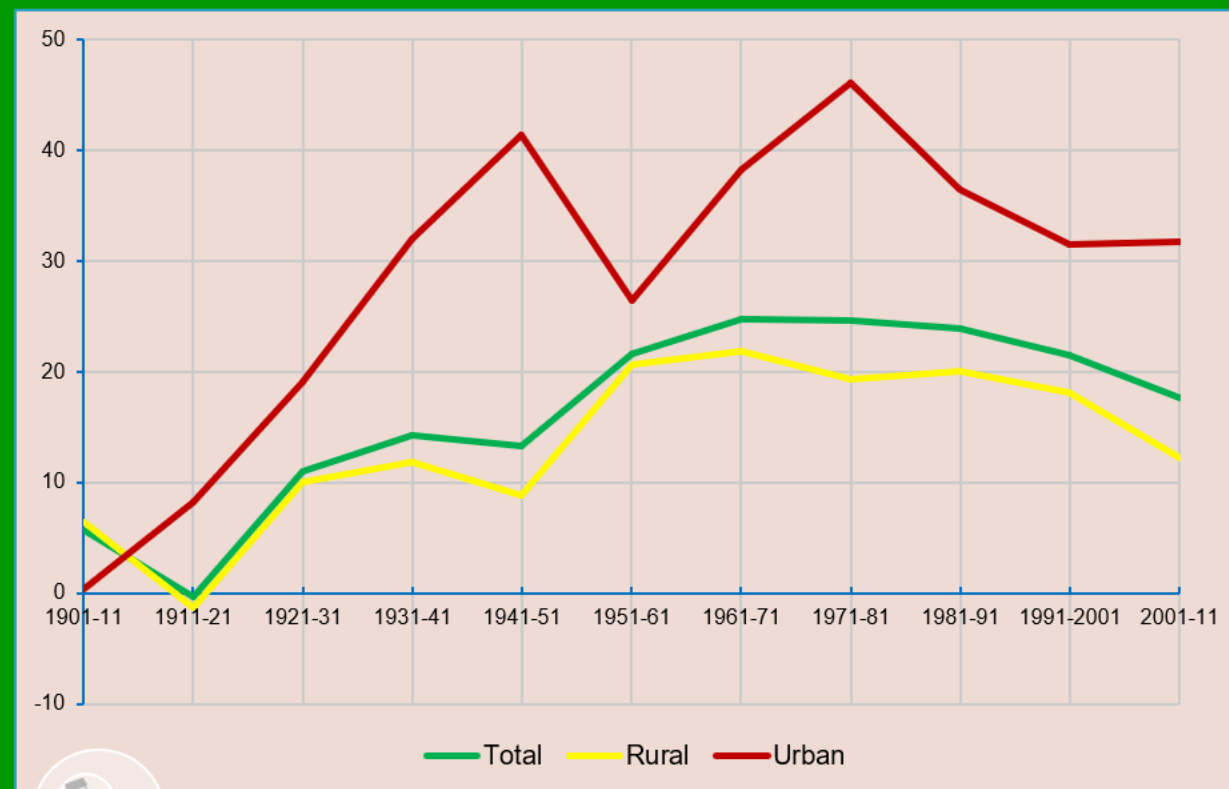


Source of Data: <https://www.google.com/>

Urbanisation in India

Census Year	Population (in mn)		Variation over past decade (in %)	
	Rural	Urban	Rural	Urban
1901	212.54	25.85		
1921	223.23	28.09	-1.29	8.26
1931	245.51	33.46	9.98	19.12
1951	298.64	62.44	8.8	41.4
1961	360.30	78.94	20.64	26.41
1971	439.05	109.11	21.86	38.23
1981	523.87	159.46	19.32	46.14
1991	628.86	217.57	20.04	36.44
2001	742.62	286.12	18.09	31.51
2011	833.09	377.11	12.18	31.80

65.07% of the people of India lives in rural areas and 34.93% live in urban areas in 2020.



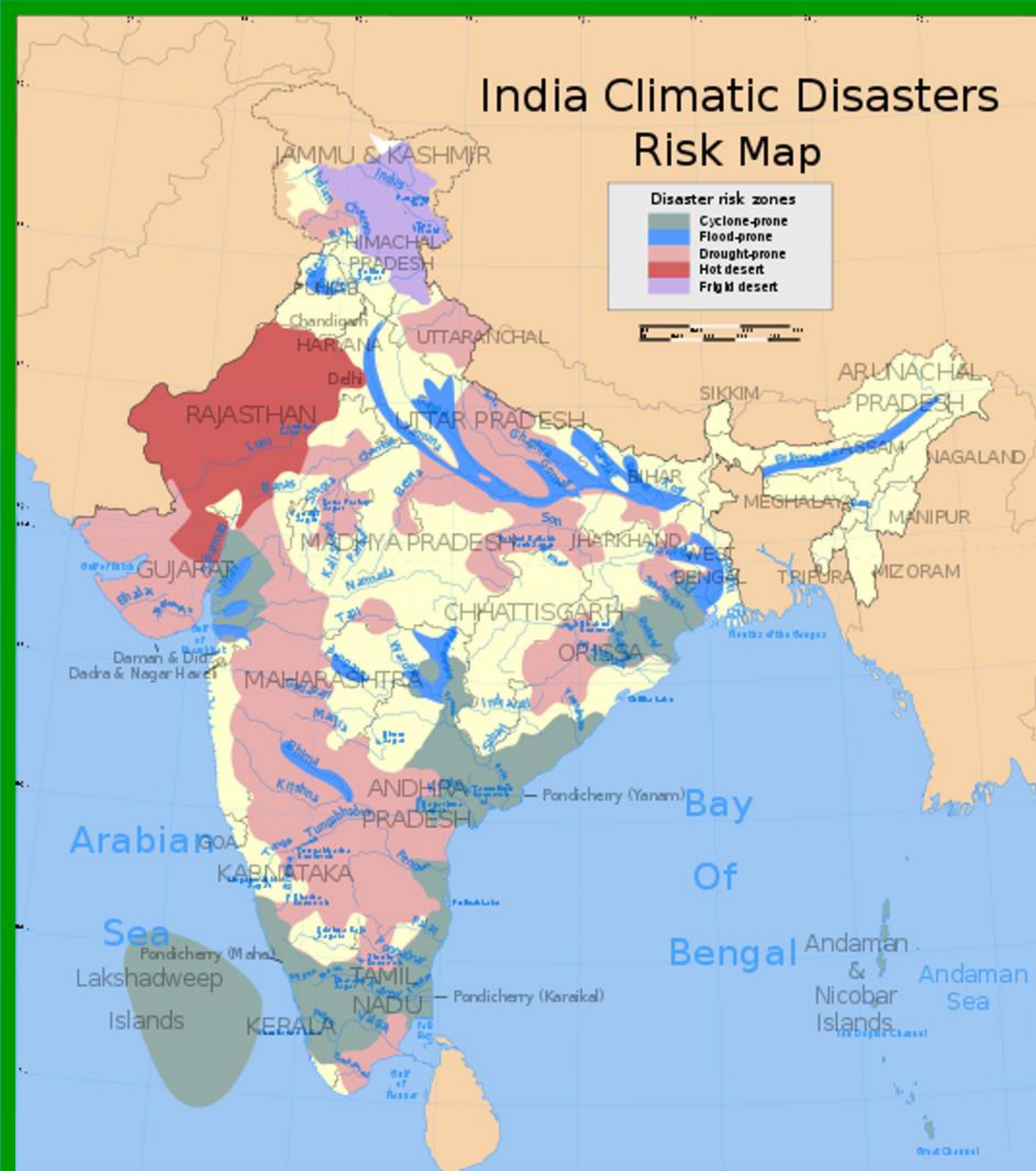
Source of Data: <https://www.google.com/>



The Government of India launched National Action Plan on Climate Change (NAPCC) on **30th June, 2008** outlining eight National Missions on climate change. These include: National Solar Mission and National Mission for Enhanced Energy Efficiency.

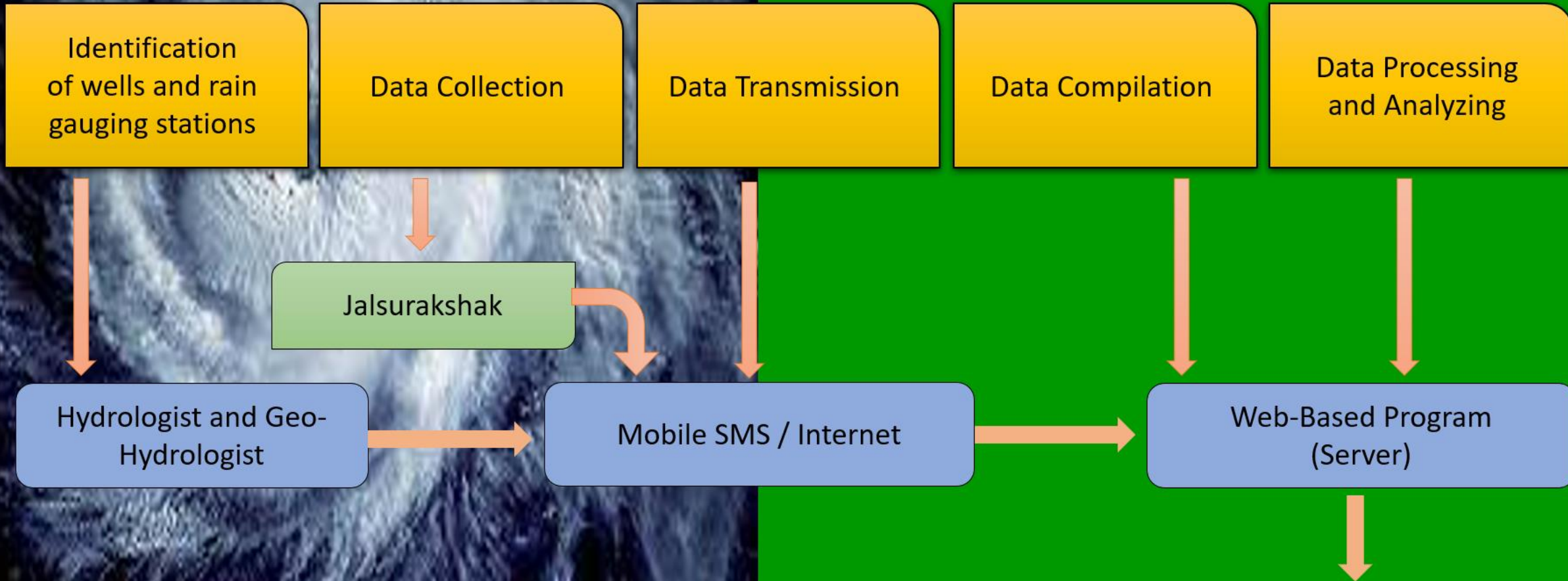


Take urgent action to combat climate change and its impacts



Development of Web-Based Programme

Methodology



‘Phailin’ Super Cyclone on Bay of Bengal 11.10.2013

Source of Data: <https://www.google.com/>

Expected Outcome

Prediction of water excess or scarcity villages on real time basis using the decision support tool

India is determined to continue with its on-going interventions, enhance the existing policies as detailed in previous sections to achieve the contributions and launch new initiatives in the following priority areas:

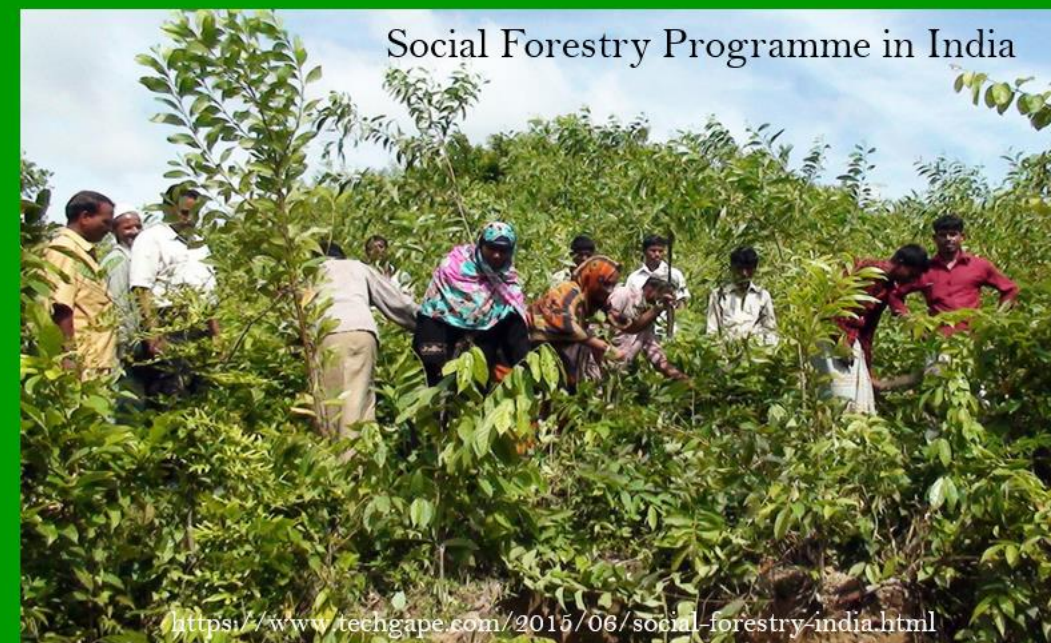
1. Introducing new, more efficient and cleaner technologies in thermal power generation.
2. Promoting renewable energy generation and increasing the share of alternative fuels in overall fuel mix.
3. Reducing emissions from transportation sector.
4. Promoting energy efficiency in the economy, notably in industry, transportation, buildings and appliances.
5. Reducing emissions from waste.
6. Developing climate resilient infrastructure.
7. Full implementation of Green India Mission and other programmes of afforestation.
8. Planning and implementation of actions to enhance climate resilience and reduce vulnerability to climate change.

- India is very vulnerable to climate change, notably due to the melting of the Himalayan glaciers and changes to the monsoon.
- As part of its pledge under the 2015 Paris climate agreement, India, the world's third-biggest carbon emitter, is supposed to reduce its carbon footprint by 33-35% from 2005 levels by 2030. India also aims to produce 40% of its power from non-fossil fuel sources by 2030.

Afforestation Programme in India



- <https://www.epw.in/journal/2020/15/special-articles/key-drivers-indian-greenhouse-gas-emissions.html>
- csj_ghg_CS_11.pdf
- <https://climateactiontracker.org/countries/india/>
- <https://edgar.jrc.ec.europa.eu/>
- <https://www.carbonbrief.org/the-carbon-brief-profile-india>
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- Jha, A. K., Sharma, C., Singh, N., Ramesh, R., Purvaja, R. and Gupta, P. K., Greenhouse gas emissions from municipal solid waste management in Indian mega-cities: A case study of Chennai landfill sites. Chemosphere, 2008, 71, 750–758.
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Thank You