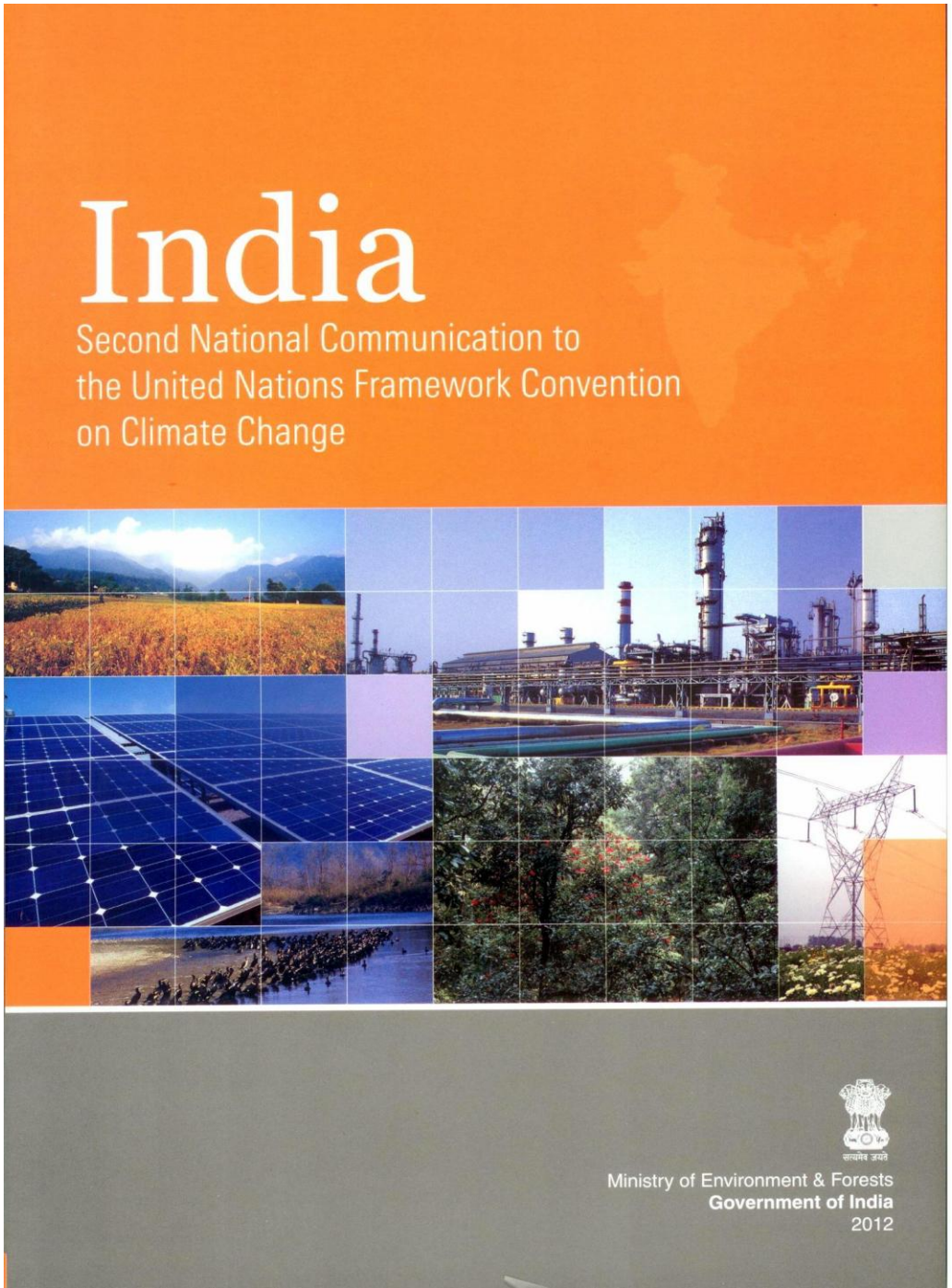

Subodh Sharma

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Government of India

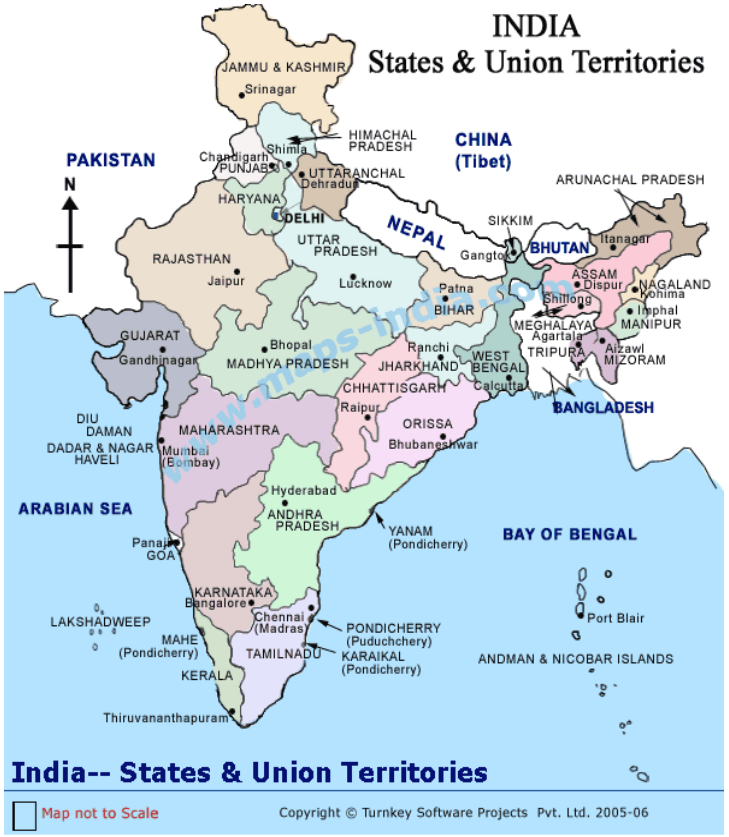
New Delhi

Outline

- Introduction – National Circumstances
- Key Outcomes
  - GHG Inventory
  - Vulnerability Assessment and Adaptation
  - Other Elements
- Implementation Arrangement & Institutional Network
- Key Challenges
- Next Steps

National Circumstances, 2010

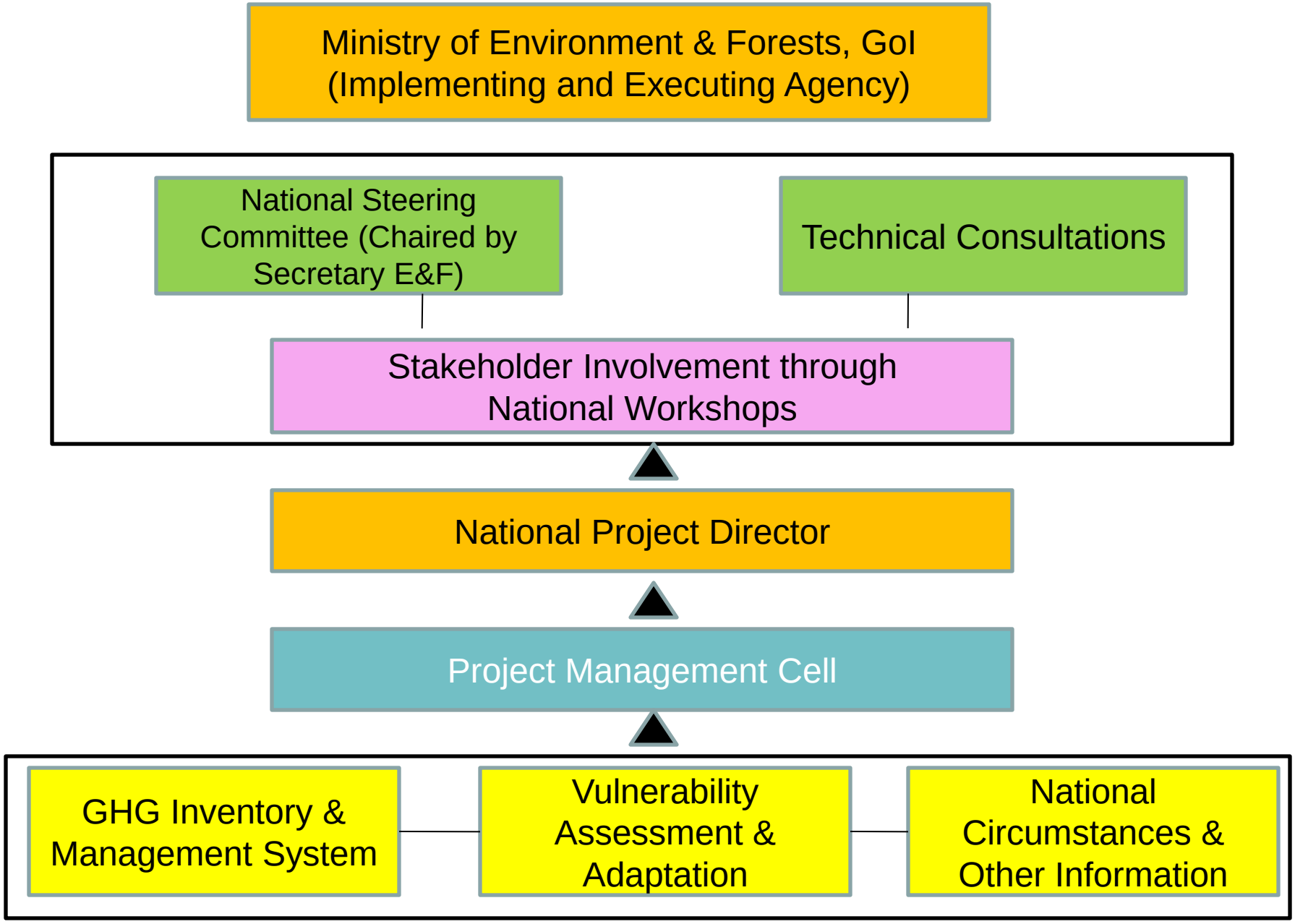
CRITERIA	Measure
Polulation (million 2011)	1210
Relevant area (million square kilometers)	324
Land area used for agricultural purposes (million square kilometers)	1.95
Urban population as percentage of total population	34
Forest area (million square kilometers) (2007)	0.69
Livestock polution excluding poultry (million) (2003)	464
Polulation below poverty line (percentage) (2004)	21.8
Life expentancy at birth (years) (2006)	63.5
Literacy rate (percentage, 2011)	74.04



National Circumstances, 2010

CRITERIA	Measures
GDP at Factor cost (1999-2000 prices) Rs. Billion	61332
GDP at Factor cost (1999-2000 prices) US$ billion	1371
GDP per capita (1999-2000) prices) US$	1133
Share of industry in GDP (percentage)	25.8
Share of services in GDP (percentage)	57.3
Share of agriculture in GDP (percentage)	16.9

Implementation Arrangement for SNC



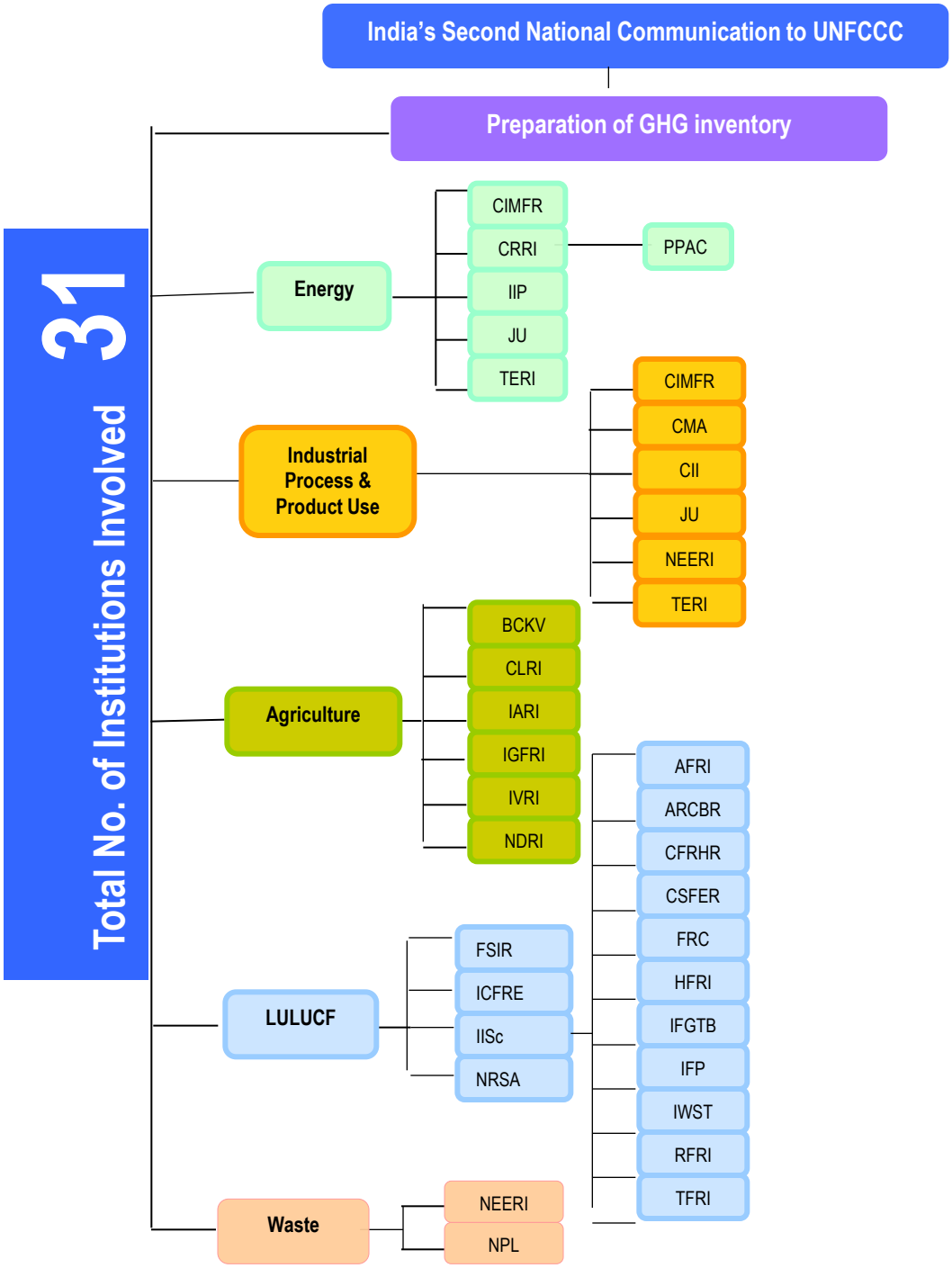
Key Outcomes : GHG Emissions Inventory

A consistent, comparable, comprehensive, and transparent national GHG emission inventory with reduced uncertainties

I. GHG inventory by sources and sinks for the base year 2000 & 2007 with reduced uncertainties

II. Strengthened institutional networks and improved scientific measurements, monitoring, reporting, and learning capacities and informed decision-making

Institutional Framework for GHG Inventory Preparation



AFRI: Arid Forest Research Institute
ARCBR: Advanced Research Centre for Bamboo and Rattans
BCKV: Bidhan Chandra Krishi Vishwavidyalaya;
CFRHRD: Centre for Forestry Research and Human Resource Development
CII: Confederation of Indian Industry
CIMFR: Central Institute of Mining and Fuel Research
CLRI: Central Leather Research Institute
CMA: Cement Manufacturers Association
CRRI: Central Road Research Institute
CSFER: Centre for Social Forestry and Eco-Rehabilitation
FSI: Forest Survey of India
FRC: Forest Research Centre
HFRI: Himalayan Forest Research Institute
IARI: Indian Agricultural Research Institute
ICFRE: Indian Council of Forestry Research and Education
IFGTB: Institute of Forest Genetics and Tree Breeding
IFP: Institute of Forest Productivity
IGFRI: Indian Grassland and Fodder Research Institute
IIP: Indian Institute of Petroleum
IISc: Indian Institute of Science
IVRI: Indian Veterinary Research Institute
IWST: Institute of Woods Science and Technology
JU: Jadavpur University
NDRI: National Dairy Research Institute
NEERI: National Environmental Engineering Research Institute
NPL: National Physical Laboratory
NRSA: National Remote Sensing Agency
PPAC: Petroleum Planning and Analysis Cell
RFRI: Rain Forest Research Institute
TERI: The Energy and Resources Institute
TFRI: Tropical Forest Research Institute

Key Features of GHG Inventory Preparation

Feature	1994 GHG Inventory	2000 and 2007GHG Inventory
Coverage	CO_2, CH_4 and N_2O reported LULUCF included emissions from changes in forest land only	CO_2, CH_4, N_2O, HFCs, CFCs and SF6 reported Carbon pools in addition to forests considered
Guidelines	Revised 1996 IPCC Guidelines	Revised IPCC Guidelines 1996 and 2006, IPCC Good Practice Guidance 2000 and 2003
Emission factors	Mix of default and Country-specific (26% of source categories used country-specific factors)	Mix of default and Country-specific (35% of source categories used country-specific factors)
Methodology (Tier hierarchy)	7% of the total CO2 eq. emissions made using Tier-III approach	12% of the total CO2 eq. emissions made using Tier-III approach

Key Results – GHG Inventory

- The total Greenhouse Gas (GHG) emissions from India in 2000 (excl. LULUCF*) were 1523.78 million tons of CO_2 equivalent (eq) of which
  - CO_2 emissions were 1024.77 million tons;
  - CH_4 emissions were 19.39 million tons; and
  - N_2O emissions were 0.26 million tons

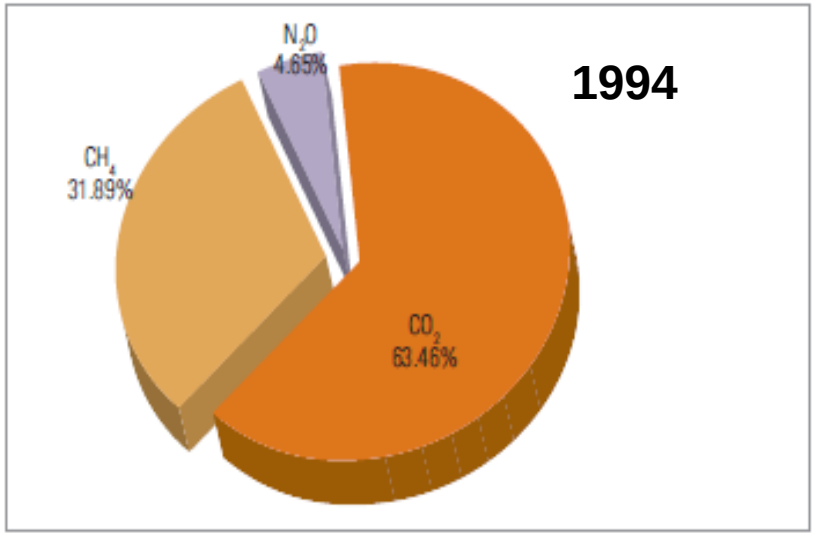
- GHG emissions from Energy, Industry, Agriculture, and Waste sectors constituted 67.4%,5.8%, 23.3% and 3.4% of the net CO_2 eq emissions respectively.

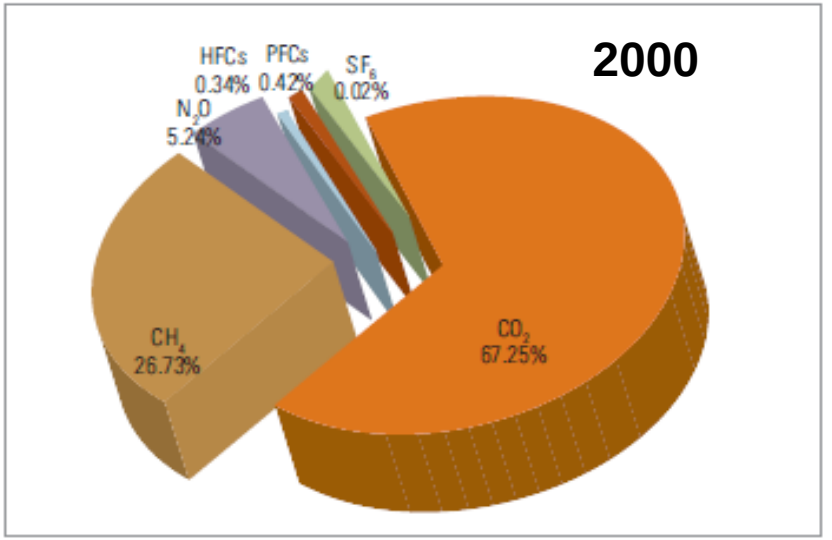
- Energy sector emitted 1027.02 million tons of CO_2 eq, of which 543.75 million tons of CO_2 eq were emitted from electricity generation and 98.10 million tons of CO_2 eq from the transport sector.

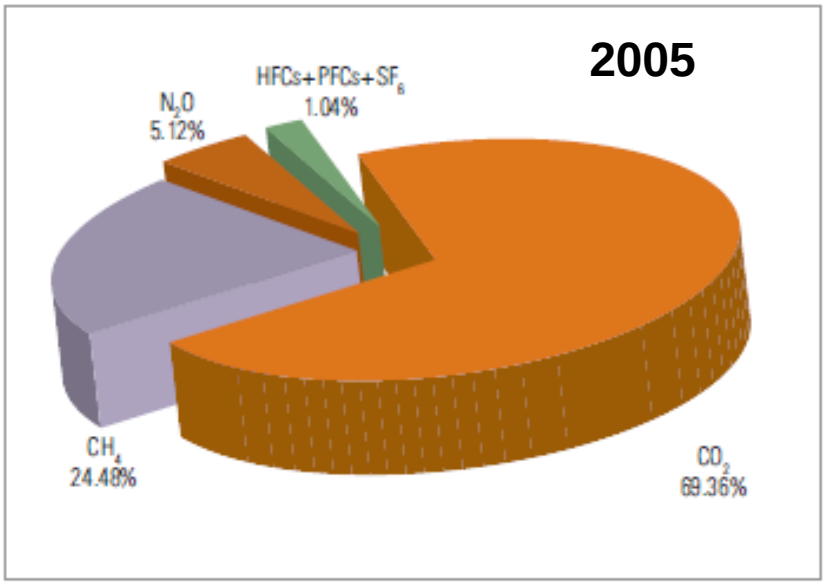
- Industry sector emitted 88.61 million tons of CO_2 eq.

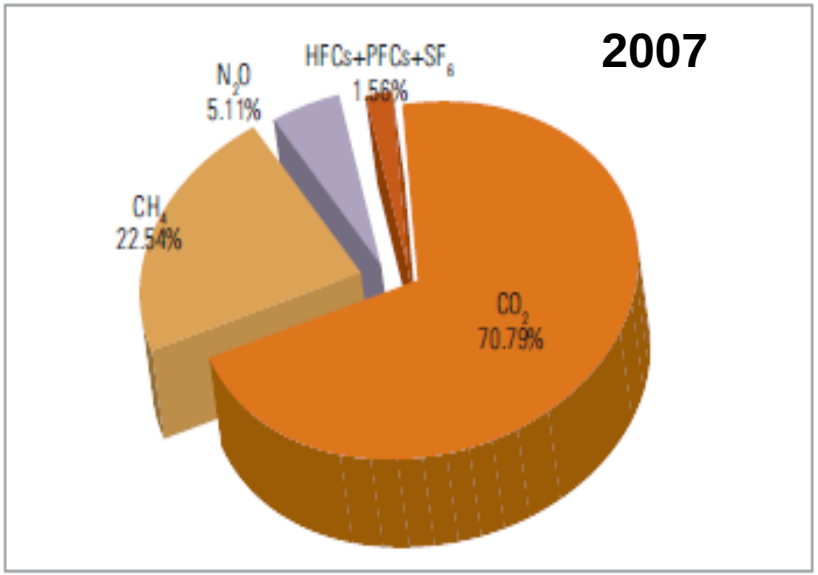
*LULUCF sector was a net sink. It sequestered 222.57 million tons of CO_2.

Trends of CO_2 eq. emissions, by Gas

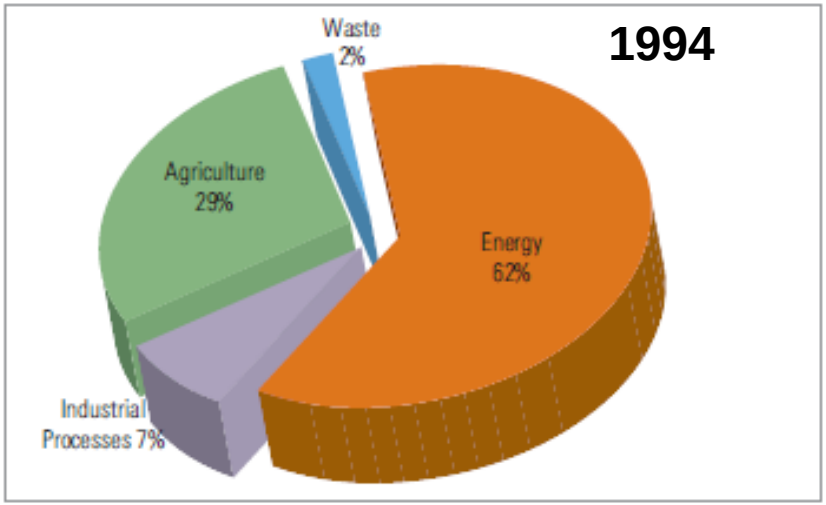


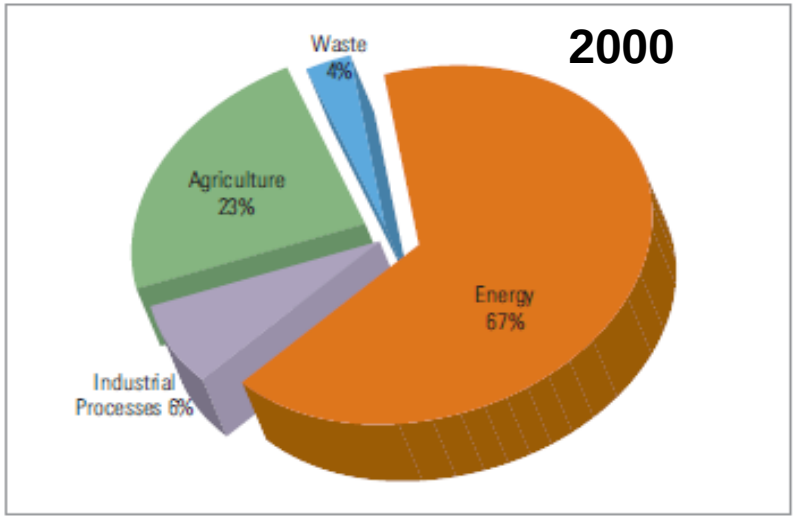


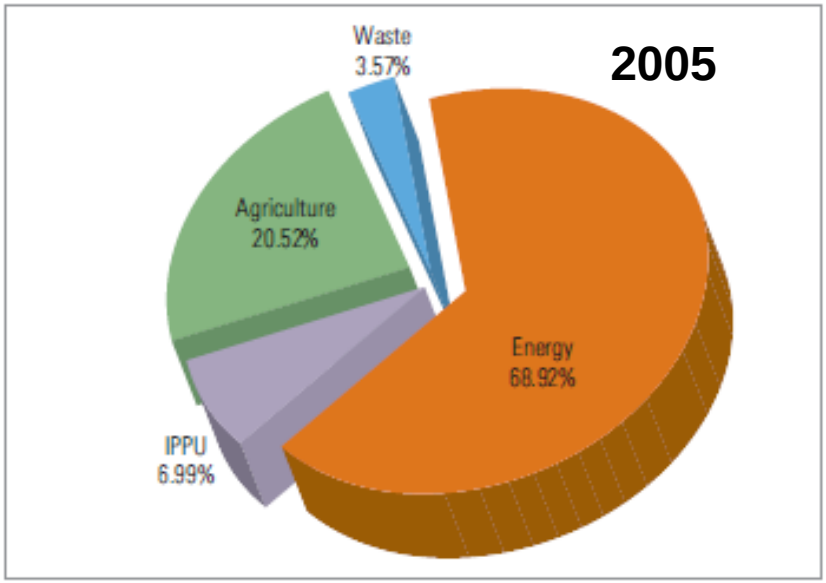


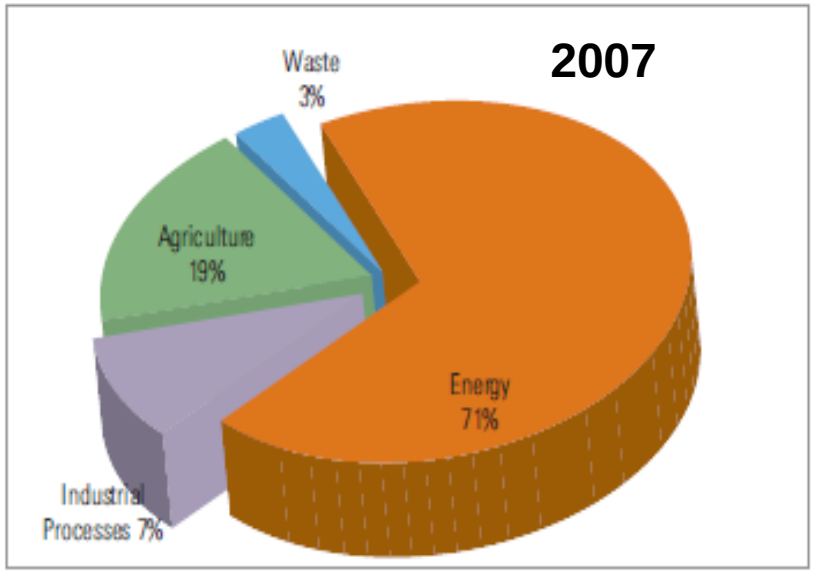


Trends of CO_2 eq. emissions, by Sector









Methodological Features of Inventory Preparation

2000 and 2007 Inventory

- Estimates made using revised IPCC 1996 Guidelines (1996), IPCC Good Practice Guidance (2000), the LULUCF Good Practice Guidance (2003), IPCC 2006 Guidelines.
- Carbon pools in addition to forests have been considered in the LULUCF sector (cropland, grassland, settlements, flooded land and other land)
- Used a mix of default EF and CS (35% of the source categories used CS factors).
- CO_2, CH_4 and N_2O emission coefficients of fossil fuel other than coal updated from IPCC 2006 Guidelines

…….continued

Methodological Features of Inventory Preparation

- Key source analysis by level and trend approach carried out as per the methodology indicated in IPCC 2000 Good Practice Guidance
- Uncertainty analysis using tier-I approach presented as per the methodology in the IPCC 2000 Good Practice Guidance
- CO_2, CH_4, N_2O, HFC-132a, HFC-23, CF_4, C_2F_6, SF_6 reported
- For 2000 and 20007, 12% of the emissions are assessed using Tier-III approach, implying greater accuracy

Key Outcome : General Description Of Steps Taken Or Envisaged To Implement The Convention

- **Develop climate scenarios**
- **Assess impacts of climate change on:**

  Water resources
  Agriculture
  Forests and Natural Ecosystems
  Coastal zones
  Society and human settlements
  Human health

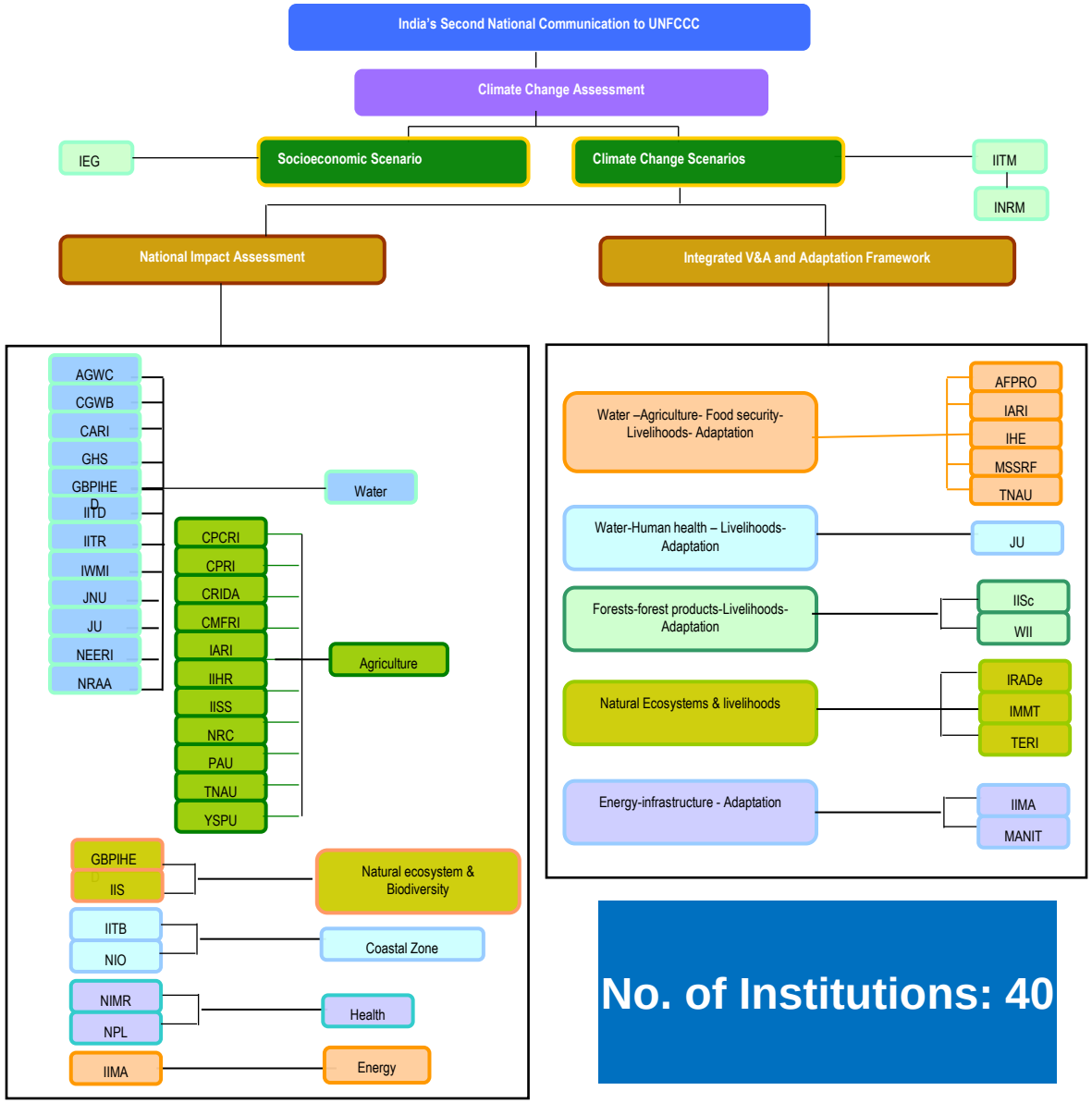
Leads to generation of information pertaining to:

Vulnerability to adverse impacts of climate change

Programs, policies and activities facilitating adaptation

Adaptation assessment, including identification of critical vulnerable areas

Institutional Framework – V&A



No. of Institutions: 40

AGWC: Arete Glaci-er & Water Consultants Pvt. Ltd.
AFPRO: Action for Food Production
CARI: Central Agriculture Research Institute
CGWB: Central Ground Water Board
CMFRI: Central Marine Fisheries Research Institute
CPCRI: Central Plantation Crops Research Institute
CPRI: Central Potato Research Institute
CRIDA: Central Research Institute for Dryland Agriculture
GBPIHED: G.B. Pant Institute of Himalayan Environment and Development
GHS: Global Hydrological Solution
IARI: Indian Agricultural Research Institute
IEG: Institute of Economic Growth
IHE: Institute of Home Economics
IIHR: Indian Institute of Horticulture Research
IIMA: Indian Institute of Management, Ahmedabad
IISc: Indian Institute of Science
IISS: Indian Institute of Soil Science
IITB: Indian Institute of Technology Bombay
IITD: Indian Institute of Technology, Delhi
IITR: Indian Institute of Technology, Roorkee
IITM: Indian Institute of Tropical Meteorology
IMMT: Institute of Minerals and Materials Technology
INRM: Integrated Natural Resource Management
IRADe: Integrated Research and action for Development
IWMI: International Water Management Institute
JU: Jadavpur University
JNU: Jawaharlal Nehru University
MANIT: Maulana Azad National Institute of Technology
MSSRF: M.S. Swaminathan Research Foundation
NEERI: National Environmental Engineering Research Institute
NIMR: National Institute of Malaria Research
NRAA: National Rainfed Area Authority
NIO: National Institute of Oceanography
NPL: National Physical Laboratory

Impacts, Vulnerability Assessment and Adaptation - Approach

- Development of improved Climate Change Scenarios (A1B scenario)
  - Projections of climate change scenarios using PRECIS regional climate model
  - Generate scenarios for extreme events
  - Study impacts of climate change on onset of monsoon
- Impacts, Vulnerability Assessment and Adaptation
  - Sectoral impact assessments of climate change in key sectors
  - Enhanced institutional capacity for undertaking V&A assessments and informed decision making.

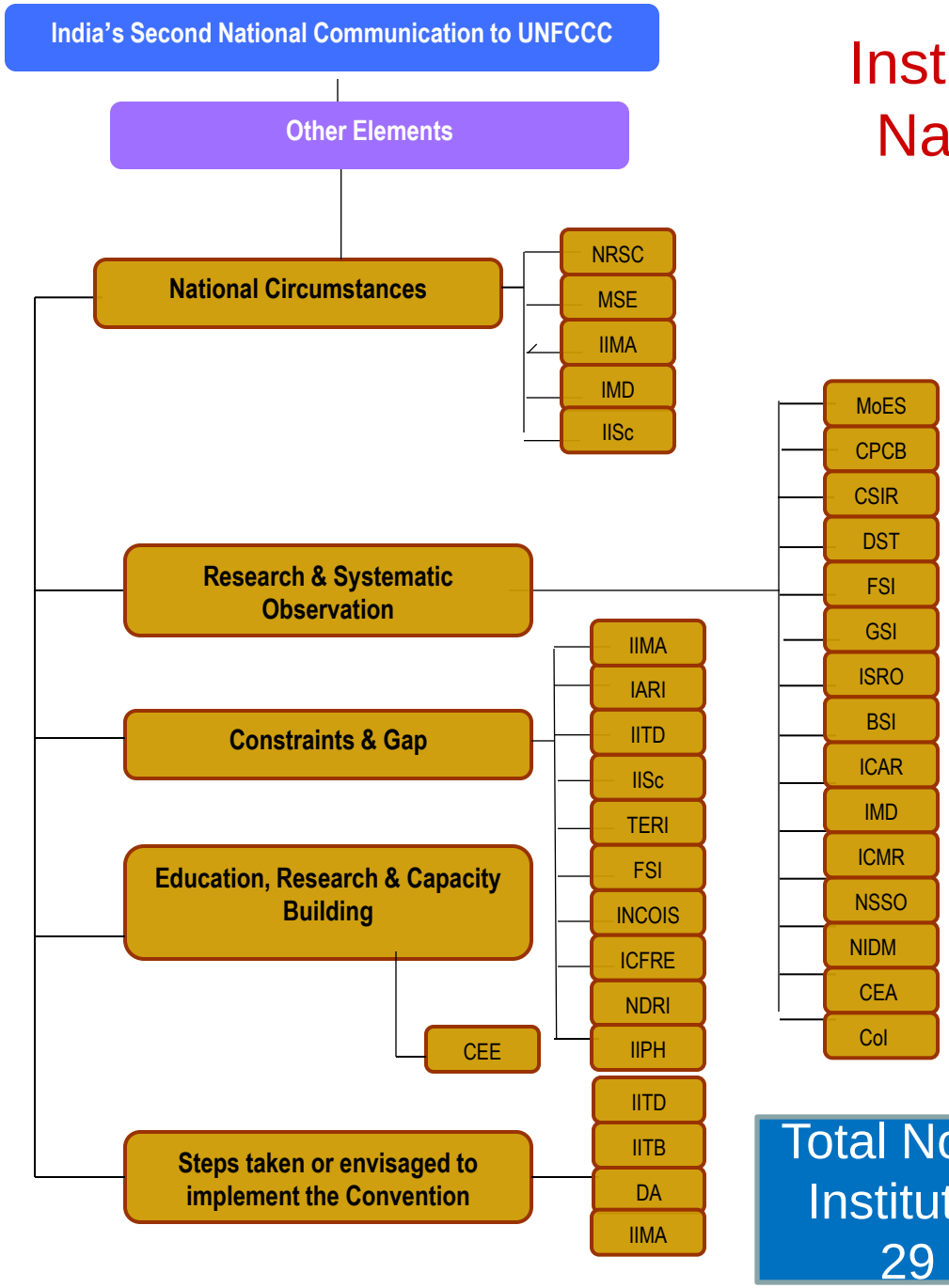
Key Outcome : Other Information Considered Relevant to the Achievement of the Objective of the Convention

- Transfer of technologies
- Research and systematic observation
- Education, training and public awareness
- Capacity- building
- Information and networking

Leads to identification of:

Constraints and gaps, and related financial, technical and capacity needs for continued reporting

Institutional Framework – National Circumstances



Total No. of Institutes 29

BSI:	Botanical survey of India
CPCB:	Central Pollution Control Board
CSIR:	Council of Scientific and Industrial Research
CEA:	Centre for Electricity Authority
CEE:	Centre for Environment Education
CoI:	Census of India
DA:	Development Alternatives
DST:	Department of Science and Technology
FSI:	Forest Survey of India
GSI:	Geological Survey of India
IARI:	Indian Agricultural Research Institute
IIT D:	Indian Institute of Technology, Delhi
IIT B:	Indian Institute of Technology, Bombay
IISc:	Indian Institute of Science
ICFRE:	Indian Council of Forestry Research & Education
ICAR:	Indian Council of Agriculture Research
ICMR:	Indian Council of Medical Research
ISRO:	Indian Space Research Organisation
IIMA:	Indian Institute of Management, Ahmedabad
IMD:	Indian Meteorological Department
INCOIS:	Indian National Centre for Ocean Information services
IIPH:	Indian Institute of Public Health
MoES:	Ministry of Earth Science
MSE:	Madras School of Economics
NDRI:	National Dairy Research Institute
NRSC:	National Remote Sensing Centre
NSSO:	National Sample Survey Office
NIDM:	National Institute of Disaster Management
TERI:	The Energy and Resources Institute

Institutional Framework for SNC

127 institutions

> 220

scientists

Key Challenges & Possible Approaches
GHG Inventory

Gaps and Constraints	Details	Possible approach
Data organization	Data not available in IPCC – friendly formats for inventory reporting	Consistent reporting formats
	Mismatch in top-down and bottom-up data sets for same activities	Regular monitoring and consistency check on collected data
	Mismatch in sectoral details across different published documents	Consistent reporting formats
Non-availability of relevant data	Time-series data for some specific inventory sub-categories like municipal solid waste	Generate and maintain relevant data
	Data for informal sectors of economy	Data surveys
	Data for refining inventory to higher tier levels	Data depths to be improved

Key Challenges & Possible Appraoches
GHG Inventory

Gaps and Constraints	Details	Possible approach
Data non-accessibility	Proprietary and trade secret data for inventory reporting at Tier-III level	Involve industry, industry associations, and monitoring institutions
	Data not in electronic formats	Standardize data reporting and centralize data in usable electronic format
	Security concerns	Protocols to access data
	Procedural delays	Awareness generation
Technical and institutional capacity needs	Training the activity data generating institutions in inventory methodologies and data formats	Extensive training programmes
	Institutionalize linkages of inventory estimation and climate change research	Wider dissemination activities
Non-representative emission coefficients	Inadequate sample size for representative emission coefficient measurements in many sub-sectors	Conduct more measurements, statistical sampling

Key Challenges – Impacts, Vulnerability Assessment and Adaptation

Geographic Hierarchy/ Strategies	Local	National
Capacity Building	Monitoring, Observation, Awareness/Assessment at state/district/city/community levels	Scientific assessment, Measurement, Models, National Research agenda
Knowledge/ Information	Locale-specific databases, Scenarios and assessment, Local monitoring networks	Research networks, National databases (for example, NATCOM), Scientific and policy models, National scenarios, Technology inventory

Key Challenges – Impacts, Vulnerability Assessment and Adaptation

Geographic Hierarchy/ Strategies	Local	National
Institutions/ Partnerships	Community initiatives, early warning networks	Stakeholders networks, Public/Private programmes
Policy/ Instruments	Locale-specific adaptation plans, community-based adaptation programmes	Science-policy linkage, economic instruments (for example, insurance, R&D funds), Integration with national development/planning process
Technology	Locale-specific technology adaptation	Targeted R&D, technology transfer protocols, demonstration/pilot projects

Next Steps

- **THIRD NATIONAL COMMUNICAITON (TNC)**
  - **Full Scale Project**
  - **Enhanced information (more decentralized)**
  - **Use of improved models, methodology and systems**
  - **Expansion of the network (to enhance coverage)**
  - **Launch of other TNC activities; and**

Next Steps

- NEW REPORTING REQUIREMENTS
- Biennial Update Reports (BURs)
  - Non-Annex I Parties to submit first BUR by December 2014
  - Report to be submitted every two years
  - First report, at a minimum, the inventory for the calendar year no more than four years prior to the date of submission or more recent years (i.e. inventory of the year 2010)
- International Consultation and Analysis (ICA)
  - First round of ICA will be conducted for developing country Parties, commencing within six months of the submission of the first BUR

THANK YOU