

Targeted Research on Climate Change

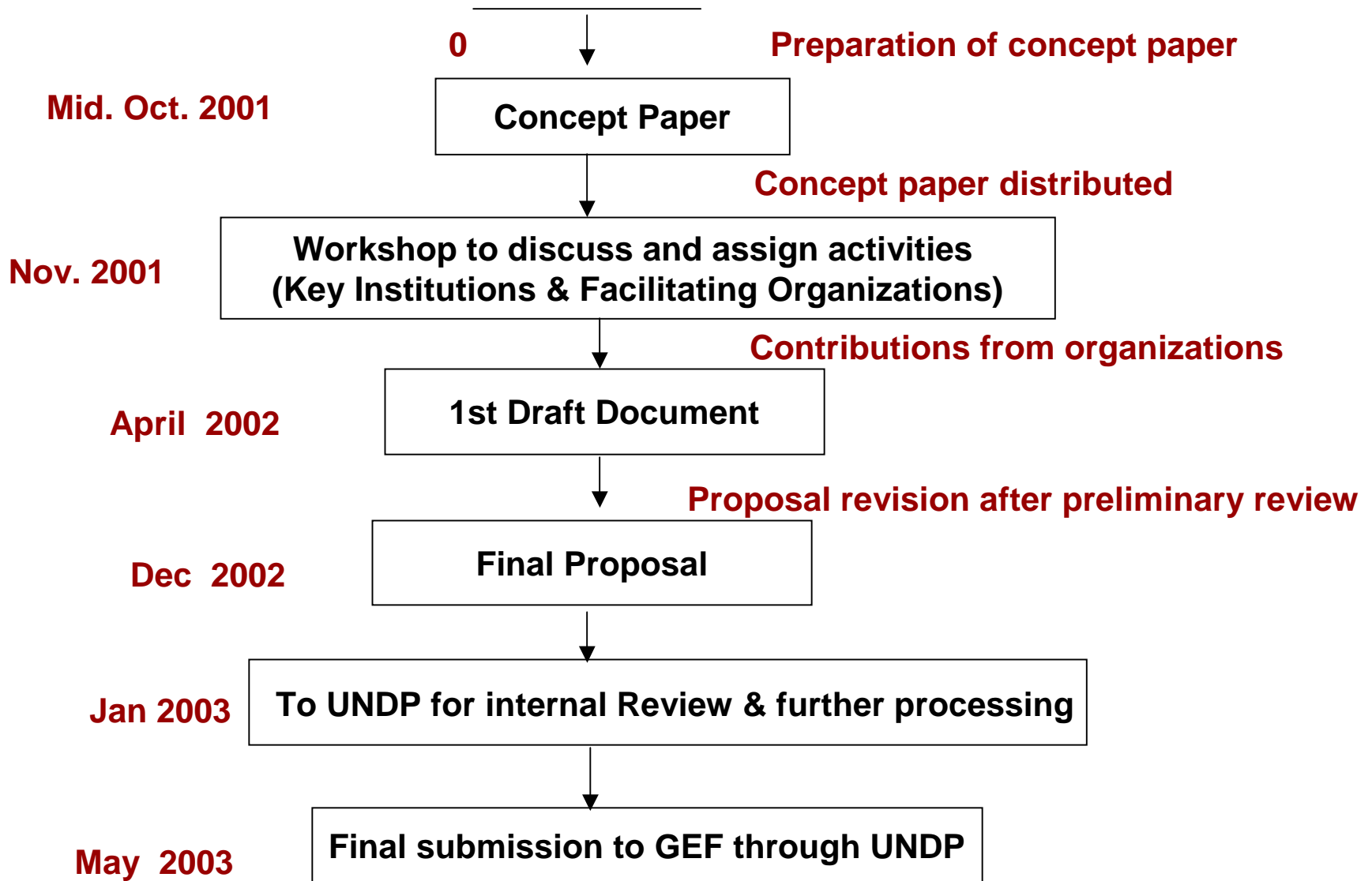
Why Targeted Research

To strengthen regional scientific capacity in order to respond to the climate change challenge as well as to lay the foundation for further National Communications and implementation of the Convention.

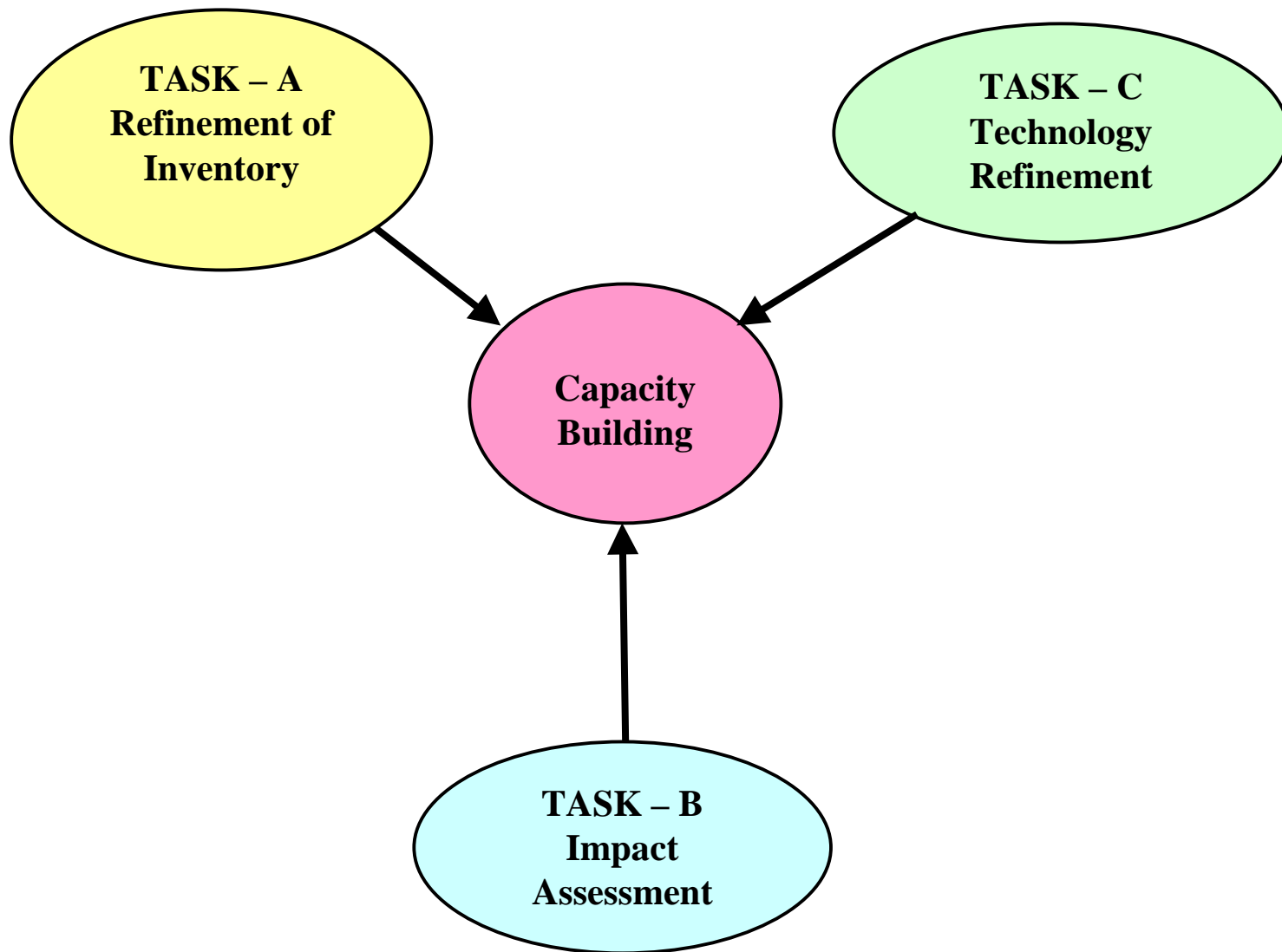
Targeted Research....Objectives

- Identification of technology and capacity building needs, modalities to acquire and absorb them, design and evaluate host projects.
- Capacity building for participation in systematic observation networks.
- Studies leading to the preparation of national capacities to address climate change, improvement of local emission coefficients.
- Maintenance and enhancement of capacities to prepare national communications on a continuous basis.
- Developing and strengthening activities for public awareness, education and access to information.

Targeted Research....Time Plan



Targeted Research Framework



TASK A: Measurement towards refinement of GHG inventories

- Systematic and improved networked observations of GHG emission factors, other trace gas and pollutants emitted from anthropogenic sources including gap areas leading to South Asia specific emission factors
- Systematic observation of background atmospheric constituents
- Introduction of reference measurement standards ensuring traceability

Projects under TASK-A

- 1.1 Development of CO₂ emission factors linking coal beds with power plants
- 1.2 Measurement of GHG emission coefficients due to burning of coal in all the major cement and steel plants.
- 1.3 To strengthen the emission estimates from India's transport sector and undertake a case study of Delhi for developing a simulation model of emissions from the network of transport systems plying in the city
- 1.4 (a) Measurement of CH₄ and N₂O emission coefficients emitted from rice cultivation for selected cultivars, fertilizer application, soil amendment, and water regimes. (b) Development of emission coefficient of non-CO₂ gases emitted from major agriculture crop residue

Projects under TASK-A....contd.

- 1.5 Measurement of CH₄ and N₂O emission coefficient from enteric fermentation in animals and manure management
- 1.6 Measurement of N₂O emission coefficients from major soil types in the country
- 1.7 CO₂ emission and uptake measurement in forests to ascertain their net sink capacity
- 1.8 Soil Carbon measurements, Soil carbon cycle modeling, remote sensing and generation of GIS based mapping of land use
- 1.9 Measurement of emission coefficients from solid waste disposal and domestic and commercial waste water

Projects under TASK-A...contd.

- 1.10 Climate related Environment studies (background measurements)
- 1.11 To establish a GHG reference laboratory for generating and disseminating certified reference materials
- 1.12 Nodal center for synthesis, QA/QC analysis and networking

TASK B: Impact and Vulnerability Assessment

- **Formation of country specific sustainable development indicators**
- **Improved regional climate model scenarios with high resolution representing within the region variability in climate**
- **In depth study on extreme climate events**
- **Changing socio economic scenario**
- **Impacts of climate Change on:**
 - **extreme climate events**
 - **Agriculture**
 - **Water balance**
 - **Health**
 - **Forestry**
 - **Natural Ecosystems and**
- **Integrated Impact Assessment**

Projects under TASK-B

- 2.1 Generation of high resolution regional climate scenario, investigating its impact on the Indian monsoon and on extreme climate events and setting up of a climate data center**
- 2.2 Generation of future GHG emission scenarios**
- 2.3 Assessment of Vulnerability of Agriculture sector due to impacts of climate change and formulation of Adaptation Strategies.**
- 2.3 To study impact of climate change on water resources and develop adaptation strategies**
- 2.5 To study the impacts of climate change on Forestry and develop adaptation strategies**
- 2.6 To study the impacts of climate change on natural ecosystems such as the Sundarbans**

Projects under TASK-B.....contd.

- 2.7 Study of impacts of climate change on health**
- 2.7 Impacts of climate change and extreme events on coastal zones**
- 2.9 Impacts of climate change on the Urban energy and infrastructure**
- 2.10 Development of urban policy responses for integrating climate change and sustainable development**
- 2.11 Integrated impact assessment for India including long term emission scenarios, GHG policies and adaptation strategies**

TASK C: Identification and refinement of technologies for energy efficiency improvement and GHGs reduction in GHG emission areas

- Utilization of Coal for energy
- Transport sector
- Steel sector
- Clean energy for rural use
- GHG capture for energy use

Projects under TASK-C

1. 3.1 To study the level of non-coking coal beneficiation and its impact on efficiency improvement/ mitigation of GHG emission in thermal power stations.
- Va3.2 Validation of the Multi Stage Hydrogenation (MSH) technology for converting coal to oil
- 3.3 Utilization of Green House Gases, Carbon dioxide and Methane for production of fuels and chemicals
- 3.4 Mitigation of green house gas via *in situ* infusion of fly ash with CO₂ in thermal power plant: upscaling of the process vis- à- vis associated carbon sequestration and adoption.
- 3.5 Minimization of CO₂ and other polluting gaseous levels by suitably developing soft coke technology as the source of rural/semi urban domestic energy

Projects under TASK-C....contd.

- 3.6 Ecologically-friendly and value added steel making process based on VRDR- SAF- ESR route
- 3.7 Recovery of Methane from Landfills and Paddy Fields
- 3.8 Cleaner electricity production through fuel cell technology
- 3.9 Carbon Dioxide Sequestration in Geologic formations with Enhanced Coal bed Methane Recovery.
- 3.10 Improvement in solar cell efficiency upto 15% at commercial level and upto 20% at research level
- 3.11 Development of Mass Emission measurement system for Greenhouse Gases from the automotive vehicles.

Consideration of Issues

- **Follow up on Targeted Research proposal**
- **Review and further processing by UNDP for submission to GEF**