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# **Cambodia: Opportunity and Challenge of Developing National Inventories, and Next Steps**

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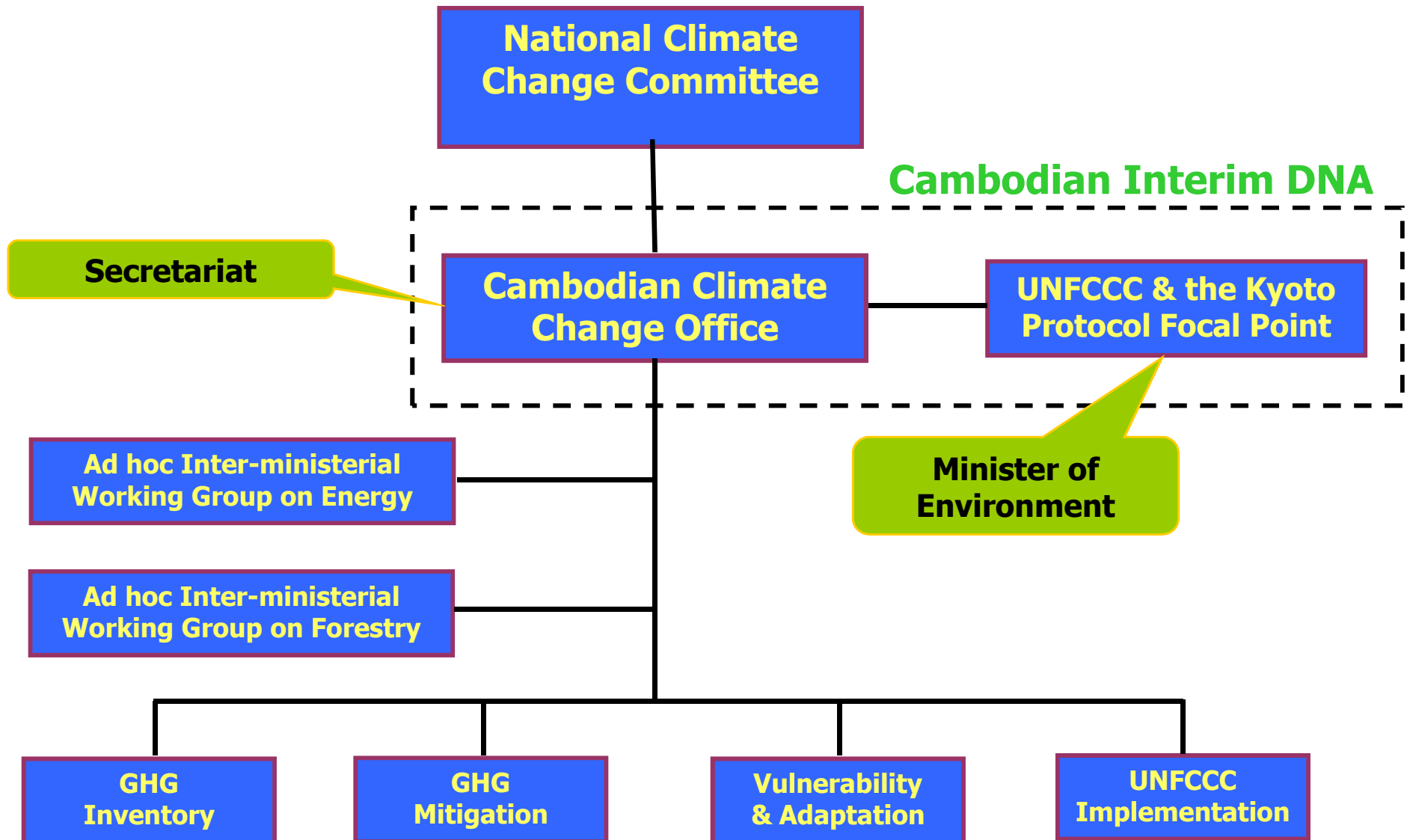
# Outline

1. Background of National Greenhouse Gas (GHG) Inventories in Cambodia
2. Climate Change Institutional Framework in Cambodia
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# 1. Background of National Greenhouse Gas (GHG) Inventories in Cambodia

- Cambodia ratified the UNFCCC in December 1995 and acceded to the Kyoto Protocol in July 2002
- The Ministry of Environment (MoE) is the National Focal Point for the UNFCCC and the Kyoto Protocol
- The Cambodia's Initial National Communication (INC) was prepared from 1999-2001 and submitted to the COP-8 of the UNFCCC in 2002
- The INC document consists the results of the national GHG inventories for the year 1994 and GHG mitigation options in Cambodia.

## 2. Climate Change Institutional Framework in Cambodia



# 3. The 1<sup>st</sup>. National Greenhouse Gas Inventories in Cambodia (1)

- The first Cambodia National GHG inventory for the base year of 1994 was developed by using the revised IPCC 1996 which covered 5 sectors: (i) energy, (ii) industrial process, (iii) agriculture, (iv) waste, and (v) land use change and forestry (LUCF).
- It is mandatory to cover 3 main GHGs: carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O), but the other gases such as carbon monoxide (CO), sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), and non-methane volatile organic compound (NMVOC) were also considered.

## 3. The 1<sup>st</sup>. National Greenhouse Gas Inventories in Cambodia (2)

- The basic approach for calculating emissions is based on the equation:

$$\text{Emission} = \text{Activity Data} \times \text{Emission Factor}$$

- In case if activity data were not available we used several assumptions based on studied and interviewed
- In this inventory, local emission factors were not available so we used the IPCC default values for energy sector and emission factors developed by regional countries such as Thailand, Philippines and Indonesia for non-energy sector.

# 3. The 1<sup>st</sup>. National Greenhouse Gas Inventories in Cambodia (3)

- In 1994, Cambodia emitted some 59,708 Gg and removed some **64,850 Gg** of CO<sub>2</sub> equivalent. Thus Cambodia was a net carbon sink country with a net total carbon removal of 5,142 Gg of CO<sub>2</sub>-eqv.
- However, this status may change if some of the assumptions used in the LUCF sector in particular were changed.
- Land use change and forestry accounted for most of GHG emissions and removals in 1994.
- LUCF represented 81.2% of greenhouse gases emissions, followed by agriculture with 15.5% and energy with 2.8%.

## GHG emissions by sources and removals by sinks

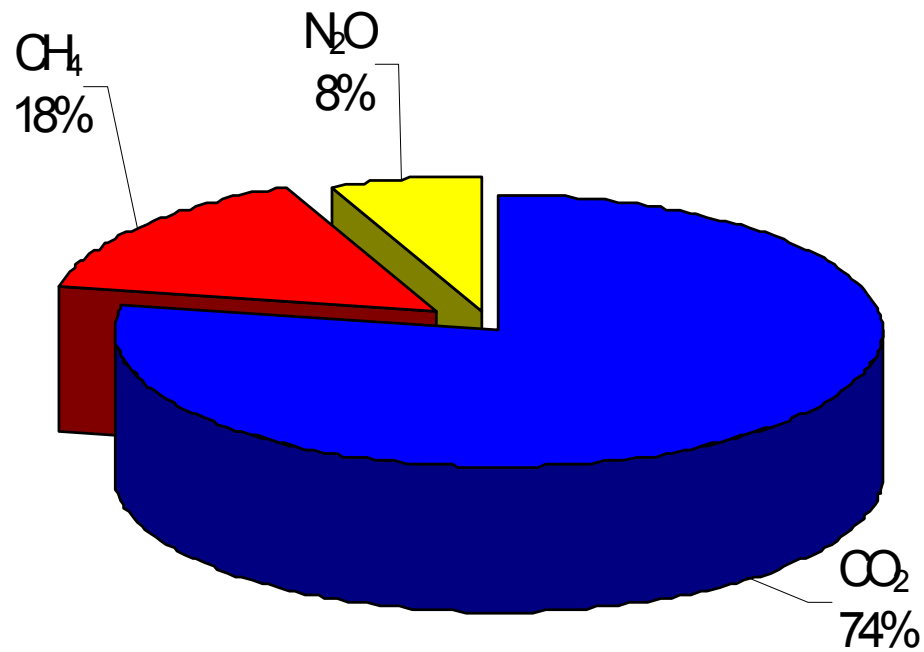
Sector	CO <sub>2</sub> Emission (Gg)	CO <sub>2</sub> Removal (Gg)	CH <sub>4</sub> (Gg)	N <sub>2</sub> O (Gg)	Total CO <sub>2</sub> -eq. (Gg)
Energy	1,272		507	102	<b>1,881</b>
Industrial Process	50				50
Agriculture			339	11	<b>10,560</b>
Waste			7	0.42	<b>273</b>
LUCF	45,214	<b>-64,850</b>	75	0.51	<b>-17,907</b>

**Total National CO<sub>2</sub>-eq. UPTAKE (Gg)**

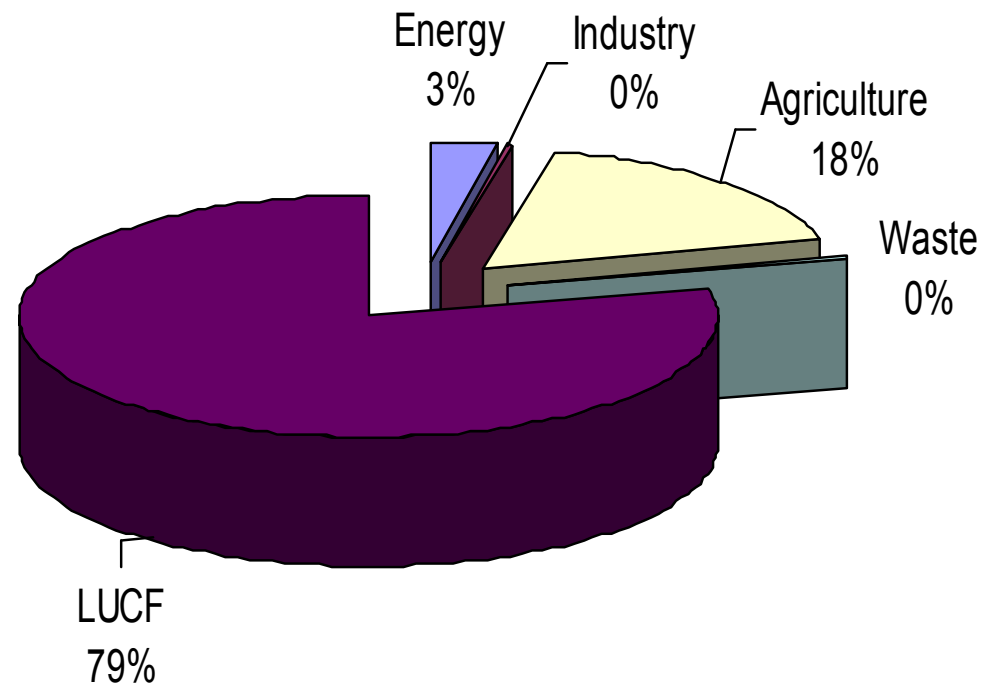
**-5,142**



**a. 1994 Percentage Share of the Three Main GHGs**



**b. Total CO<sub>2</sub> Equivalent Emissions by Sectors**



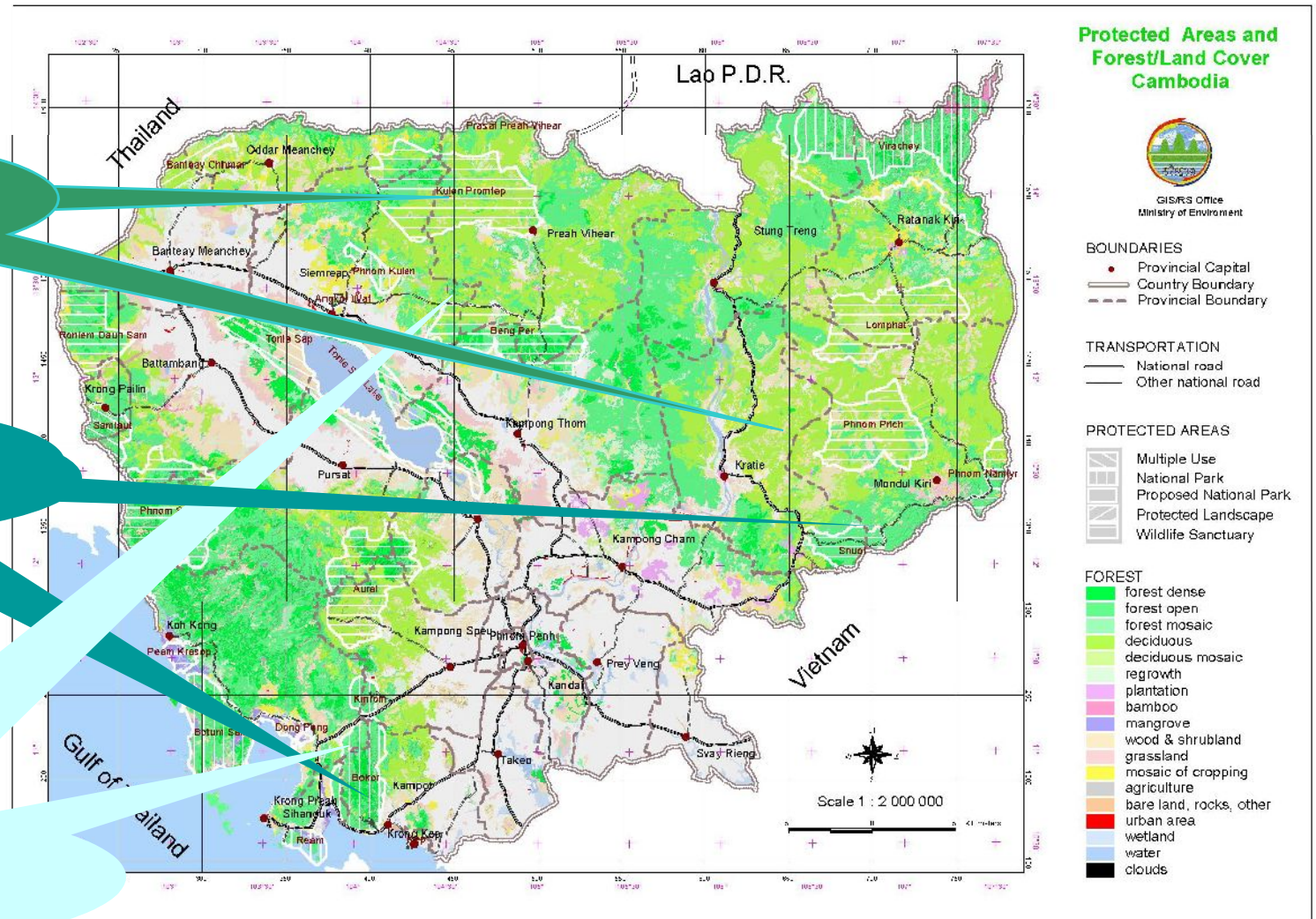
## 4. The development of the 2<sup>nd</sup>. National Greenhouse Gas Inventories in Cambodia

- The preparation of the Second National Communication (SNC) to the UNFCCC officially started in January 2007 and covers 4 main components including (i) GHG inventory for the year 2000, (ii) V&A , (iii) GHG mitigation and (iv) technology transfer and awareness raising.
- The basic approach for this GHGs inventory is based on revised 1996 IPCC guidelines, IPCC-GPG and UNFCCC Software, which calculates automatically GHG emissions using IPCC methodologies and equations, based on national data inputs.
- When national data and emission factors are not available, default values from IPCC and other national sources and studies are used.

# 5. Opportunities of Developing National GHGs Inventory (1)

- Conducted research on the Estimation of Biomass Growth Rate under the APN-CAPaBLE Project:
  - The objectives of field surveys are to: (i) identify type, species and number of trees in three selected forest types; (ii) estimate the aboveground biomass of trees in these selected forest types; and (iii) estimate the annual biomass increment of the selected forest types.
  - The research was focused on the main forest types which play an important role as the key source/sink categories:
    - Evergreen forest;
    - Deciduous forest; and
    - Secondary forest;

# Location of research study



Deciduous

Evergreen

Secondary

## 5. Opportunities of Developing National GHGs Inventory (2)

- 2007 in cooperation with the Joint Graduate School of Energy and Environment (JGSEE) we conducted a research measurement on CH<sub>4</sub> emission from the secondary forest and rice field in Cambodia.
- National approval of 5 CDM projects related to energy sector such as biomass, biogas, waste heat, and hydro power.

## 6. Potential problems/challenges (1)

- Lack of sustainable national GHG inventory system within the country. The inventory is prepared on a project basis for including into the national communication to UNFCCC;
- Limited of activity data. e.g., energy balance sheet in the country, livestock, water management, soil carbon....);
- Weak of database management system for inventory;
- Lack of appropriate local emission factors;
- Limited of previous researches/studies related to inventory sector;
- Lack of financial support to do researches/studies and update the inventory;

## 6. Potential problems/challenges (2)

- Limited financial resources: funding for climate change activities depends on donors and their priorities
- Lack of climate change research/training institutions in the country;
- Inadequate technical capacity of local staff;
- Limited incentives for qualified government staff;
- Weak cooperation and coordination among relevant institutions;
- Lack of qualified national experts in the country.

# 6. Next Steps

- Improve national and international cooperation and networking;
- Improve database management for GHG inventories;
- Improve climate change education, awareness raising and technology transfer;
- Climate change national institutional strengthening;
- Strengthening and enhancing capacity to local staff;
- UNFCCC and the Kyoto Protocol implementation;
- Resources mobilization for conducting research or studies on local emission factors;
- Finalize the preparation of Second National Communication to UNFCCC including GHG inventory for year 2000;
- Develop potential GHG mitigation options for Cambodia;
- Attract investors to implement CDM projects and other GHG emission reduction projects (REDD,...).



Thank you for your kind  
attention!