LOW CARBON SOCIETY DEVELOPMENT PLAN SCOPING MEETING

CAMBODIA: Current Status of GHG Inventory and SNC

By Uy Kamal
Head of GHG Inventory and Mitigation Office

10 January 2011, Sunway Hotel, Phnom Penh

I. Second National Communication and GHG Inventory Chapter

SNC Status

- Status of the country's Second National Communication:
  - Name and Contact Address of SNC Coordinator:

    Dr. Tin Ponlok

    General Directorate of Administration for Nature Conservation and Protection, Ministry of Environment
    #48, Samdech Preah Sihanouk Blvd., Tonle Bassac, Chamkarmorn,
    Phnom Penh, CAMBODIA
    Tel/Fax: (+855) 23 218 370
    Email: cceap@online.com.kh/etap@online.com.kh
  - What is the status of SNC?
    - Completed, but still being reviewed.
    - The target date of submission to UNFCCC is expected at the of 2010.

SNC Status

- What is the status of GHG Inventory Chapter?
  - GHG Inventory has been reviewed recently.
    - It will submit together with other two technical reports (Adaptation and Mitigation) to SNC Coordinator .
    - No recalculation for Agriculture and LUCF sectors, but only for energy sector.
    - ALU Software has not yet applied for this second National GHG Inventory, but it is just an exercise.
    - The USEPA Template Workbook was not applied yet.

Cambodia's Profile of GHG by sector, 1994 and 2000

Sector	Gg CO2-e		Change from 1994 (Gg CO2-e)	Change from 1994 (%)
	1994	2000		
Energy	**1,881**	**3,444.5**	**1,564**	**83**
Industrial Processes	50	0	-50	**-100**
Agriculture	10,560	21,112	-6,658	**-63**
LUCF	-17,907	-24,565	-44	**0**
Waste*	273	229	-50	**-18**
Total (w/ LUCF)	**-5,143**	**221**	-5,239	-98
Total (w/o LUCF)	**12,764**	**24,786**	**-5,195**	**-41**

** In waste sector, data for 1994 Inventory was data of 1998, and 1994 waste ratio (org/inorg) was high, and waste management system was different between 1994 and 2000, etc,*

Cambodia's Profile of GHG from Energy sector, 1994 and 2000

Subcategory	Gg CO2-e		Change from 1994 (Gg CO2-e)	Change from 1994 (%)
	1994	2000		
Energy Industries	332	546	214	64
Manufacturing Industries and construction	7	81	74	1057
Transport	831	780	-51	-6
Other sector (Commercial, Agri, and residential)	711	1847	1136	160
Other				
Inerational Bunker				
Total	**1881**	**3498**	**2990**	**159**

Cambodia's Profile of GHG from Agriculture sector, 1994 and 2000

Subcategory	Gg CO2-e		Change from 1994 (Gg CO2-e)	Change from 1994 (%)
	1994	2000		
Enteric fermentation	5,084	3,440	-830	-16
Manure management				
Rice cultivation	3,158	14,365	11,207	355
Agricultural soils	2,209	2,362	153	7
Prescribed burning of savannas	49	55	6	12
Field burning of agricultural residues	59	77	18	31
Total	**10,560**	**21,113**	10,553	

Cambodia's Profile of GHG from LUCF sector, 1994 and 2000

Subcategory	Gg CO2-e		Change from 1994 (Gg CO2-e)	Change from 1994 (%)
	1994	2000		
Changes in forest and other woody biomass stocks	-64,850	-27,208	37,642	58
Forest and Grassland Conversion	46943	22,859	-24	49
Abandonment of Managed land	-	-20,957.60		
CO2 emission and removal from soils	-	0		
Other	-	0		
Total		-25,307		

Key Category Analysis

- KCA was performed and the level and trend assessments are shown below:

Level Assessment Results

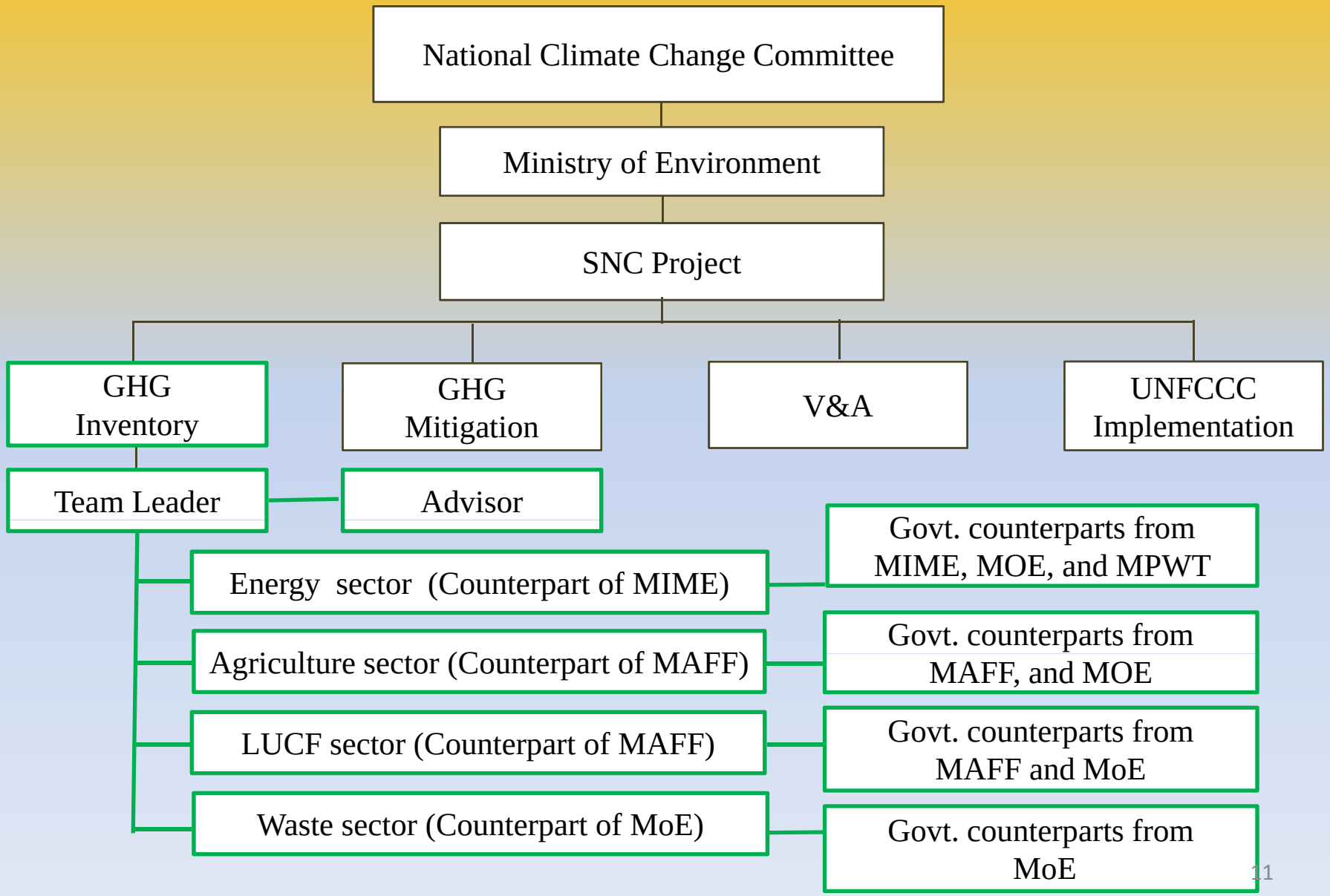
Inventory Categories	Base Year Estimate (Gg CO2 eq.)	Current Year Estimate (Gg CO2 eq.)	Total	Cumulative Sum	Status
CH_4 Emissions from Rice Production	3158.36	14365.01	57.9%	57.93%	key source
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	3417.69	3440.31	13.9%	71.80%	key source
N_2O (Direct and Indirect) Emissions from Agriculutural Soils	2209.21	2363.69	9.5%	81.34%	key source
Residential CH_4	713.37	1142.88	4.6%	85.94%	key source
CO_2 Combustion: Road Vehicles	825.25	774.39	3.1%	89.07%	key source
CO2 Emissions from Energy Industry	331.31	546.12	2.2%	91.27%	key source
CH4 Emissions from Manure Management	462.84	469.79	1.9%	93.16%	key source
N_2O Emissions from Manure Management	1203.55	343.11	1.4%	94.55%	key source
Residential N_2O	98.90	224.70	0.9%	95.45%	key source

Key Category Analysis

Trend Assessment Results

Trend Assessment Results	*Base Year Estimate (Gg CO_2 Eq.)*	*Trend Assessment (%)*	*Cumulative Sum*	**Status**
CH_4 Emissions from Rice Production	3158	46.99%	46.99%	key source
CH_4 Emissions from Enteric Fermentation in Domestic Livestock	3418	17.95%	64.93%	key source
N_2O Emissions from Manure Management	1204	11.26%	76.19%	key source
N_2O (Direct and Indirect) Emissions from Agricultural Soils	2209	10.81%	86.99%	key source
CO_2 Combustion: Road Vehicles	728	3.58%	90.58%	key source
CH_4 Emissions from Manure Management	463	2.41%	92.98%	key source
N_2O Emissions from Wastewater Handling	130	1.34%	94.32%	key source
Other Sectors: Residential CH_4	713	1.33%	95.66%	key source

SNC Institutional Arrangements



Issues, problems and gaps:

- Lack of sustainable national GHG inventory database, data format, etc.,
- Lack of activity data. e.g., energy balance sheet in the country, livestock, water management for paddy, soil carbon, etc….)
- Lack of researches/studies related to Sector GHG inventory
- The GHG inventory preparation is basically on project base, and most outputs are relying on consultants
- Inadequate capacity of technical and local staffs
- Inadequate in coordination and facilitation among inline government ministries and agencies
- Lack of financial support

Future Inventory

- The Third National Communication (NC3) is not yet confirmed.
- Requesting for funding (e.g. from GEF) has not submitted yet.

- For the next inventory, CCD plans to apply ALU software with agriculture and LUCF sectors, while other sectors with UNFCCC Software, LEAP, etc.,

Future Inventory

- Strengthening cooperate with the concerned government institutions and research institutions to improve activity data and emission factors
- Establish data management systems for inventory
- Use on-the-job training approach to build technical capacity of local experts
- Decentralizing GHG inventory work to involved sectors
- Promoting and coordinating CC mainstreaming into relevant sectors
- Strengthening capacity of the NCCC and its Secretariat
- Resource mobilization for addressing CC
- Exchange experts within the region
- Promote cooperation with regional research organizations.

2. GHG Mitigation Options Under SNC

A. Non-energy Sector (Agriculture and LUCF)

B. Energy and Transport Sector

GHG Mitigation Options

A. Non-energy sector (Agriculture and LUCF)

1. Agriculture

- Livestock Management
  - Enteric Fermentation
    - ✓ Improved feeding practices
      - Fodder/forage production
      - Fat/oil supplements
      - Mineral Urea Blocks (MUB)
      - Mechanical and chemical feed processing
    - ✓ Production enhancing agents
      - Ionosphores
      - Probiotics
      - Proprionate precursors
      - Bovine Somatrophin and Anabolic Steroids
      - Vaccinations
  - Manure Management
    - ✓ Methane capture and destruction
      - Large scale and small scale biogas from animal waste
    - ✓ Aerobic treatment of waste
      - Composting

Other options: Aquaculture, low meat diet, High genetic merit animals

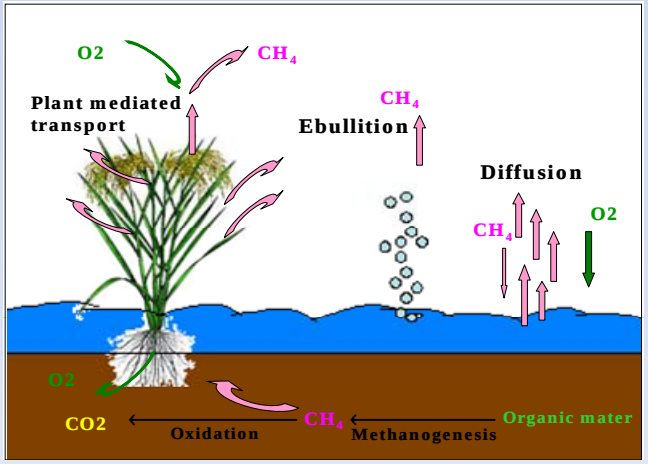
GHG Mitigation Options

A. Non-energy sector (Agriculture and LUCF)

1. Agriculture

❑ Rice Cultivation: GHG mitigation options

- Water Management (drainage in dry season and rainy season)
- Fertilizer application (sulphated fertilizer, compost and biogas slurry)
- No tillage
- Direct seeding
- Rice cultivar selection (short cycle cultivars)



GHG Mitigation Options

A. Non-energy sector (Agriculture and LUCF)

1. Agriculture

- Soil Management

  - Organic Agriculture
  - Bio-Slurry
  - Crop Management
  - Water Management

GHG Mitigation Options

A. Non-energy sector (Agriculture and LUCF)

- Forestry Sector: GHG mitigation options

GHG MITIGATION OPTIONS IN SUBSECTOR LAND USE CHANGE & FORESTRY

Measure	**GHG Mitigation Option**
Forest Protection and management (Increased efficiency)	• Reduce Impact Logging (or SFM) • Product conversion and utilization efficiency • REDD+
Sink Enhancement and management (Increase production)	• Afforestation and Reforestation • Agro-forestry
Carbon substitution or reduction (Increased efficiency)	• Efficient Cookstoves • Bioenergy Plantations

GHG Mitigation Options

B. Energy and Transport

1. Energy Sector
2. Manufacturing Industry
3. Transport Sector
4. Commercial Institution
5. Residential Sector
6. Agricultural Sector

GHG Mitigation Options

B. Energy and Transport

1. Energy Sector

- **Energy Industries**
  - Energy efficiency users
  - Energy efficiency buildings
  - Hydro dam CH4 mitigation
  - Small and Pico hydro
- **REEs**
  - Gasification imported Ankur technology
  - Gasification Cambodian made
  - Grid connection
- **Battery Charging Stations**
  - Grid connection
  - Biofuel
  - Solar charging
  - SHS

GHG Mitigation Options

B. Energy and Transport

2. Manufacturing Industry

- Rice milling efficiency/technology
- Brick works efficiency/technology
- Energy efficiency garment industry
- Ice plants efficiency/technology
- Garment sector efficiency/technology
- Waste water methane recovery
- Landfill gas recovery
- Ethanol production
- Biofuel from Jatropha

- Rice husk gasification imported Ankur tech
- Rice husk gasification locally produced
- Bier factories, biogas from waste water
- Efficient charcoal production
- Efficient cookstove
- Ice plants using gasification
- Reduction private electricity generation
- Rice millers using gasification
- Rice husk briquettes
- Cement production heat recovery

GHG Mitigation Options

B. Energy and Transport

3. Transport Sector

- Electricity motobike
- Electricity bicycle
- Electricity cars
- Hybrid cars
- Special motor/bicycle lanes
- Car free zones
- Public city transport

GHG Mitigation Options

B. Energy and Transport

4. Commercial Industry

- Air conditioning from diesel gensets

5. Residential Sector

- Efficient cookstove urban area
- Efficient cookstove rural area
- Biodigesters
- Water filters
- Solar lanterns
- SHS
- Energy efficiency

GHG Mitigation Options

B. Energy and Transport

6. Agriculture

- Wind water pumping
- Large biogas plants pigs and cows
- Agricultural waste briquettes
- Mining (aluminum mining)

Thank You

For Further Information:

Tel/Fax: 855-23-218370
E-mail: kamaluy@camclimate.org.kh
kamaluy@hotmail.com