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# CLIMATE CHANGE AND BIO-DIVERSITY IN MALAYSIA: RESEARCH, DEVELOPMENT AND POLICY ISSUES IN SUSTAINABLE FORESTRY

by

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## Presentation

### ▣ Introduction

- Snap Shots of GHG
- **Carbon Stock & Emissions**
- **Global Warming: Impacts & Implications**

### ▣ **Snap Shots of Flora Biodiversity**

- Conservation Measures in Malaysia
- Endemism, Threatened (Endangered/ Vulnerable/ Critically Endangered)

### ▣ **Malaysia's Commitments to Climate Change, Biodiversity & Sustainable Forestry**

### ▣ Importance of Sustainable Forestry

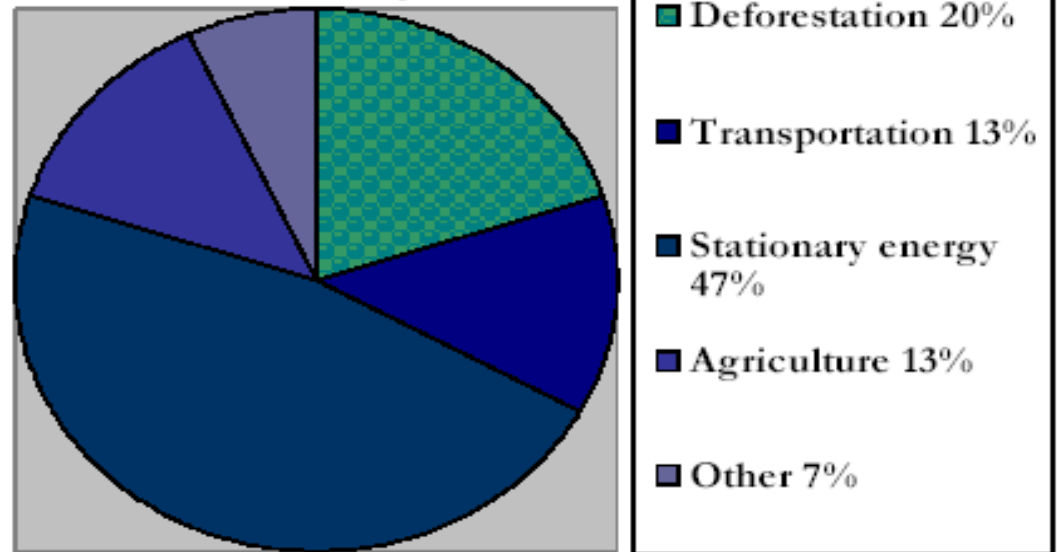
### ▣ **Climate Change & Biodiversity: Matrix of R&D and Policies in Sustainable Forestry**

### ▣ Conclusions

# Global Greenhouse Gas Emission by Source

- Deforestation is the second largest source of GHG emissions globally
  - ~6 billion tonnes pa
- 13 million ha of forest is cleared each year
  - 71,000 football fields a day

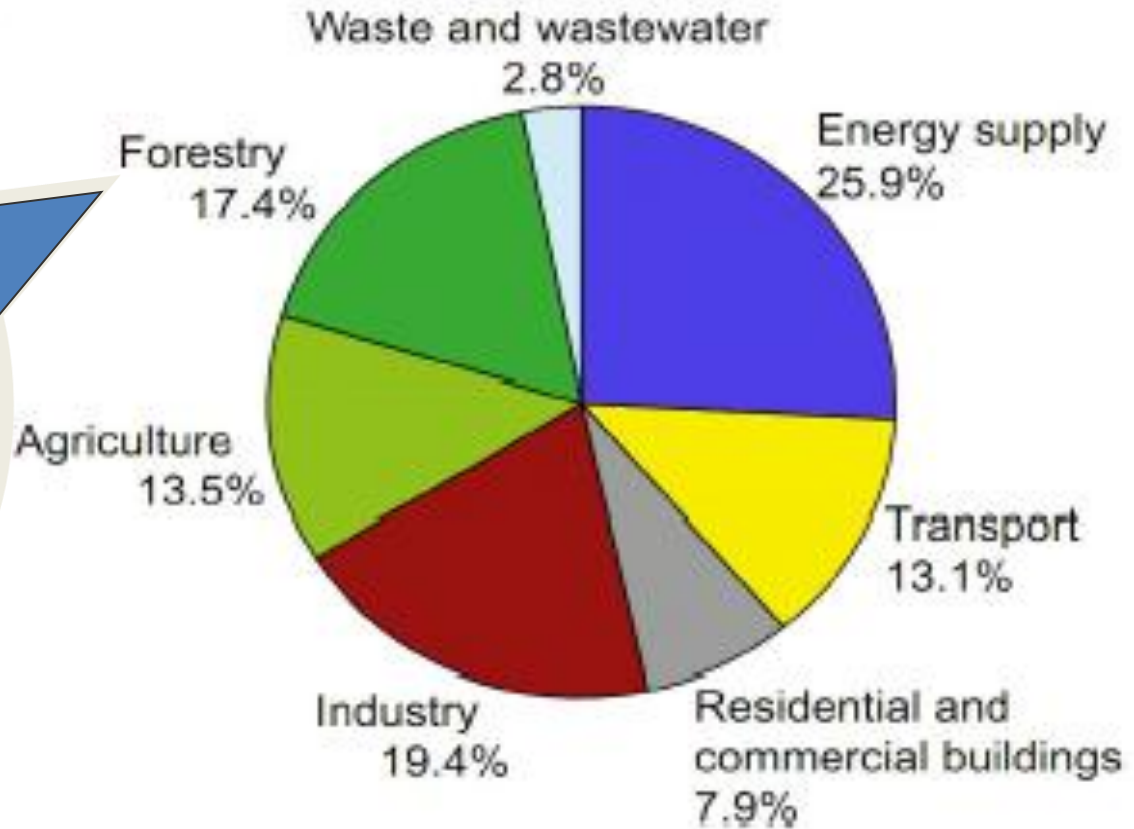
GHG emissions by source

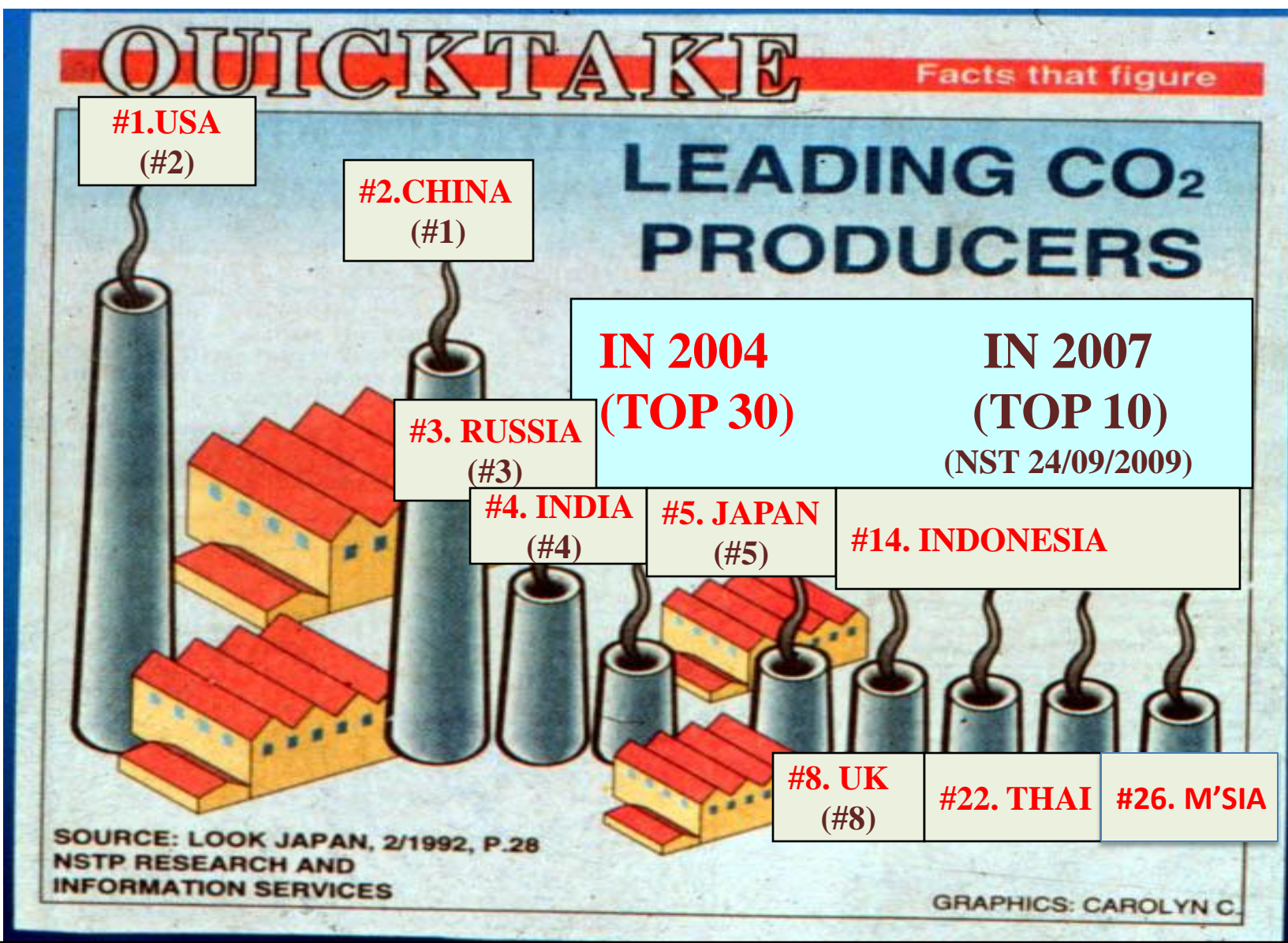


Data source: World Resources Institute 2005

# Share of Different Sectors in Total Anthropogenic Greenhouse Gas Emissions in 2004 in Terms of CO<sub>2</sub>-equivalent

- Deforestation
- Decay / decomposition above-ground biomass
- Peat fires
- Decay of drained peat soils





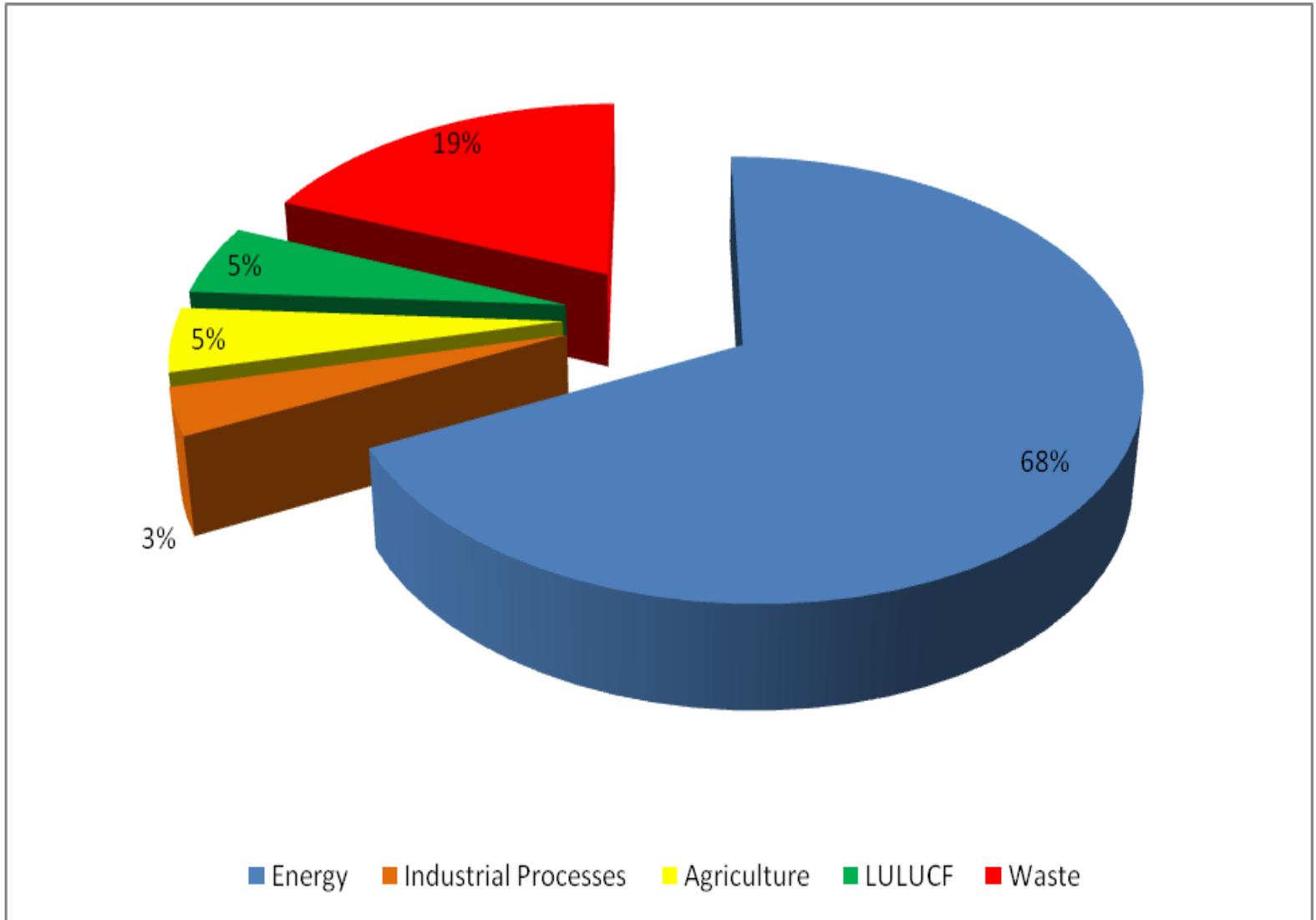
**6. Germany (#6), 7. Canada (#7), 9. S. Korea (#9), 10. Italy, 11. Mexico, 12. S. Africa, 13. Iran (#10), 15. France, 16. Brazil, 17. Spain, 18. Ukraine, 19. Australia, 20. Saudi Arabia, 21. Poland, 23. Turkey, 24. Kazakhstan, 25. Algeria, 27. Venezuela, 28. Egypt, 29. UAE,**

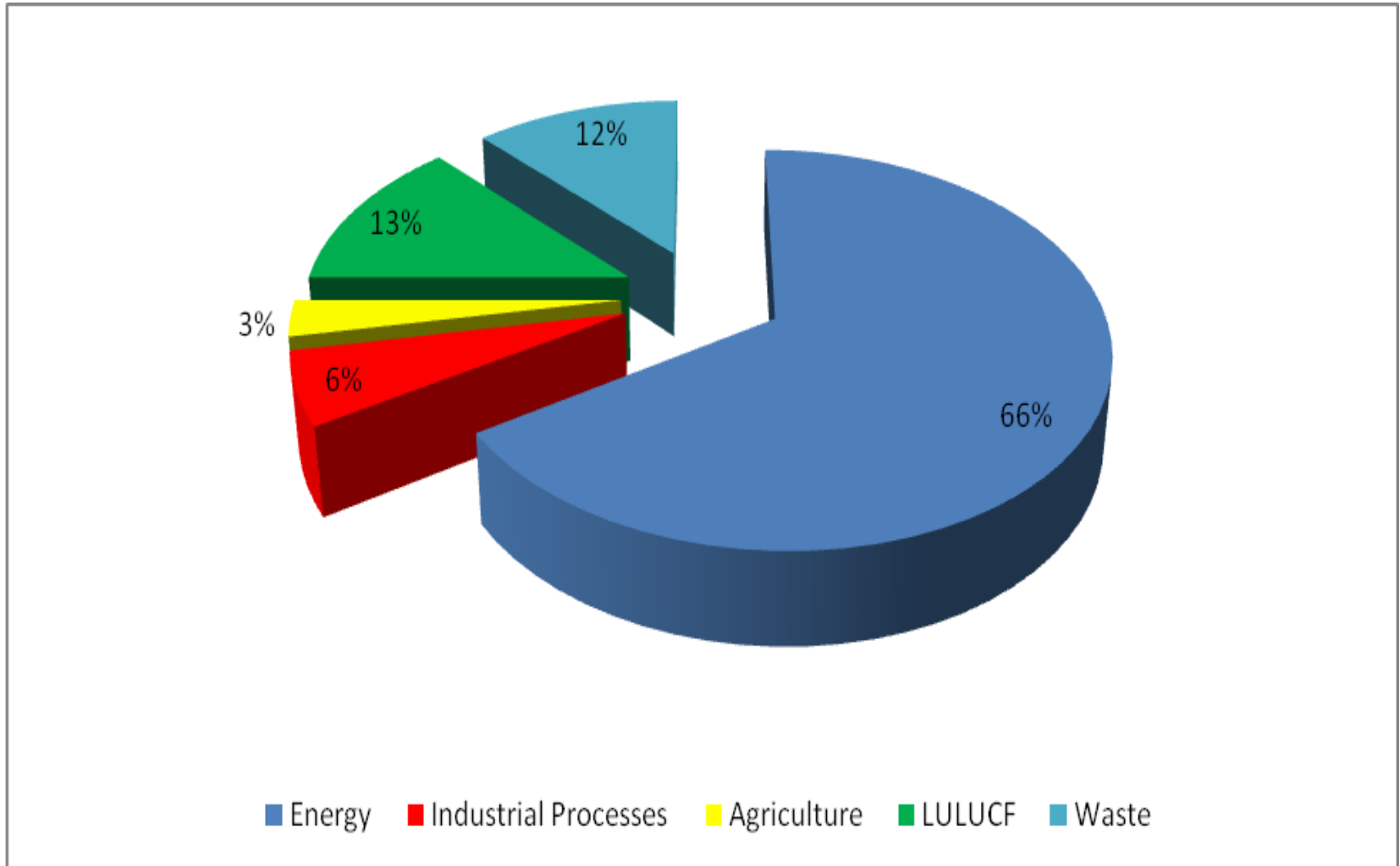
# Figure 1A: Greenhouse gas emission by sectors, INC (1994)



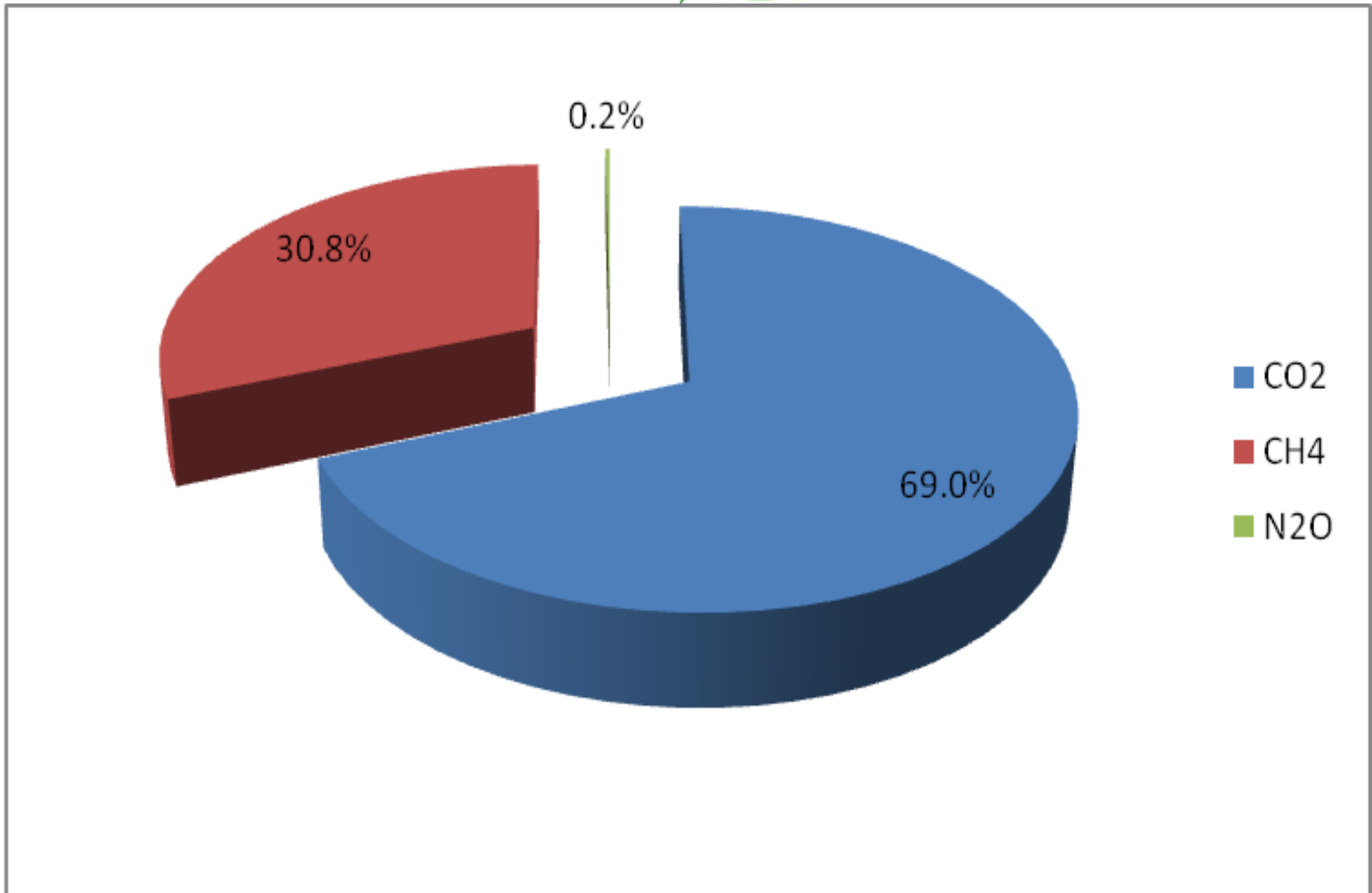
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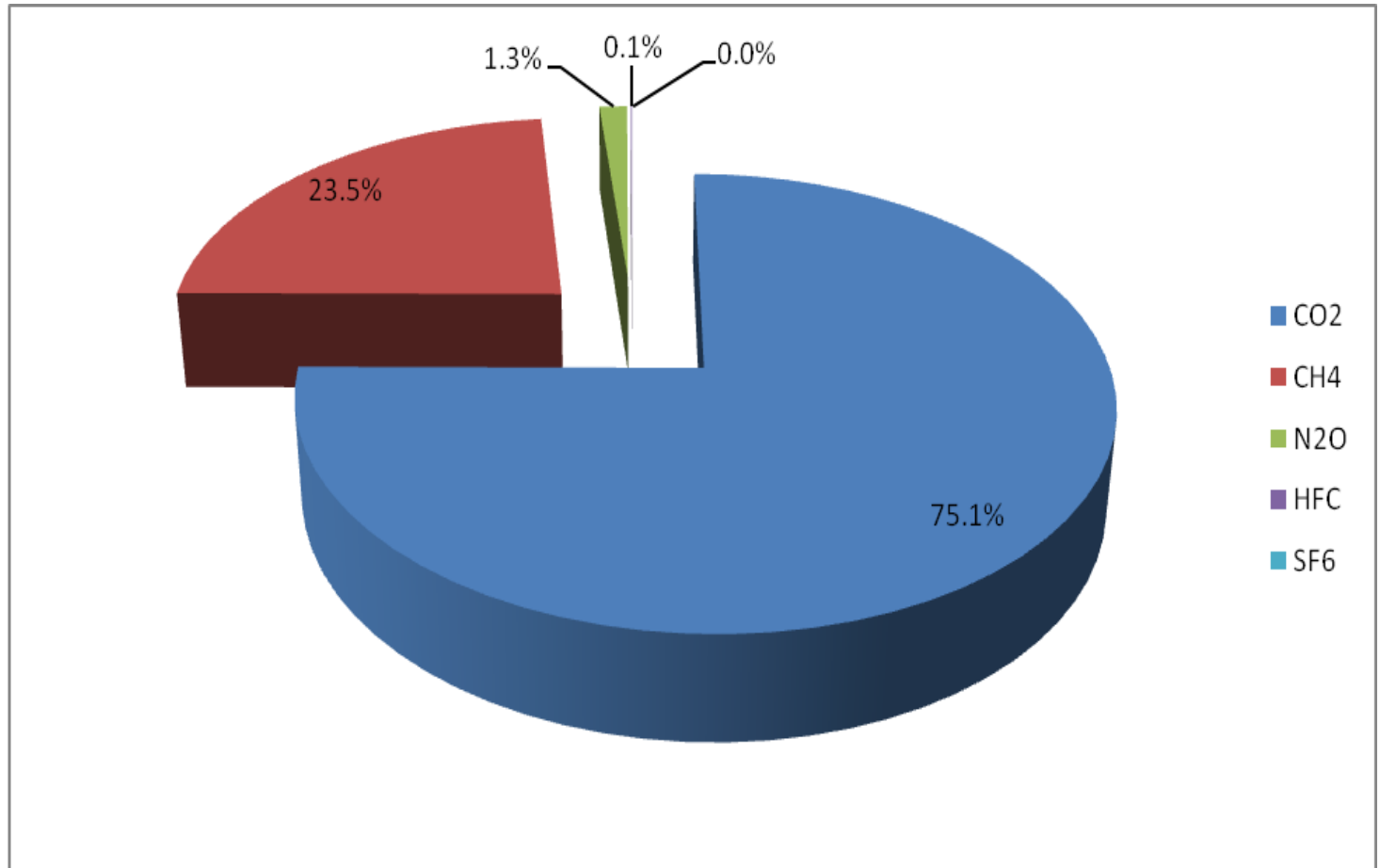
**Figure 1B: Greenhouse gas emission by sectors, NC2 (2000)**



**Figure 1C: Emissions according to greenhouse gas for INC (1994)**



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**Figure 1D: Emissions according to greenhouse gas for NC2 (2000)**

	Unit	(INC) 1994	(NC2) 2000	%increase
GDP	RM million	261,951	356,401	36%
Population	'000	20.112	24.495	22%
CO <sub>2</sub> emission	'000 t	84.4	167.5	<b>98%</b>
CO <sub>2</sub> equivalent	'000 t	144.3	223	<b>55%</b>
CO <sub>2</sub> emission per GDP	tonne/RM	0.32	0.47	<b>47%</b>
CO <sub>2</sub> equivalent per GDP	tonne/RM	0.55	0.62	<b>13%</b>
CO <sub>2</sub> emission per capita	tonne/capita	4.2	6.8	<b>62%</b>
CO <sub>2</sub> equivalent per capita	tonne/capita	7.2	9.1	<b>26%</b>

**Table 1: CO<sub>2</sub> emission for Malaysia**

Sector	Emissions/ removal ( Mt CO <sub>2</sub> e)		
	2000	2005	2007
Energy	147	204.3	217.0
Industrial Processes	14.1	15.6 <sup>#</sup>	17.1 <sup>#</sup>
Agriculture	6.0	6.6 <sup>#</sup>	7.2 <sup>#</sup>
LULUCF	29.6	25.3	19.7
Waste	26.4	27.4	31.9
<b>Total emissions</b>	<b>223.1</b>	<b>279.2</b>	<b>292.9</b>
<b>Total sink</b>	<b>-249.8</b>	<b>-240.5</b>	<b>-247</b>
<b>Net total (after subtracting sink)</b>	<b>-26.7</b>	<b>38.7</b>	<b>45.9</b>

**Table 2: Greenhouse gas emissions trends for years 2000, 2005 and 2007**

# Carbon Stocks between 1970-1972 (NF1)



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Forest type	Carbon stocks (t ha <sup>-1</sup> )	
	Vegetation	Soil
Lowland	223	100
Hill	140	97
Swamp	100	780
Mangrove	130	320

**NC2(2010):** Total carbon stock of Malaysian forests ~ 92,000,000tC.

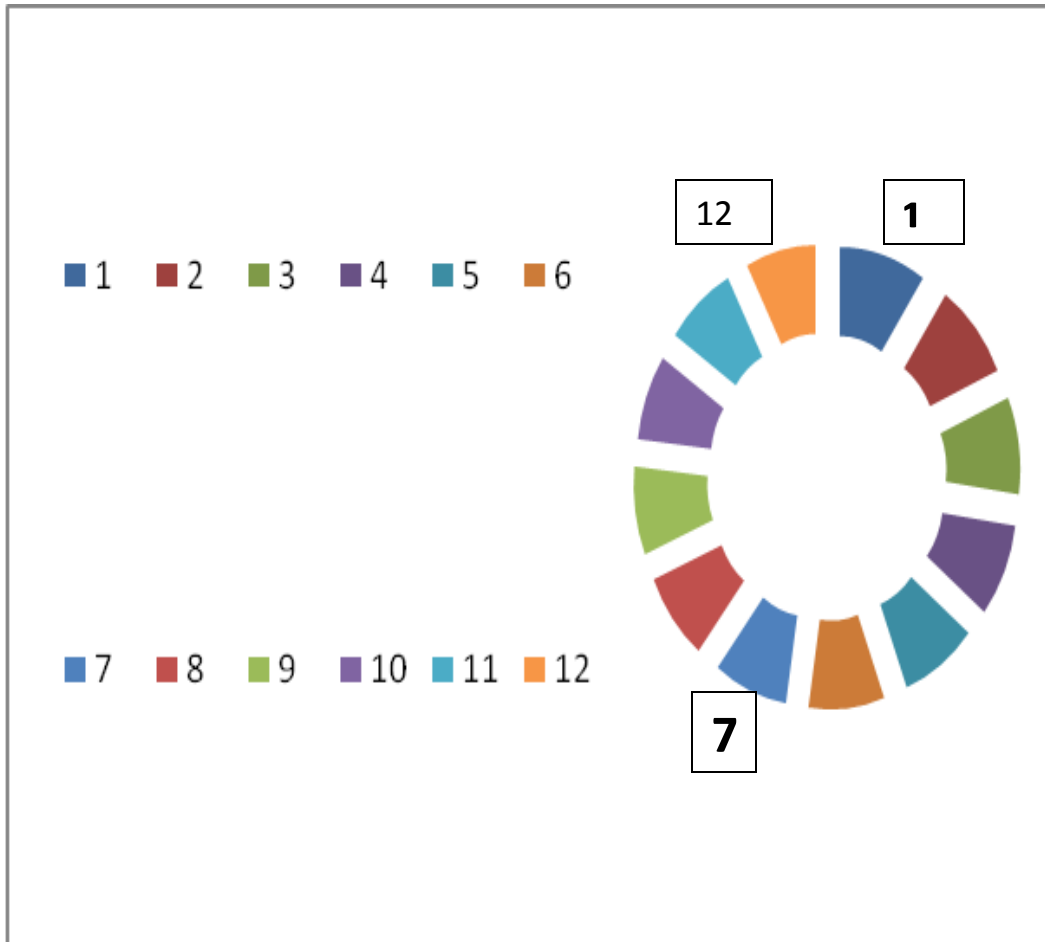
- The total Carbon released due to conversion and forest harvesting activities ~ 26,000,000tC.
- After accounting for emission from land conversion, the amount of carbon sequestration or carbon uptake by forest vegetation ~ 390,000,000tC.
- Malaysian forests and other woody biomass contributed to about 4% of the tropical forests sink.

Source: Chan, 1982

# Projections

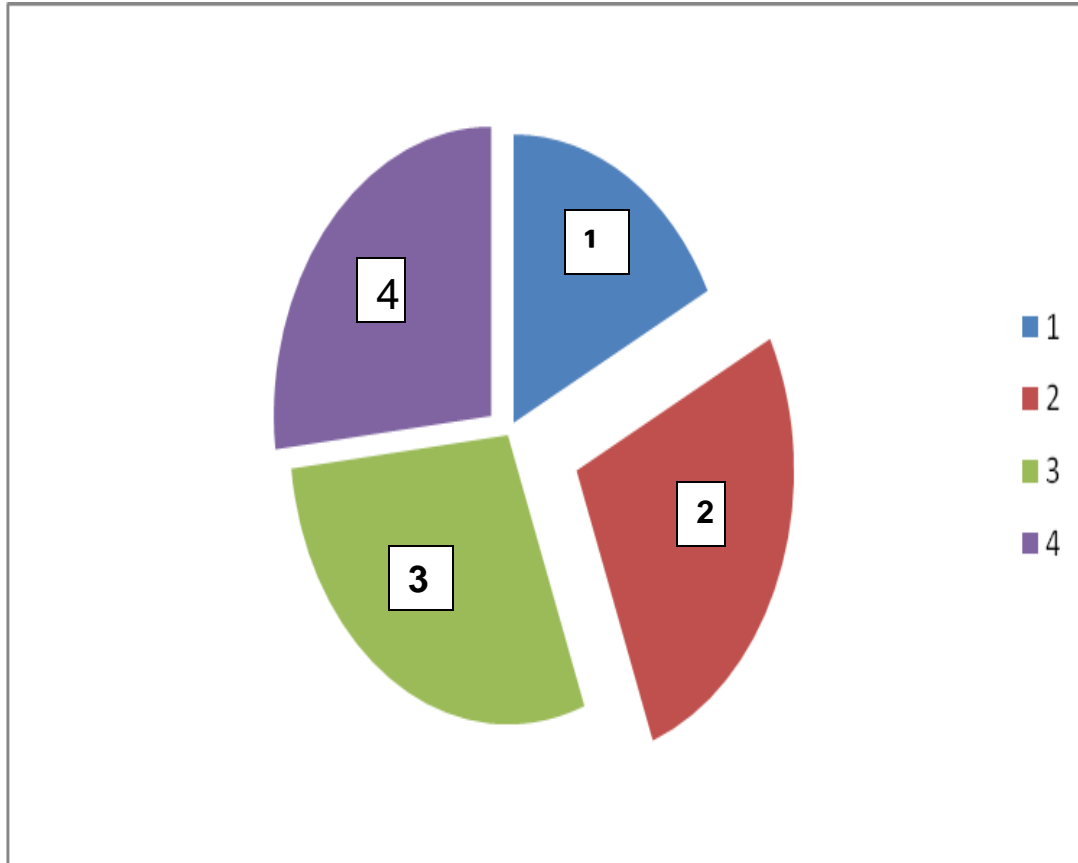
Examples of impacts associated with global average temp. change relative to 1980-1999

	0	1	2	3	4	5°C
<b>WATER</b>	Increased water availability in moist tropics and high latitudes Decreasing water availability and increasing drought in mid-latitudes and semi-arid low latitudes Hundreds of millions of people exposed to increased water stress					
<b>ECO-SYSTEMS</b>	Increased coral bleaching		Most corals bleached	Widespread coral mortality		
				Terrestrial biosphere tends towards a net carbon source as: 15% 40% of ecosystems affected		
	Increasing species range shifts and wildfire risk					
	Ecosystem changes due to weakening of the meridional overturning circulation					
<b>FOOD</b>	Complex, localised negative impacts on small holders, subsistence farmers and fishers					
	Tendencies for cereal productivity to decrease in low latitudes			Productivity of all cereals decreases in low latitudes		
	Tendencies for some cereal productivity to increase at mid- to high latitudes			Cereal productivity to decrease in some regions		
<b>COASTS</b>	Increased damage from floods and storms					
	About 30% of global coastal wetlands lost					
	Millions more people experience coastal flooding each year					
<b>HEALTH</b>	Increasing burden from malnutrition, diarrhoeal, cardio-respiratory, infectious diseases					
	Increased morbidity and mortality from heat waves, floods, droughts					
	Changed distribution of some disease vectors					



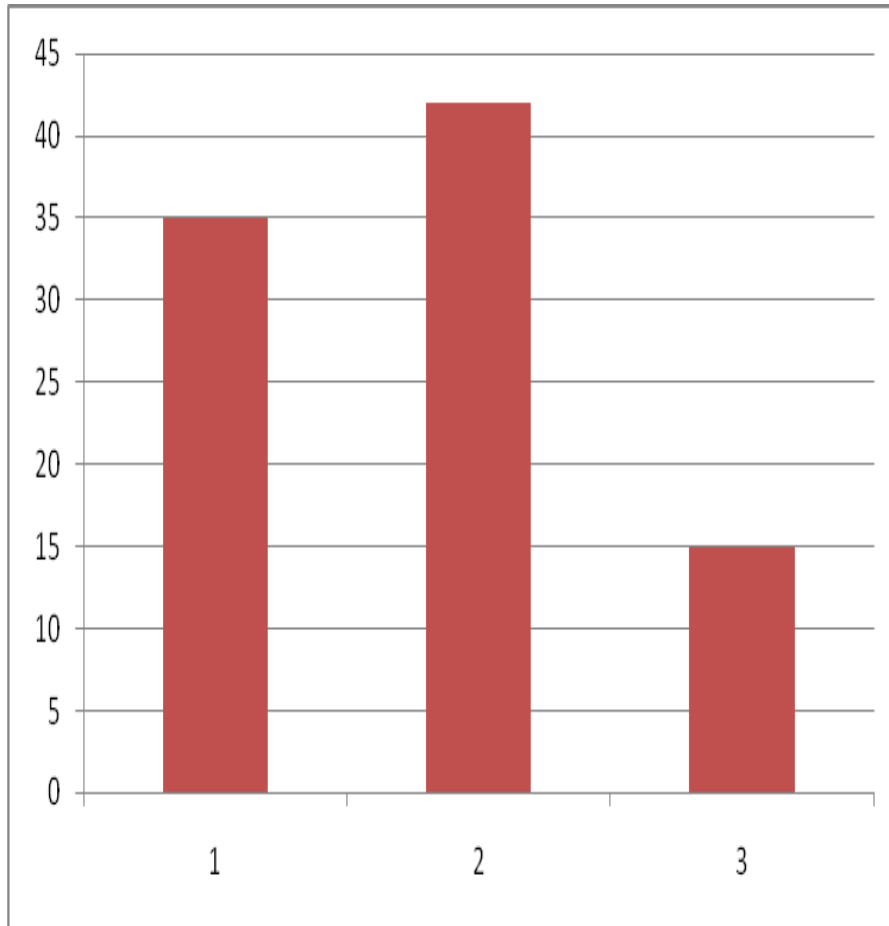
No.	Country	NBI
1.	Indonesia	1.000
2.	Colombia	0.935
3.	Mexico	0.928
4.	China	0.893
5.	Brazil	0.877
6.	Ecuador	0.873
7.	Australia	0.853
8.	Venezuela	0.850
9.	Peru	0.843
10.	Costa Rica	0.820
11.	Madagascar	0.813
12.	Malaysia	0.809

Figure 2A: National Biodiversity Index (NBI) of 12 biologically diverse countries



No	Endemism
1.	<b>26% of 2830 tree species in Pen. Malaysia.</b>
2.	<b>20- 40% of 3500 tree species in Sabah &amp; Sarawak</b>
3.	<b>43% of 212 palm species in Pen. Malaysia</b>
4	<b>40% of 290 palm species in Sabah &amp; Sarawak.</b>

**Figure 2B: Tree/ Palm species endemism**



No.	Threatened Category
1.	<b>35 taxa ENDANGERED (EN)</b> of which 10 endemic to Pen. Malaysia
2.	<b>42 taxa VULNERABLE (V)</b> of which 6 endemic to Pen. Malaysia
3.	<b>15 taxa CRITICALLY ENDANGERED (CR)</b> of which 6 endemic to Pen. Malaysia.

**Figure 2C: Dipterocarps in Peninsular Malaysia – Number of taxa threatened**





## Significance of Sustainable Forestry

“Forestry can make a very significant contribution to a low-cost global mitigation portfolio that provides synergies with adaptation and sustainable development”

**IPCC 4<sup>th</sup> Assessment Report 2007**



## Significance of Sustainable Forestry

“Given the scale of emissions from deforestation, any climate change deal that does not fully integrate forestry will fail to meet the necessary targets”

**Nicholas Stern 2006**



## Significance of Sustainable Forestry

“Climate change cannot be won without the world’s forests. This, however, will be a complex and challenging feat. Nonetheless, it is one of the best large-scale investments we can make against climate change that could result in an equally large-scale dividend”

**Ban Ki-moon, UN Secretary-General, September 2008**

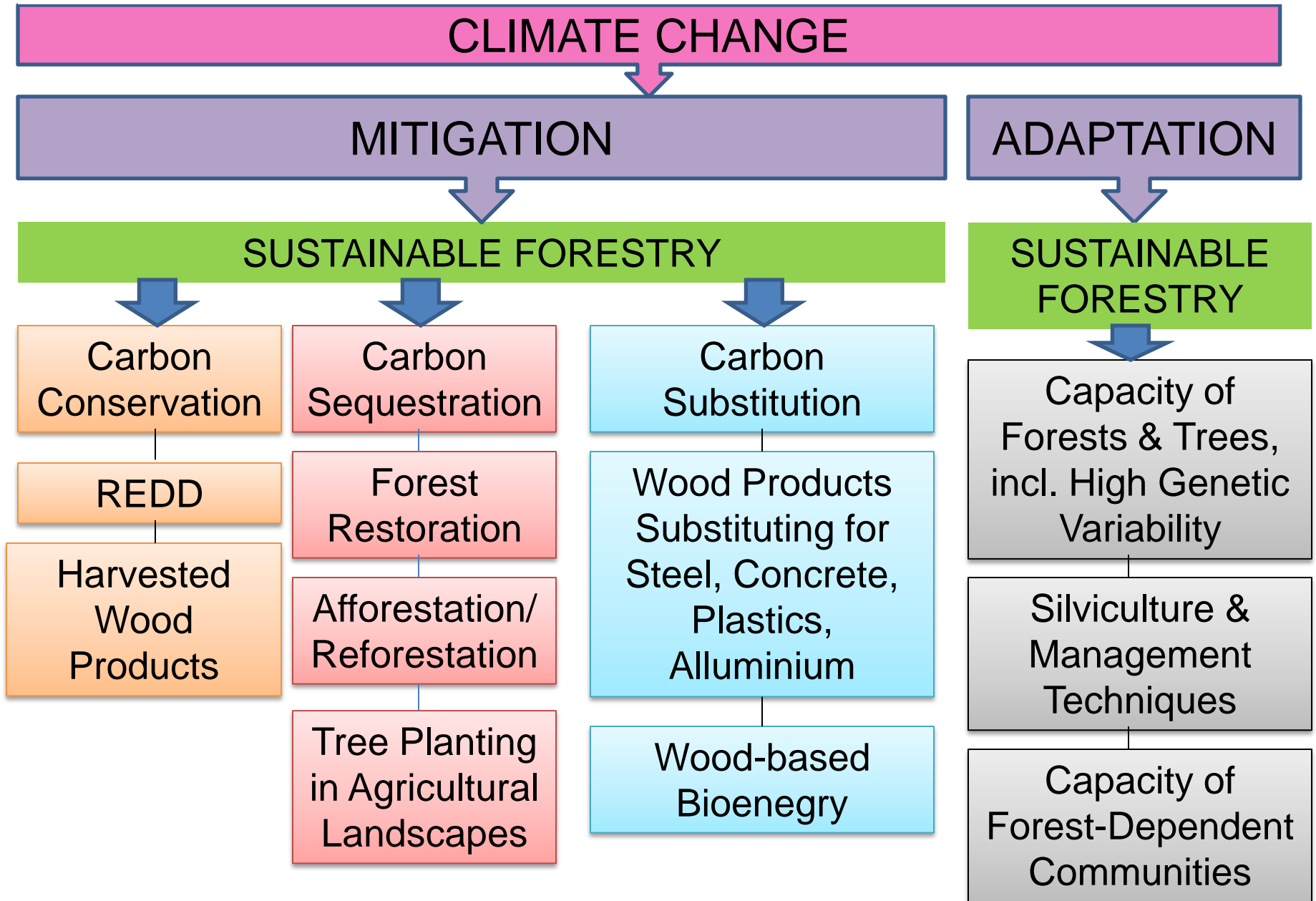


## Significance of Sustainable Forestry

*“Indeed this phenomenon [climate change] is too real, too important, too far reaching and too time sensitive for our bickering, for our indifference or for our cynicism”*

**Dato' Seri Najib Razak, Deputy Prime Minister of Malaysia  
Regional Conference on Climate Change, NRE / The British  
High Commission, Kuala Lumpur , October 2007.**

# POSSIBLE FOREST-RELATED RESPONSES TO CLIMATE CHANGE



# MALAYSIA – EXISTING KEY INITIATIVES TO COMBAT GLOBAL WARMING

- 1. POLICY ON RENEWABLE ENERGY: BIOMASS, BIOGAS, MUNICIPAL WASTE, SOLAR & MINI HYDRO.**
    - ▶ **SMALL RENEWABLE ENERGY PROGRAM (SREP):**
    - ▶ **RENEWABLE ENERGY FOR POWER PRODUCTION**
    - ▶ **RENEWABLE ENERGY FROM BIOMASS** ☞ TAX INCENTIVE
  - 2. BIO-FUEL FROM OIL PALM, INCLUDING LCA OF OIL PALM PRODUCTS**
  - 3. ENERGY CONSERVATION & SAVING INITIATIVES**
    - ☞ INVESTMAN TAX ALLOWANCE
  - 4. SUPPORTS CDM** ☞ TAX EXEMPTION FOR INCOMES FROM CERs TRADING
- Cont.



# MALAYSIA – EXISTING KEY INITIATIVES TO COMBAT GLOBAL WARMING

Cont.

5. **STRONGLY ADVOCATES REGIONAL “DECENTRALIZED GROUPINGS” TO NETWORKING WITH UNFCCC VIA e.g. APEC, G8**
6. **PROPOSES “PERSONAL CARBON RATIONING” IN LINE WITH EQUAL SHARES FOR EVERYONE, BASED ON PER CAPITA, LESS CARBON INTENSIVE / CARBON NEUTRAL LIFESTYLES**

# CLIMATE CHANGE & BIO-DIVERSITY MATRIX OF PROPOSED R&D AND POLICIES IN SUSTAINABLE FORESTRY

## PROPOSED

- 7 STRATEGIC DIRECTIONS AT NATIONAL LEVEL &
- 4 STRATEGIC DIRECTIONS AT INTERNATIONAL LEVEL

### **BASED ON ERE (EMISSION REDUCTION**

**EFFECTIVENESS:** EASE OF IMPLEMENTATION, FEASIBILITY AND SIMPLICITY OF ENFORCEMENT, APPLICABILITY IN MANY LOCATIONS, AND OTHER FACTORS CONTRIBUTING TO OVERALL MAGNITUDE OF REALIZED SAVINGS, WHERE APPLICABLE)



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# CLIMATE CHANGE & BIODIVERSITY: MATRIX OF POTENTIAL R& D AND POLICIES IN SUSTAINABLE FORESTRY



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- 1. DEVELOP & IMPROVE FORMAL METHODOLOGIES**
  - ☞ TO CALCULATE BASELINE, ESTIMATE LEAKAGE & PERMANENCE, ETC
  - ☞ TO MONITOR CARBON STOCKS, INCLUDING ITS REAL & MEASURABLE INCREASE.

**[R&D / IMPROVES COMPLIANCE TO INTERNATIONAL AGREEMENTS: IMPROVES CAPACITY BUILDING & ERE]**
- 2. INITIATE PILOT SUSTAINABLE FORESTRY PROJECTS INVOLVING CO<sub>2</sub> (EMISSION REDUCTION OR CARBON SINKS) ON A LARGE SCALE AS SHOW CASE TO THE WORLD e.g. to estimate emissions from peatland fires and drainage**
  - ☞ TO MARKET CERs.
  - ☞ TO FORMULATE CRITERIA FOR ADDITIONALITY,
  - ☞ TO IMPROVE QUANTIFICATION OF CO<sub>2</sub>

**[POLICY DECISION AND R&D / IMPROVES SUSTAINABLE FORESTRY PRACTICES: HIGH ERE]**

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- 3. DEVELOP A NATIONAL CENTER OF EXCELLENCE IN CLIMATE CHANGE & BIODIVERSITY – EITHER NEW OR BY CONSOLIDATION :**
  - ☞ **CHARGE AS CDM & REDD CLEARINGHOUSE SECRETARIAT**
  - ☞ **ROLES LIMITED TO AUTHORIZING PERMITS & CERTIFICATION.**

**[POLICY DECISION AND R&D / IMPROVES PR NATIONALLY & INTERNATIONALLY: R&D MORE FOCUSED AND ORGANIZED]**
- 4. COMPLY TO SUSTAINABLE FORESTRY DEVELOPMENT e.g. DEVELOP AN INDEX OF FOREST HEALTH & VIABILITY**

**[FOREST MANAGEMENT DECISION / IMPROVES SUSTAINABLE FORESTRY PRACTICES: HIGH ERE]**

# CLIMATE CHANGE & BIODIVERSITY: MATRIX OF POTENTIAL R& D AND POLICIES IN SUSTAINABLE FORESTRY

5. OBSERVE MALAYSIA'S NATIONAL POLICIES AND COMMITMENTS TO INTERNATIONAL CONVENTIONS & PROTOCOLS, e.g. UNFCCC, KP, UNCBD, etc THAT PROMOTE ECONOMIC INCENTIVES AND SUPPORT LAND USE STABILIZATION; INCLUDE DESCRIPTIONS ON CLIMATE CHANGE ADAPTATION AND MITIGATION & BIODIVERSITY STATUS INTO THE EXISTING NATIONAL FOREST POLICY 1978.

**[FOREST POLICY DECISION: IMPROVES ERE]**

6. CREATE SEVERAL NEW IMPROVEMENTS IN TAX INCENTIVES (ITA), INCLUDING INCREASING ITA ON EXPENDITURES FOR ENERGY CONSERVATION AND ENERGY SAVING INITIATIVES; TAX EXEMPTION FROM TRADING OF CERs; EXTEND ITA TO THE END OF 1<sup>st</sup> COMMITMENT PERIOD UNDER UNFCCC, 2012 ;

**[POLICY DECISION: HIGH ERE]**



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# CLIMATE CHANGE & BIODIVERSITY: MATRIX OF POTENTIAL R& D AND POLICIES IN SUSTAINABLE FORESTRY

7. **CAPITALIZE ON THE INTERNATIONAL FINANCIAL RESOURCES AVAILABLE TO MITIGATE CLIMATE CHANGE AS PER PLEDGES MADE AT UNFCCC BALI ACTION PLAN 2008 & COPENHAGEN ACCORD 2009 (US\$30b from 2010-2012 + another US\$100b/year by 2020):**
- ☞ **SUPPORT CAPACITY BUILDING,**
  - ☞ **PROVIDE TECHNICAL ASSISTANCE,**
  - ☞ **FACILITATE TRANSFER OF TECHNOLOGY wrt DATA COLLECTION, ESTIMATION OF EMISSIONS, MONITORING & REPORTING,**
  - ☞ **ADDRESS NEEDS TO ESTIMATE & REDUCE EMISSION FROM REDD.**
- [POLICY DECISION AND R&D: IMPROVES ERE]**



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# CLIMATE CHANGE & BIODIVERSITY: MATRIX OF POTENTIAL R& D AND POLICIES IN SUSTAINABLE FORESTRY

8. **PROJECT MALAYSIA'S IMAGE IN CLIMATE CHANGE & BIODIVERSITY ISSUES THROUGH A NATIONAL WEBSITE AND/OR INTERNATIONAL ADVERTISEMENT LINKING ITS NATIONAL FORESTRY POLICY TO THESE ISSUES, SIMILAR TO STRATEGIC ADVERTISEMENT ON NATIONAL TVs BY BIOTECHCOPR.**

**[POLICY DECISION / HIGH PR IMPACTS NATIONALLY & INTERNATIONALLY]**

9. **CREATE A THINK-TANK TO PERUSE KEY ISSUES FOR THE POST- KYOTO PROTOCOL FRAMEWORK IN TERMS OF FAIRNESS, EFFECTIVENESS, CARBON MARKET MECHANISMS & IMPLEMENTABILITY.**

**[POLICY DECISION AND R&D: ANTICIPATING POST-KYOTO PROTOCOL KEY ISSUES, HIGH IMPACTS INTERNATIONALLY]**



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# CLIMATE CHANGE & BIODIVERSITY: MATRIX OF POTENTIAL R& D AND POLICIES IN SUSTAINABLE FORESTRY

- 10. LEAD A TIMBER ORGANIZATION TO MANAGE AND CONTROL AN “EQUITABLE TROPICAL TIMBER PRICING” INTERNATIONALLY THAT COMMENSURATES WITH THE BEAUTY & HIGH QUALITY OF THE TIMBERS, THUS PREVENTING TRADE ESCALATING PRACTICE & OTHER NON-TRADE BARRIER PRACTICES AND AVOIDING “OVER-HARVESTING” OF THE RESOURCES, i.e. SAVING TO CARBON & BIODIVERSITY RESERVOIRS.**

**[POLICY DECISION & TRADE DECISION: IMPROVES ERE]**



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# CONCLUDING REMARKS



# POLITICAL COMMITMENT

## To Implement the Formulated Policies & Strategies Legislation

**Lord Ashby 1977: Reconciling Man With the Environment:** "When the final decision was taken, ministers were less influenced by any expert advice or facts than their political instincts, greatly swayed by pressure groups and political lobbies...a distressing reality, but a reality nevertheless."





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## CONCLUSIONS

**IT IS TIMELY THAT MALAYSIA SHOULD HAVE SPECIFIC ROLES OR STRATEGIC DIRECTIONS OF SUSTAINABLE FORESTRY PRACTICES WITH RESPECT TO CLIMATE CHANGE & BIODIVERSITY POLICIES, DEFINING FUNCTIONS OF FORESTS IN CARBON CONSERVATION, CARBON STORAGE & CARBON SUBSTITUTION & INDEXING FOREST HEALTH & VIABILITY (e.g. carbon rich, biodiversity rich ecosystems) RESULTING FROM ITS LANDUSE**



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## CONCLUSIONS – A WAY FORWARD

**WHEN DEALING WITH CLIMATE CHANGE & BIO-D ISSUES, ASK A BASIC QUESTION:**

***“What can public and private decision makers learn from a wide-ranging look at the social sciences and the issue of human choice and climate change that illuminates the evaluation of policy goals, implementation strategies, and choices about paths forward?”***



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