

REDD⁺ and Agriculture:

Looking back to Realities, Challenges and Opportunities



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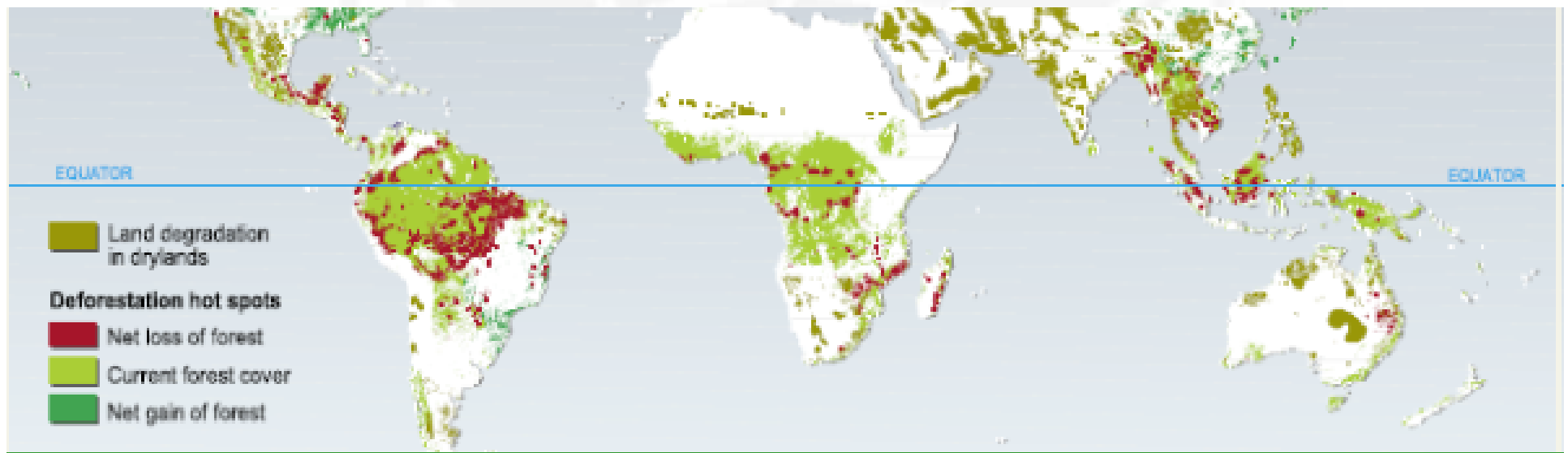
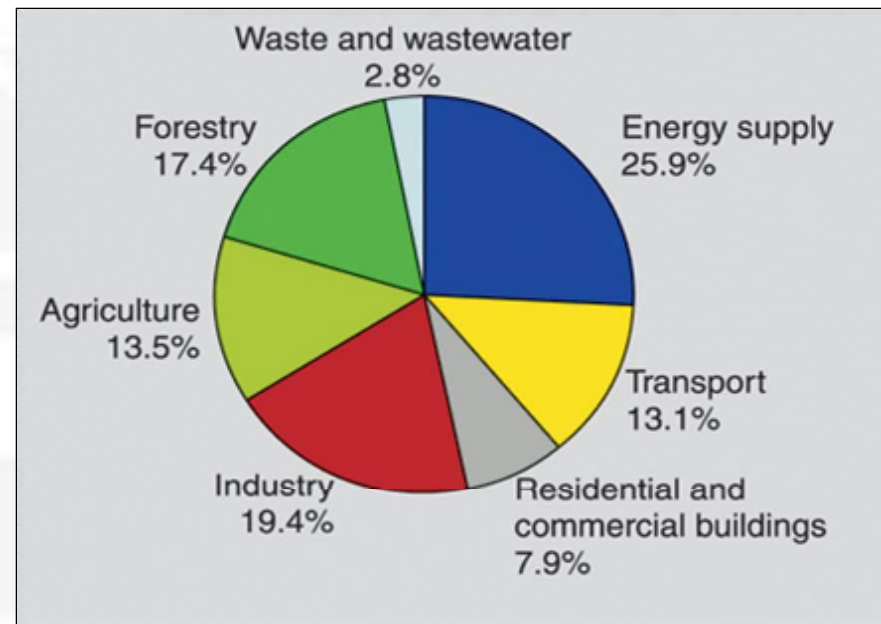
What is REDD⁺ ?



- REDD is an international mechanism that aim to bring incentive for developing countries which successfully reducing emission from deforestation and forest degradation
 - **+ sign in REDD⁺ acknowledges**
the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in addition to emission reduction from deforestation and forest degradation
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Why REDD+ ?

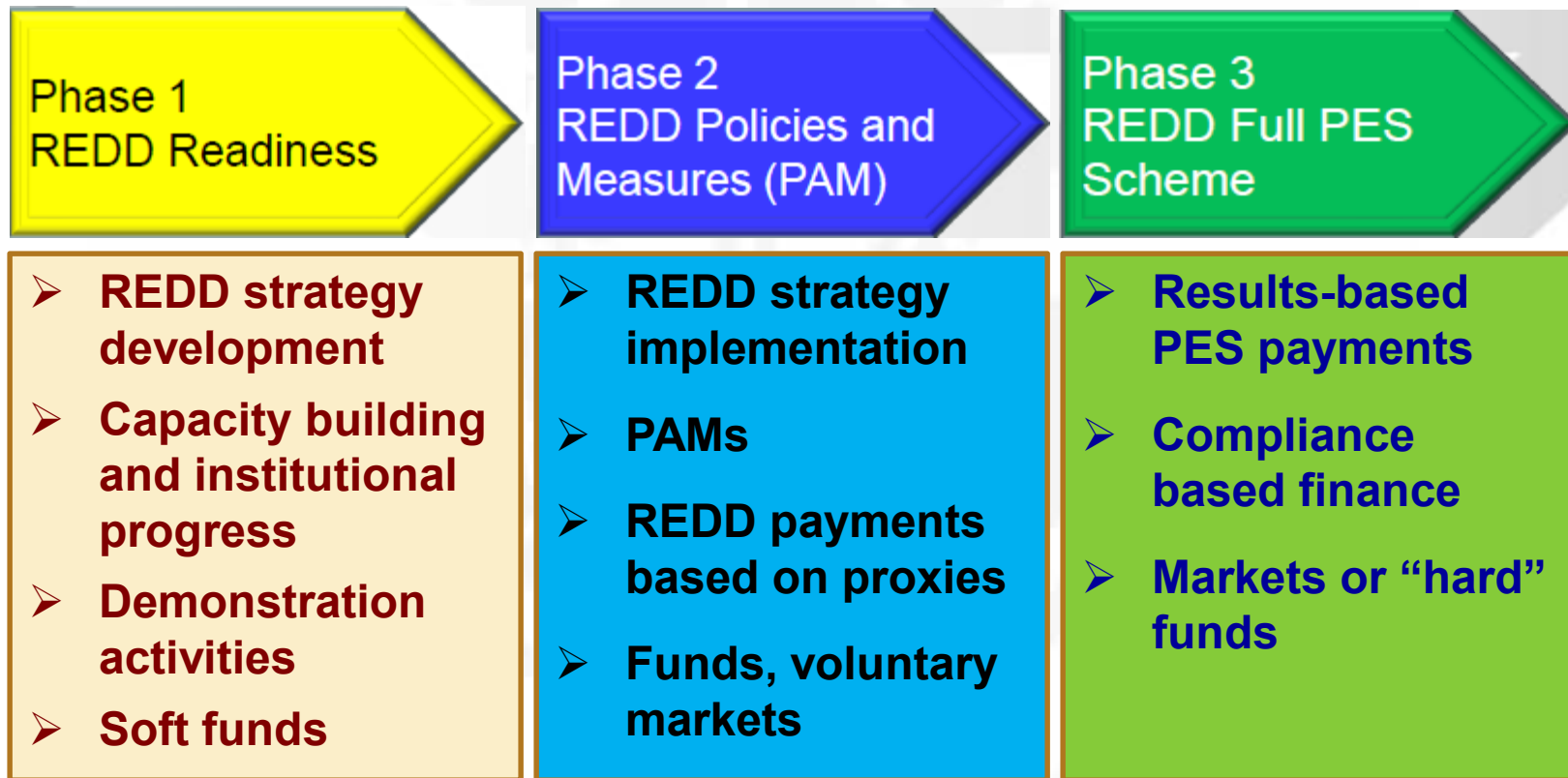
- **Deforestation & Forest Degradation results in 17.4% of annual GHG emissions globally**
- **CDM under the Kyoto Protocol (1997) did not include Avoided Deforestation for carbon credits**



History of REDD⁺

- **Avoided Deforestation** - *COP11 at Montreal in 2005*
 - **Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD)**
- *COP13 at Bali in 2007*
 - **REDD + [Conservation; Sustainable Management of Forests; Enhancement of Forest Carbon Stocks] (REDD⁺)**
- *COP16 at Cancun in 2010*
 - **Extended the Kyoto Protocol into the second commitment period** - *COP17 at Durban in 2011*
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The three phases of REDD+ implementation



Source: Henrik et al., (2011)

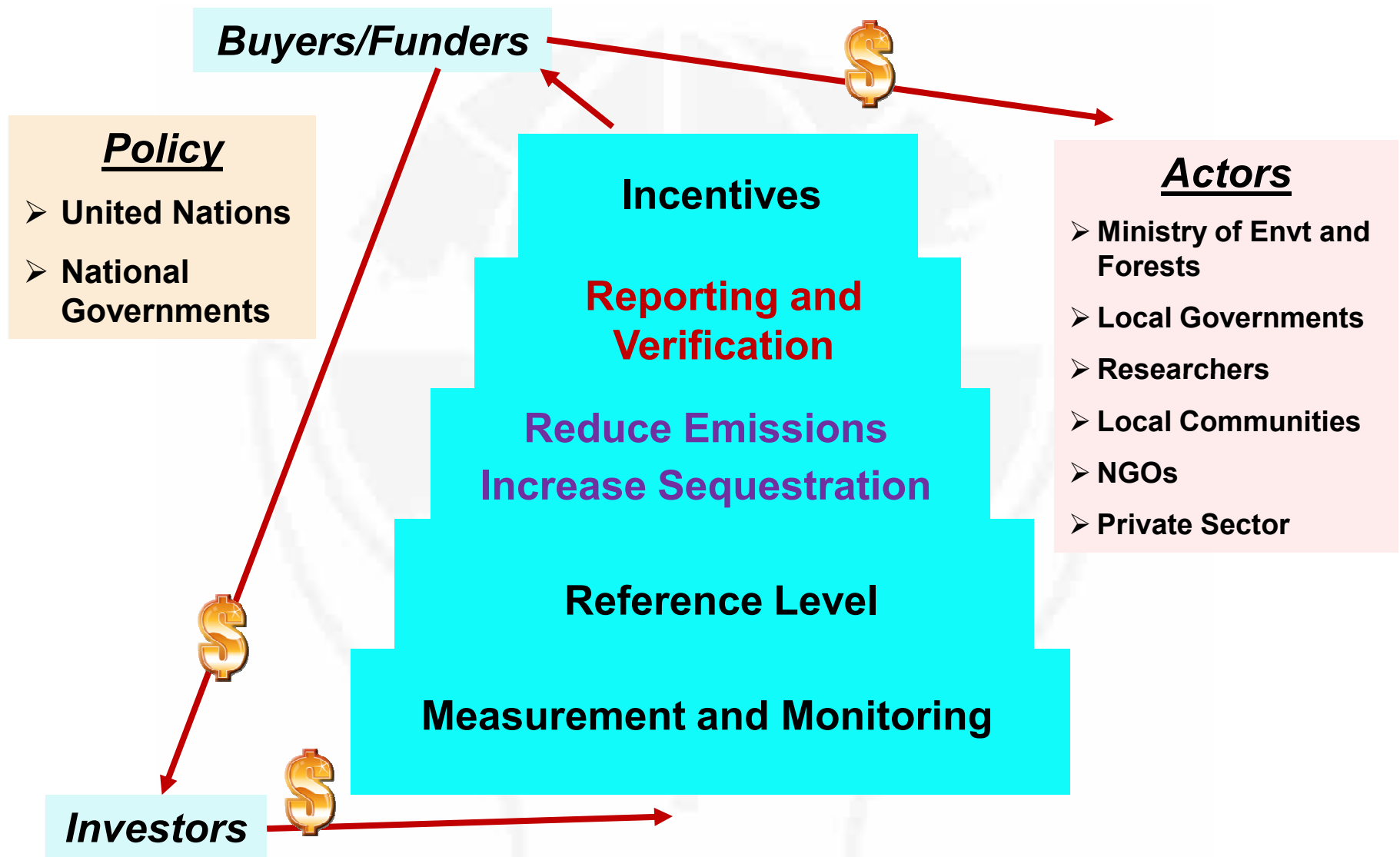
2010

2012

2015

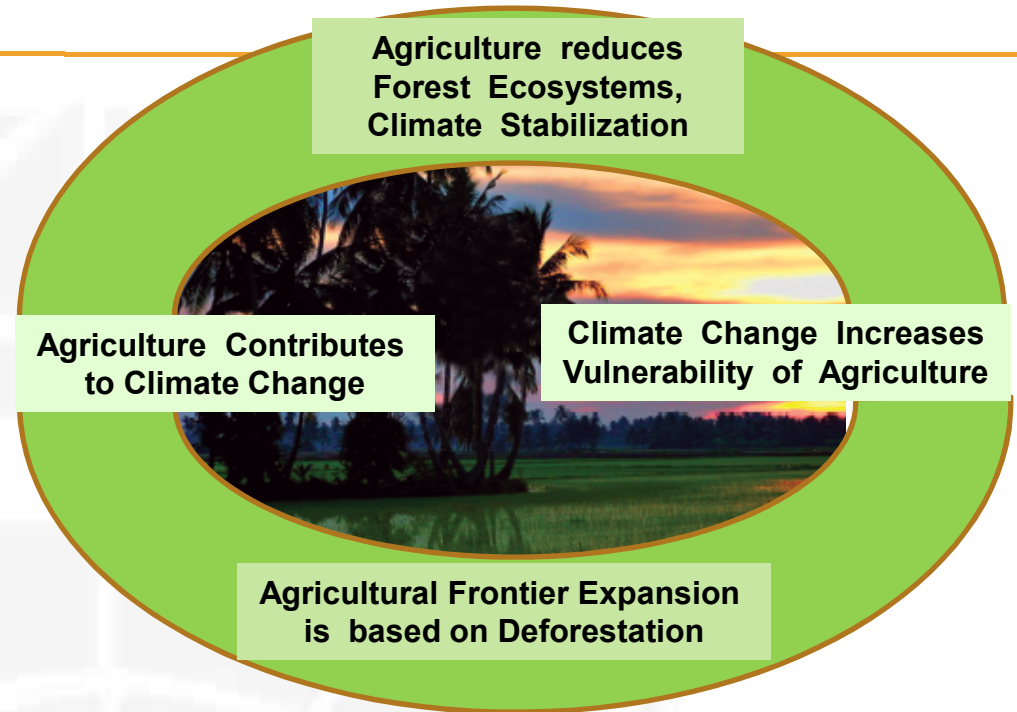
2020

The Building Blocks of REDD⁺



Agriculture and REDD⁺

Agriculture accounts for about 17% of the total global anthropogenic emissions of GHGs during 1990 – 2005
(Verchot and Singh, 2009)



- In India, agriculture sector emitted **355600.19 Gg CO₂e**, 23.3% of the total GHG emissions
- Agriculture sector also emitted **73.0% of total CH₄** and **75.0% of total N₂O emissions in India**

Agriculture and REDD⁺

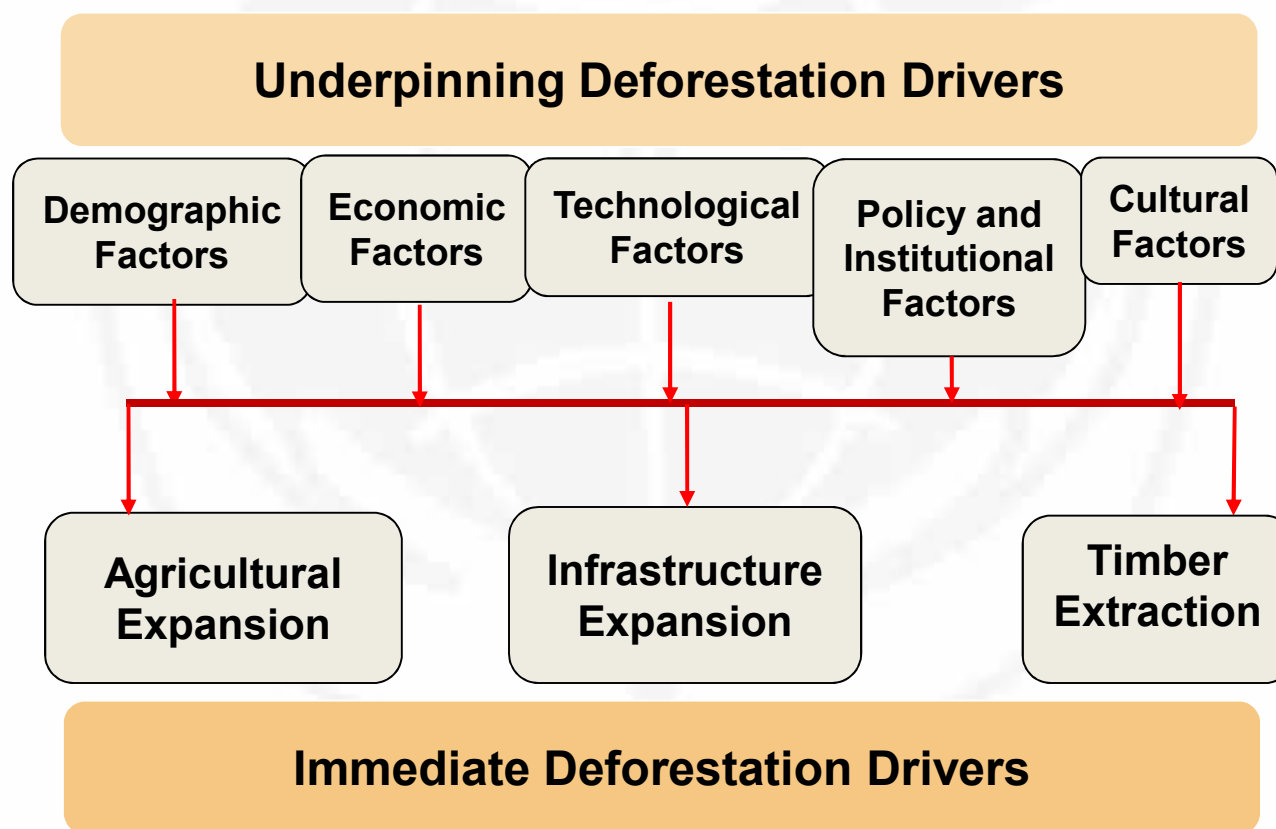
Non-CO₂ GHG emissions (Mt CO₂e) by source in the agricultural sector

GHG emission source in Agricultural sector	Year			
	1990	1995	2000	2005
N ₂ O Soil	2284	2405	2610	2782
N ₂ O Manure	196	199	205	219
CH ₄ Enteric fermentation	1772	1804	1799	1929
CH ₄ Manure	223	225	225	235
CH ₄ Other	268	274	455	456
CH ₄ Rice	601	621	634	672
Global total	5344	5528	5928	6293

Source: Verchot (2007)

Agriculture, Forests and Deforestation

During 1980 - 2000, 83% of new croplands in tropical areas came from natural forested land (Pirard and Treyer, 2010)



Agriculture Options to Strengthen REDD⁺

- Diversification of Agriculture
- Increased crop yields per area (*Borlaug hypothesis*)
- Sustainable agricultural land management
- Reduce the rate of deforestation and forest degradation

Reducing emissions of CO₂



- Improved animal production
- Improved management of livestock waste
- More efficient management of irrigation water on rice fields
- Efficient management of Agricultural waste

Reducing emissions of CH₄ & NO₂



- Conservation farming practices
- Improved forest management practices
- Afforestation and reforestation
- Agroforestry
- Restoration of degraded land

Sequestering Carbon

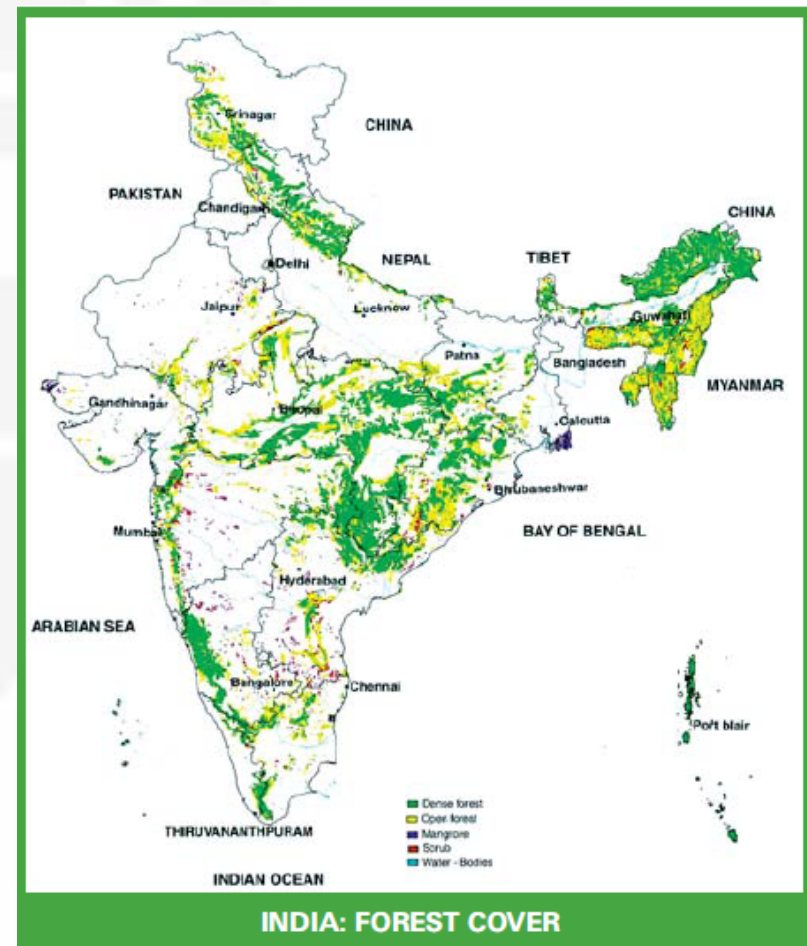


REDD+ Indian Outlook

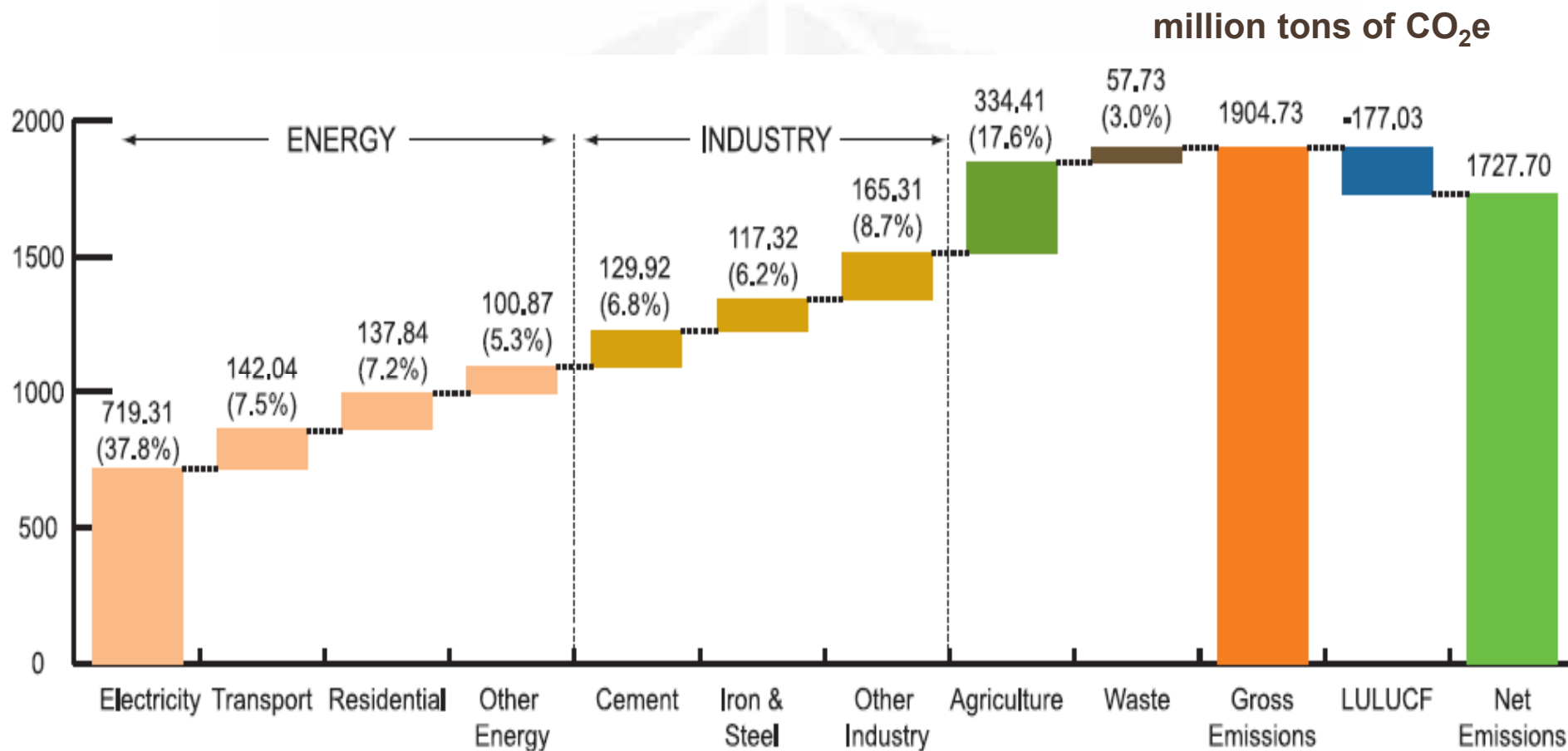
Diversification of forest to non-forest activities in India

Year	Forest area diverted (in Ha)
1981	1331.7
1985	7676.83
1990	127361.00
1995	51428.98
2000	22386.43
2004	33079.50

Source: Forest and Wildlife Statistics, MoEF, India, 2004



GHG emissions in India by sector in 2007



Land Use Land Use Change & Forestry (LULUCF) sequestered 177.03 million tons of CO₂
India's per capita CO₂e emissions including LULUCF were 1.5 tons/capita in 2007

Source: MoEF, India

A Comparison of GHG emissions in India in 1994 & 2007

Sector	GHG emissions (in million tons of CO ₂ e)		
	1994	2007	CAGR (%)
Electricity	355.03 (28.4%)	719.30 (37.8%)	5.6
Transport	80.28 (6.4%)	142.04 (7.5%)	4.5
Residential	78.89 (6.3%)	137.84 (7.2%)	4.4
Other Energy	78.93 (6.3%)	100.87 (5.3%)	1.9
Cement	60.87 (4.9%)	129.92 (6.8%)	6.0
Iron & Steel	90.53 (7.2%)	117.32 (6.2%)	2.0
Other Industry	125.41 (10.0%)	165.31 (8.7%)	2.2
Agriculture	344.48 (27.6%)	334.41 (17.6%)	-0.2
Waste	23.23 (1.9%)	57.73 (3.0%)	7.3
Total without LULUCF	1251.95	1904.73	3.3
LULUCF	14.29	-177.03	
Total with LULUCF	1228.54	1727.71	2.9

Compounded annual growth rate (CAGR)

Policies and Laws in India Relevant to REDD⁺

Policies	Laws
National Forest Policy, 1988	Indian Forest Act, 1927;
Joint Forest Management Resolution, 1990	Forest (Conservation) Act, 1980
National Environment Policy, 2006	Wildlife (Protection) Act, 1972 (amended in 2001 & 2002);
Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006	Biological Diversity Act, 2002
National Action Plan on Climate Change (NAPCC), 2008	

National Missions under the NAPCC, India

Mission	Objective	Responsible Entity
<i>National Solar Mission</i>	• 20,000 MW of solar power by 2020	Ministry of New & Renewable Energy
<i>National Mission for Enhanced Energy Efficiency</i>	• 10,000 MW of EE savings by 2020	Ministry of Power
<i>National Mission for Sustainable Habitat</i>	• EE in residential and commercial buildings, public transport, Solid waste management	Ministry of Urban Development
<i>National Water Mission</i>	• Water conservation, river basin management	Ministry of Water Resources
<i>National Mission for Sustaining the Himalayan Ecosystem</i>	• Conservation and adaptation practices, glacial monitoring	Ministry of Science & Technology
<i>National Mission for a Green India</i>	• 5 mn hectares of afforestation over degraded forest lands by the end of 12 th Plan	Ministry of Environment & Forests
<i>National Mission for Sustainable Agriculture</i>	• Drought proofing, risk management, agricultural research	Ministry of Agriculture
<i>National Mission on Strategic Knowledge for Climate Change</i>	• Vulnerability assessment, Research & observation, data management	Ministry of Science & Technology

Missions focused on 'Mitigation'
 Missions focused on 'Adaptation'

Green India Mission

- **National Mission for a Green India initiated as part of the country's NAPCC with a budget of Rs 46,000 crores over a period of 10 years**
- **The objective of the Mission is to increase forest and tree cover by 5 million ha and to improve quality of forest cover in another 5 million ha**

National Policy on Agriculture, 2000

The policy seeks to promote technically sound, economically viable, environmentally non-degrading, and socially acceptable use of country's natural resources - land, water and genetic endowment to promote sustainable development of agriculture

Kerala State Policy on Agriculture 2012 ?

Agricultural Land use Changes, Deforestation and REDD⁺ in Kerala

- **Shift from food crops** (mainly rice and cassava), in favour of **tree crops** (such as rubber and coconut)
- **Shifts in land-use have profound implications for the food security of the State**
- **Large proportion of the Kerala home gardens have been converted into small-scale plantations**
- **Change in food habits/ diet preferences and increased consumption of meat**



???



Trends in Cropping Pattern in Kerala, 1960-2009

Crops	Area under cultivation (1000Ha)			
	1960-61	1980-81	2000-01	2009-10
Coconut	500.76	651.37	936.29	778.62
Arecanut	24.26	61.24	85.38	99.22
Rubber	135.8	237.8	474.36	525.41
Cashew	54.32	141.3	86.23	48.97
Coffee	16.8	57.56	84.74	84.8
Tea	37.61	36.16	36.85	36.84
Pepper	99.75	108.07	199.37	171.49
Cardamom	28.68	54	41.29	41.59
Rice	778.91	801.7	347.46	234.01
Tapioca	242.2	244.98	111.18	74.86
Banana & plantain	44.42	49.26	92.89	99.08
Pulses	44.12	33.86	10.81	4.45
Ginger	12	12.66	11.26	5.41

Source: Govt. of Kerala, Economic Review; Statistics for Planning; and Agricultural Statistics

Trends in Cropping Pattern in Kerala Cont.....

Type of Crops	Area under cultivation (1000Ha)			
	1960-61	1980-81	2000-01	2009-10
Commercial / Non-food crops	897.98	1347.5	1944.5	1786.94
Annual/ Food crops	1121.65	1142.46	573.6	417.8
Other crops	321.37	372.04	503.6	463.97
Gross Cropped Area	2341	2862	3021.7	2668.71

Source: Govt. of Kerala, Economic Review; Statistics for Planning; and Agricultural Statistics

REDD+ Readiness Activities

➤ Readiness activities include

- ❑ A **National Strategy for Implementation** and the Institutional and Legal Implementation Framework,
 - ❑ A **Reference Emission Level and/or Forest Reference Level** for greenhouse gases (GHG) emissions from deforestation and/or forest degradation; and
 - ❑ A **Measuring, Reporting and Verification (MRV) and Monitoring System** to assess the effect of the REDD strategy on GHG emissions, livelihoods and other benefits.
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What is India's REDD+ Strategy ?

India is playing a positive role and has taken a firm stance in favour of a comprehensive REDD+ approach.

India is underlying the following initiatives related to REDD+

- Made a submission to United Nations Framework Convention on Climate Change (UNFCCC) on “**REDD, Sustainable Management of Forest (SMF) and Afforestation and Reforestation (A&R)**” in Dec 2008
 - A Technical Group has been set up to develop methodologies and procedures to assess and monitor contribution of REDD+ actions
 - A National REDD+ Coordinating Agency is being established
 - A National Forest Carbon Accounting Programme is being institutionalized
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What is India's REDD+ Strategy ? Cont.....

- **India is hosting the Conference of Parties (COP-11) of the Convention on Biological Diversity (CBD) in 2012 at Hyderabad, to coincide with twenty years of Rio**
 - **Study on the impact of climate change on India's forests assigned to the Indian Network for Climate Change Assessment (INCCA), has been released in November 2010**
 - **Submitted Second National Communication to the UNFCCC in 2012**
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Challenges for REDD⁺

- **Developing and adopting a cost effective statistically acceptable methodology for estimation of forest carbon stocks (FCS)**
 - **Institutionalization of national accounting of FCS**
 - **Fixing of frequency of estimation of FCS at national level**
 - **Fixing of a reference level**
 - **Apportioning of REDD⁺ incentives amongst stakeholders including local communities**
 - **Capacity Building**
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Opportunities for REDD⁺

- **Potential Funding Options**
 - **REDD⁺ (Bilateral and unilateral REDD⁺ actions; International financial support)**
 - **COP Mandated Fund**
 - **REDD⁺ Market**
 - **Flexible Policy Instrument**
 - **Sustainable resources to support REDD⁺ actions**
 - **Strong support from International Agencies to govern Fund mobilization, Allocation and Disbursement**
 - **Strong Policies and Laws**
 - **National Action Plan on Climate Change**
 - **Role of Forests for Climate Change Adaptation**
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Funding: International Climate Funds

Name	Governance	Focus on REDD+?	In Asia?
Adaptation Fund	Adaptation Fund Board	No	Yes
Amazon Fund	Brazilian Dev. Bank	Exclusively	No
Clean Technology Fund	World Bank	No	Yes
Congo Basin Forest Fund	African Dev. Bank	Exclusively	No
Environmental Transformation Fund - International Window	Government of the United Kingdom	Included	Yes
Forest Carbon Partnership Facility	World Bank	Exclusively	Yes
Forest Investment Program	World Bank	Exclusively	Yes
GEF Trust Fund - Climate Change focal area (GEF 4)	Global Environment Facility (GEF)	Included	Yes
GEF Trust Fund - Climate Change focal area (GEF 5)	GEF	Included	Yes
Global Climate Change Alliance	European Commission	Included	Yes
Global Energy Efficiency and Renewable Energy Fund	European Commission	No	Yes
Hatoyama Initiative	Government of Japan	Included	Yes

Funding: International Climate Funds Cont.....

Name	Governance	Focus on REDD+?	In Asia?
International Climate Initiative	Government of Germany	Included	Yes
International Forest Carbon Initiative	Government of Australia	Exclusively	Yes
LDCs Fund	GEF	No	Yes
MDG Achievement Fund – Environment and Climate Change thematic window	UNDP	No	Yes
Pilot Program for Climate Resilience	World Bank	No	Yes
Scaling-Up Renewable Energy Program for Low Income Countries	World Bank	No	Yes
Special Climate Change Fund	GEF	No	Yes
Strategic Climate Fund	World Bank	Included	Yes
Strategic Priority on Adaptation	GEF	No	Yes
UN-REDD+ Program	UNDP	Exclusively	Yes
<i>Total (overall 22 funds)</i>		<i>11</i>	<i>20</i>

The Way Forward

Climate Smart Agriculture can strengthen REDD⁺

Agriculture that sustainably

- **Increases productivity**
- **Reduces land use change**
- **Increases carbon sequestration**
(Soil, Agroforestry)
- **Reduces GHGs emissions**
(Nitrous oxide, Methane)
- **Enhances food security**



Concluding Remarks

- Emissions addressed in REDD⁺ very often **originate in agriculture - related activities**
- Success in REDD⁺ **depends on** measures taken in **agriculture sectors**
- Climate-smart agriculture **can strengthen REDD⁺**
- Revitalization of “Home gardens”, an appropriate productive systems for Kerala, is needed ?

Thank You for Your Kind Attention



Think Globally, Act Locally
