Emissions by GHG & sector

By sector (CO2 eq) (2004)

Waste and wastewater
2.8%

Deforestation
17.4%

Energy supply
25.9%

Agriculture
13.5%

Transport
13.1%

70 % N$_2$O
50 % CH$_4$

Industry
19.4%

Residential and
commercial buildings
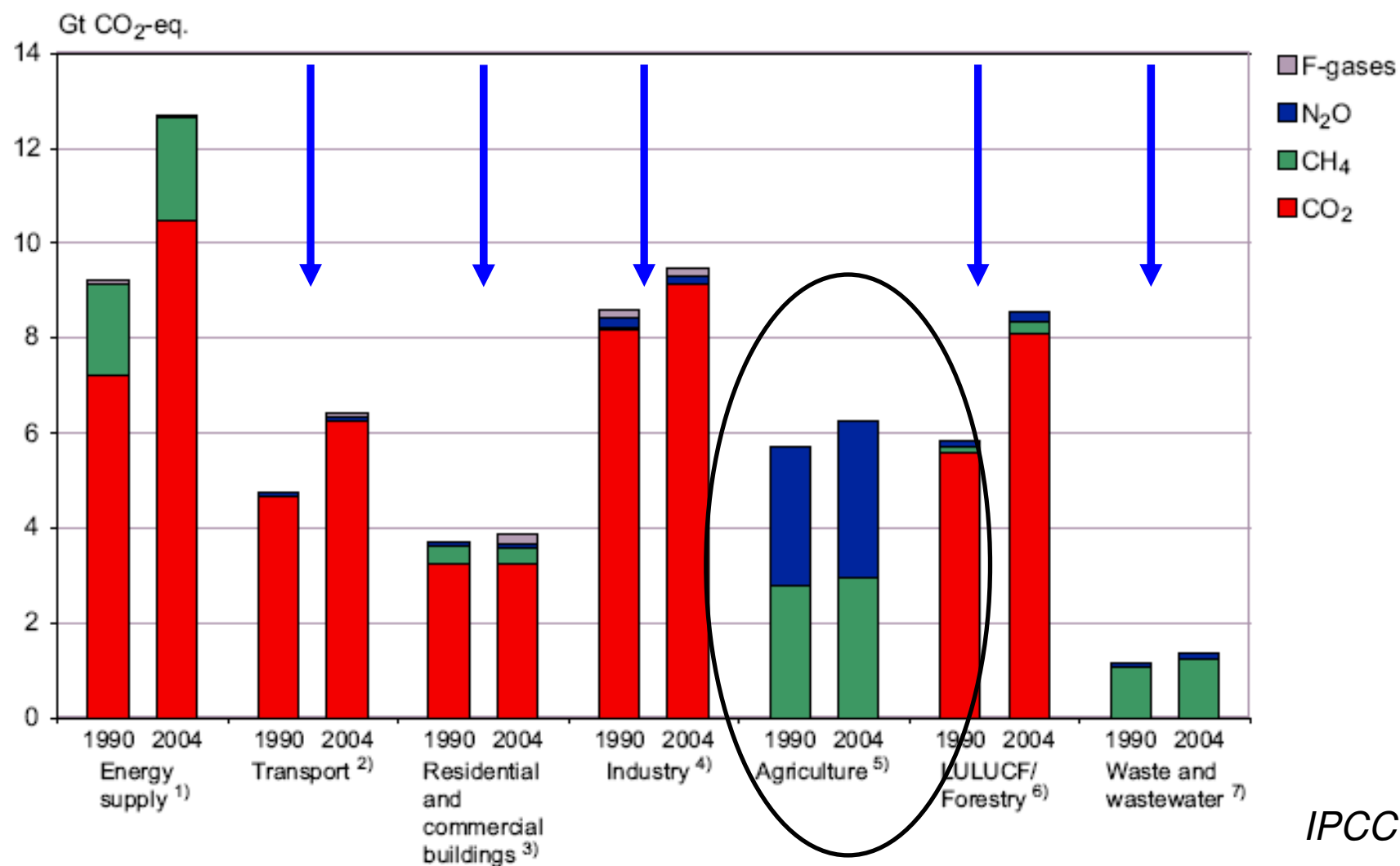7.9%
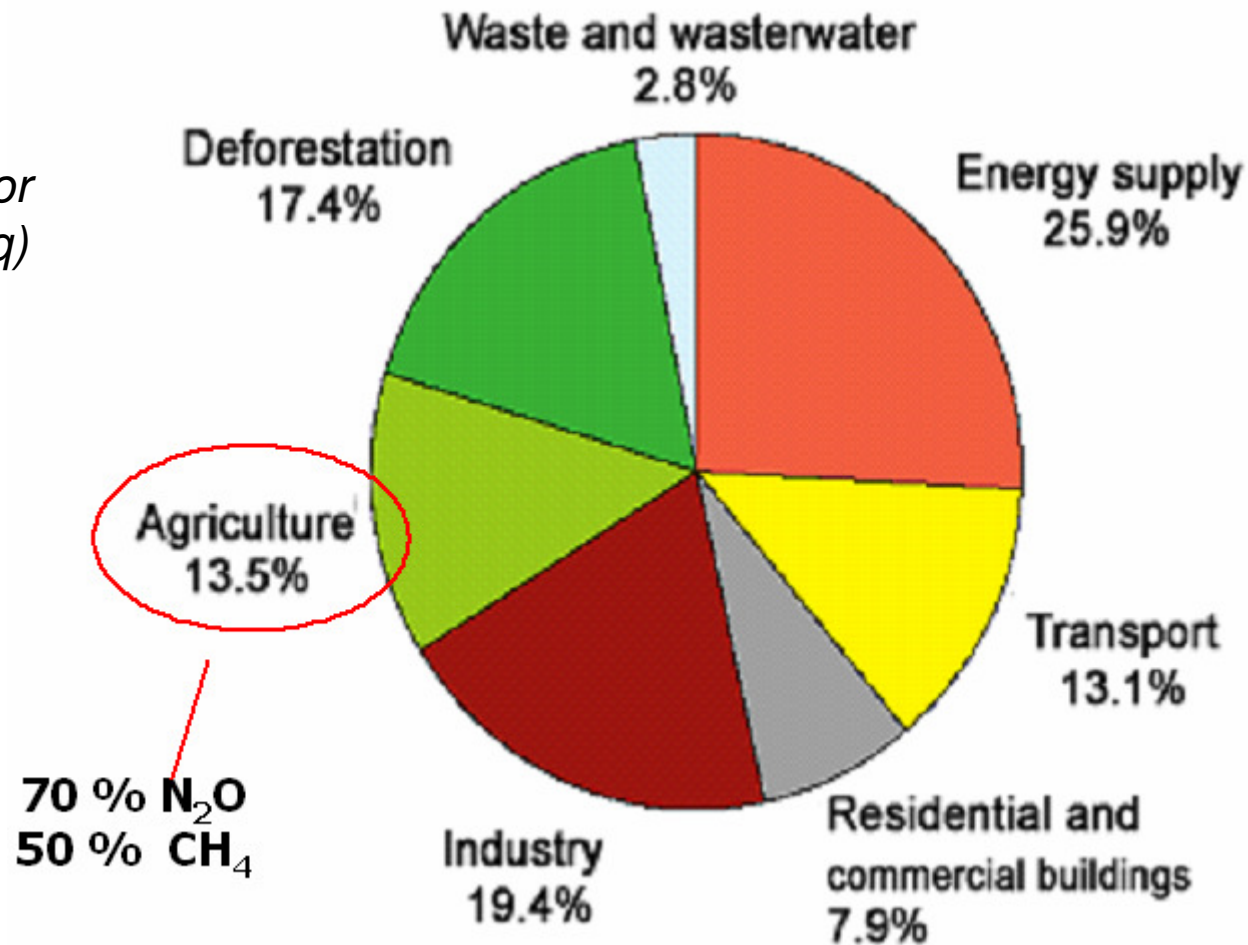
IPCC

Emissions by Sector and GHG

IPCC

Emission trends

Balance expected to shift from C- to N-based emissions in the long term

- N_2O from agriculture are projected to increase by 35-60% by 2030.
- reflecting higher intensities and productivity growth and reduced or no area expansion
- CH_4 emissions will grow slowly as most of livestock sector growth is in non-ruminants.
- CO_2 emissions from agriculture and forestry to level off as the frontier is exhausted and because of area protection

The Bottom Line

- Rich countries emit vast majority of GHG
- Poor countries are more vulnerable
  - geography
  - greater dependence on agriculture and natural resources
  - limited infrastructures and low-input agriculture
 - inadequate complementary services to adaptation

What can farmers do?

Mitigation practices

- **improved rice cultivation practices**
- **improves nutrient management**
- **water management**
- **manure management**
- **energy efficiency**
- **agro-forestry**
  Restore cultivated peaty soils and degraded lands

Adaptation practices

- **use of crop diversity**
- **nutrient management**
- **grazing, pasture management**
- **manure management**
- **energy efficiency**
- **adjustment of planting dates**
 **Restore degraded lands and tree planting**
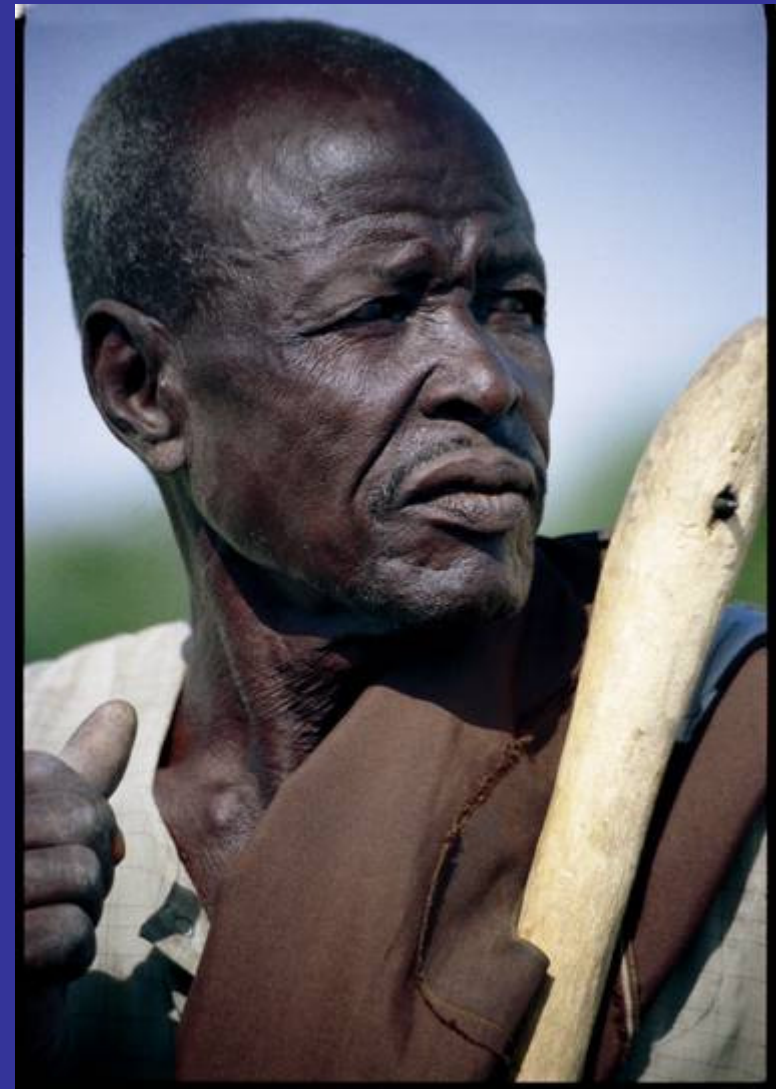
Livelihood Adaptation to Climate Change in Drought Prone Areas of Bangladesh

- Climate adaptation requires a social learning process

- Mandated Institutions for adaptation & clearly determined responsibilities are key

- Adaptation techniques to climate change are very location specific

Managing Dry Matter in Grasslands
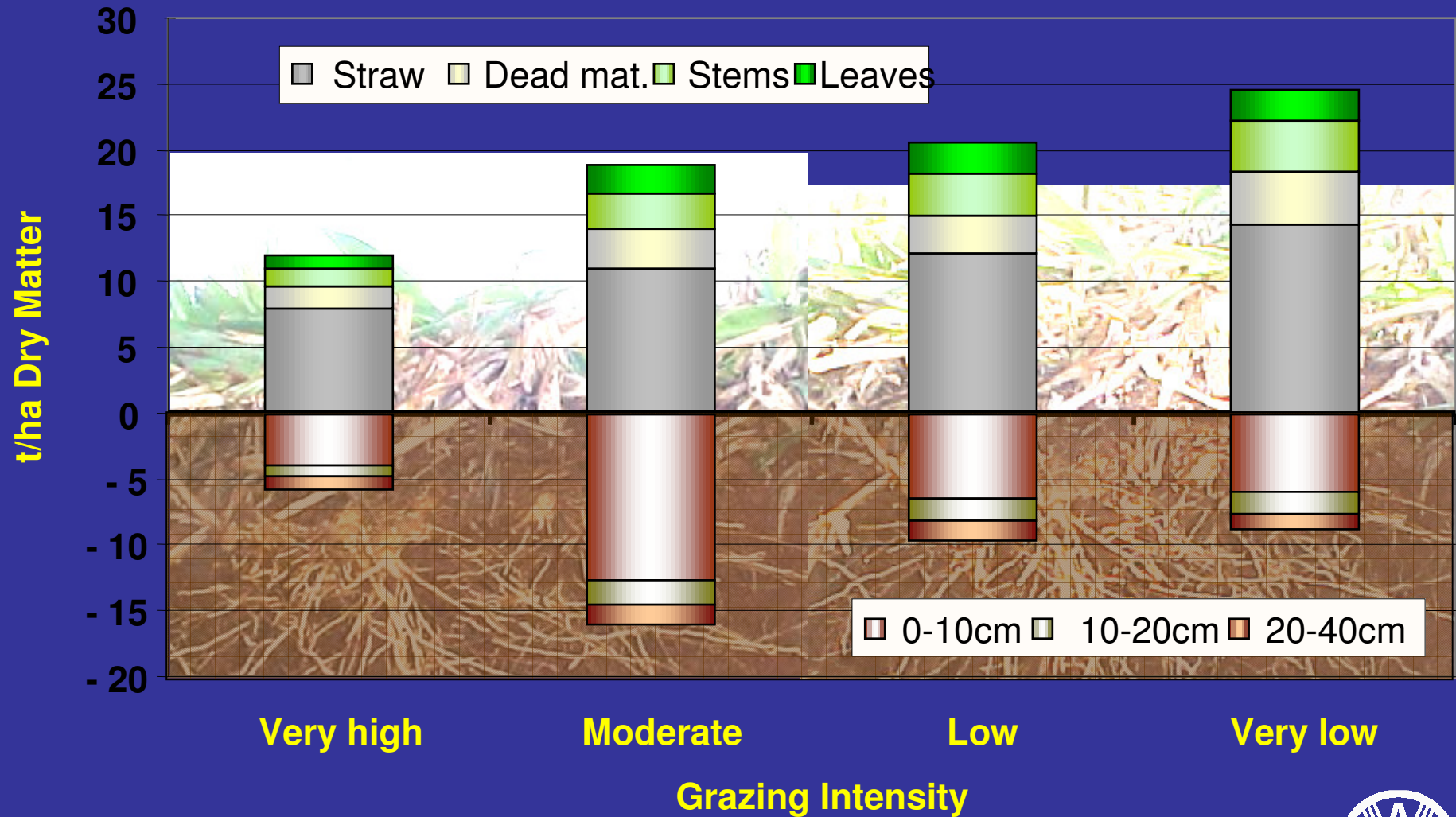
Mitigation options

- **Reduce deforestation and forest degradation**

- **Forest management interventions to maintain or increase forest carbon density**

- **Afforestation and reforestation**

- **Increase carbon stocks in wood products and enhance fuel substitution**

Forests' role in global carbon

Reservoirs

~1200 GtC

nearly twice
amt in atmosphere

Sinks

2.6 GtC/yr

Sources

1.6 GtC/yr =

25% CO_2 emissions

C Seq rates (t/ha/yr) of newly-established improved pastures

Ecosystem	min	max
Andean Hillsides, Colombia	1.6	6.8
Amazonia, Colombia	3.5	7.2
Sub-humid forest, Costa Rica	2.0	3.7

Socio-Economic Indices Andean Hillsides, Colombia

Index	Farm Type		
	Improved (n=6)	Conventional (n=19)	p
1. Farm area in forest (%)	29	14	**
2. Farm area impr. systems (%)	88	44	**
3. Farm gross income/ha/yr (US$)	250	50	***
4. Farmer self-sufficiency (%)	40	32	*
5. Living conditions (1–5)	5	3	**
6. Mean years of Schooling	8	6	

p = Prob.of statistical significance; * : 0.05 < p < 0.10; ** : 0.01 < p < 0.05; *** : p < 0.01
Source: Cuellar *et al*, 2003

What can farmers <u>not</u> do by themselves?

Carry the entire challenge of reducing GHG emissions and at the same time produce sufficient food

They need economic and technical support, enabling policies, and the engagement of the consumers

Take Home Messages

- **need to fully appreciate AG's central role in climate change :**
  - very important emitter,
  - highest potential for emission reduction,
  - largest need for adaptation
- **need to consider mitigation and adaptation together**

- **need to fully appreciate the central role of farmers**

- **need to increase awareness among consumers on the role of farmers in the production of food**