GHG Platform INDIA

Trend Analysis of GHG Emissions in MEGHALAYA

GHG Platform India is a civil society initiative providing an independent estimation and analysis of India's Greenhouse Gas (GHG) emissions across key sectors, namely- Energy, Industrial Processes and Product Use (IPPU), Agriculture, Forestry & Other Land Use (AFOLU) and Waste.

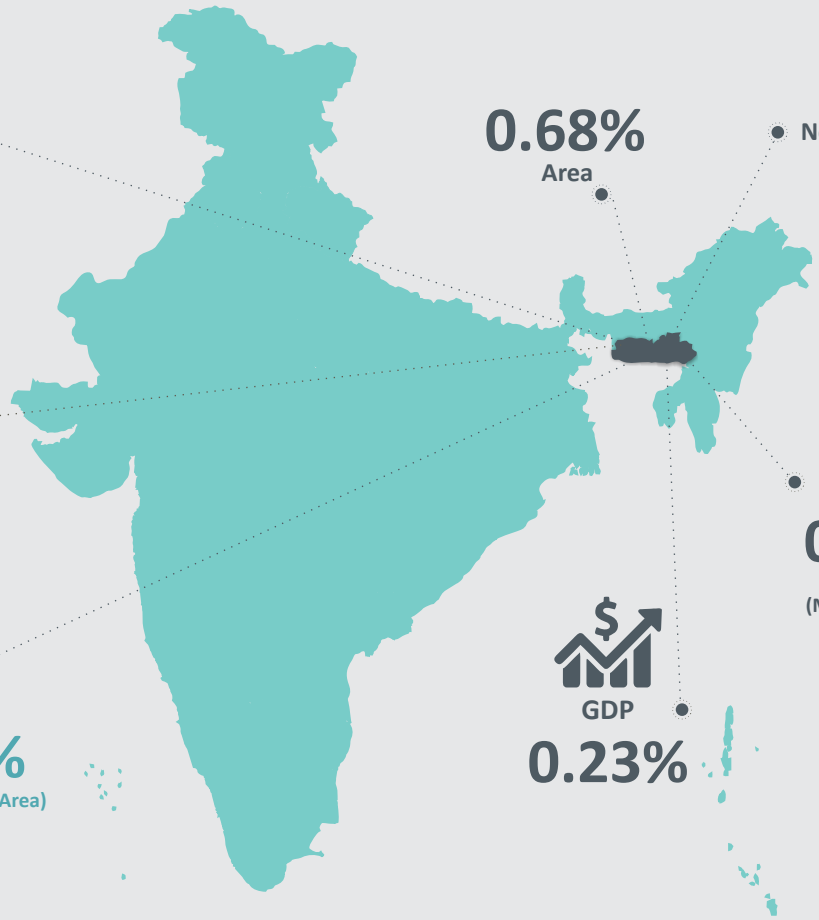
The Platform seeks to add value to the various ongoing GHG emission estimation efforts by helping address existing data gaps and data accessibility issues, extending beyond the scope of national inventories to state inventories, and by increasing the volume of analytics and policy dialogue on India's GHG emissions sources, profile, and related policies.

The initiative estimates and assesses GHG emissions and removals from the following sectors:

ENERGY | IPPU* | AFOLU | WASTE

*Fuel combusted for Captive Electricity Generation (Auto-Producers) has been reported under Energy sector.

Meghalaya at a glance (2013)



Population
0.25%

0.68%
Area

Net GHG Emissions
0.12%

Population Density
132 Persons/Sq.Km (Meghalaya)
382 Persons/Sq.Km (India)

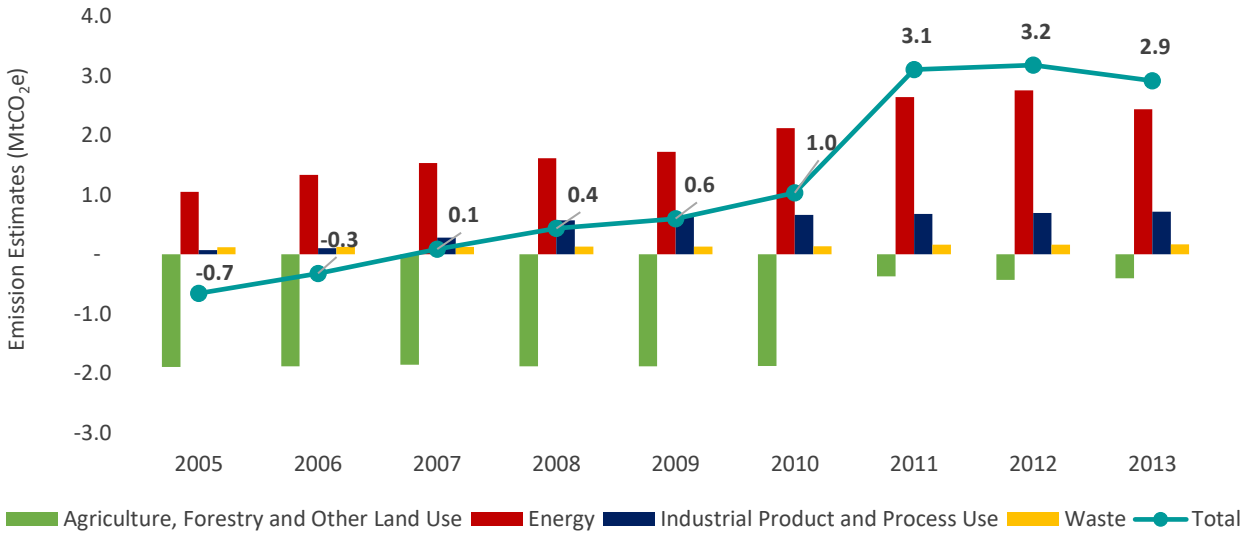
Per Capita Emissions
0.94 tCO_2e (Meghalaya)
1.93 tCO_2e (India)

Forest Area
77% (Of Meghalaya's Total Area)
2.45% (Of India's Forest Area)

GDP
0.23%

Economy-wide Emission Estimates

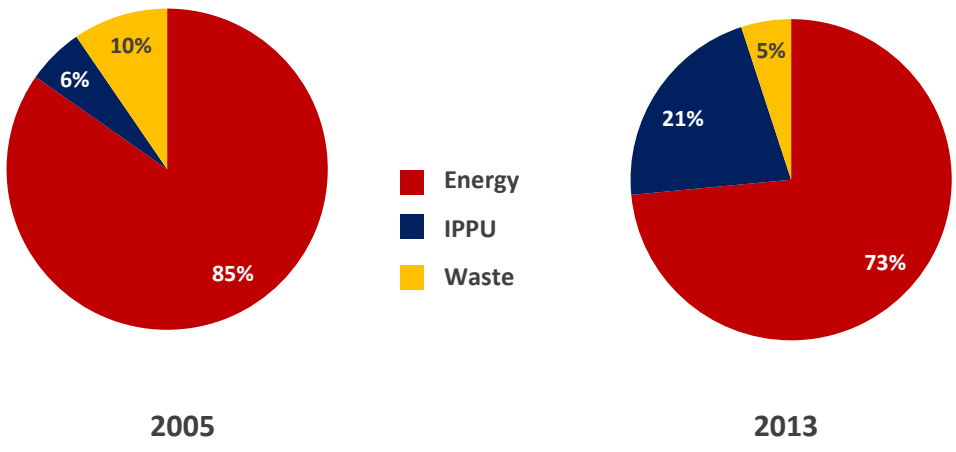
Figure 1: GHG Emission Estimates for Meghalaya (2005 to 2013)



The state of Meghalaya was a net sink of GHGs from 2005 to 2006[1] and a net emitter of GHGs thereafter. Removals from this state started to decline from 0.7 $MtCO_2e$ in 2005 and eventually the state became a positive emitter with 0.1 $MtCO_2e$ GHGs in 2007. Since 2007, the emissions kept increasing till the year 2012 after which they declined in 2013 due to a dip in the Energy sector emissions. The emissions grew from 0.1 $MtCO_2e$ in 2007 to 2.9 $MtCO_2e$ in 2013 at an observed rate of 79.6% (CAGR[2]). While the AFOLU sector was a net remover of GHGs throughout the reference period, the other sectors namely Energy, IPPU, and Waste were net emitters as depicted in Figure 1 above.

If net positive emissions were to be considered (i.e. without the AFOLU sector), ~85% emissions arose from the Energy sector and the remaining ~16% from the Waste (~10%) and IPPU (~6%) sectors in 2005 (Figure 2). The share of emissions from the Energy sector declined to 73% in 2013, while the share of the IPPU sector increased to 21%. The share of emissions from the Waste sector also declined to 5% in 2013.

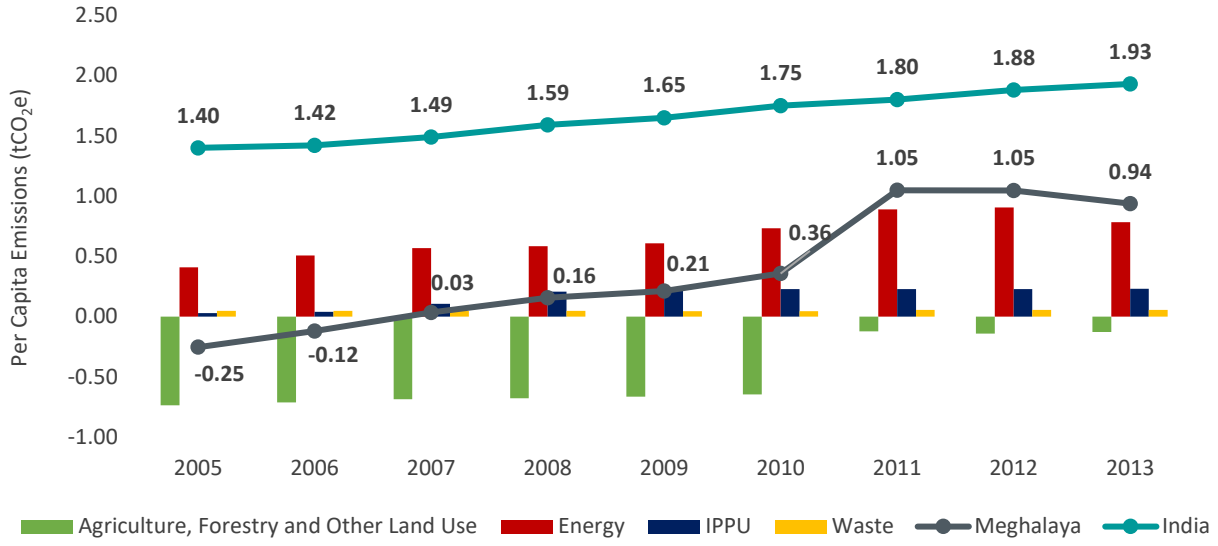
Figure 2: Sector-wise Contribution to Economy-wide GHG Emissions of Meghalaya (Excluding AFOLU sector)



[1] Calendar year values have been considered for this analysis. For Global Warming Potential (GWP) calculations IPCC-ARII values have been considered.

[2] Compound Annual Growth Rate

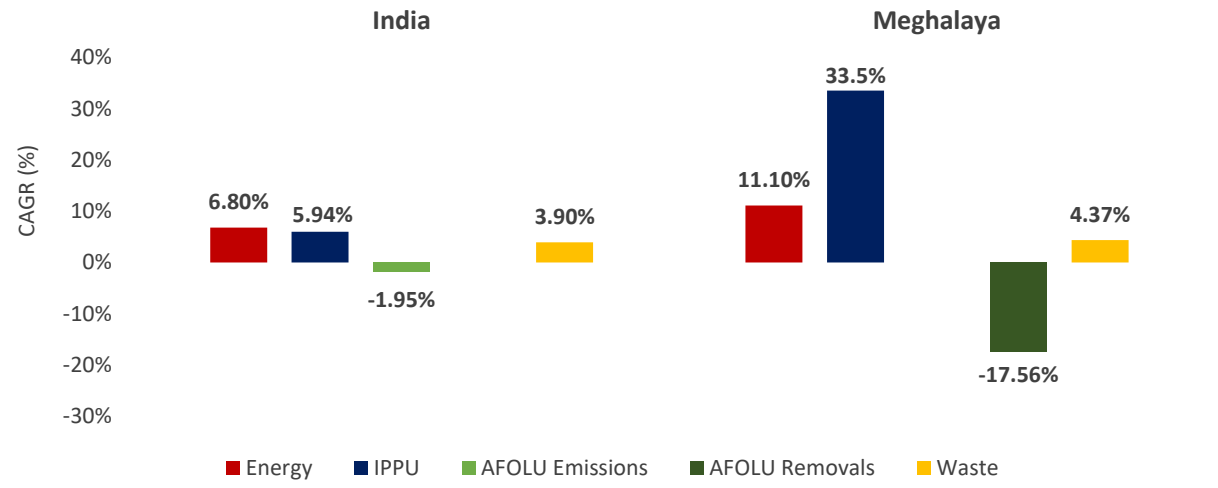
Figure 3: Per Capita GHG Emissions for Meghalaya and India (2005 to 2013)



Per capita removals from Meghalaya declined from 0.25 tCO_2e in 2005 to 0.12 tCO_2e in 2006. From 2007 onwards, the state became a net positive emitter of GHGs and the per capita emissions increased from 0.03 tCO_2e in 2007 to 0.94 tCO_2e in 2013. The CAGR for these years was of the order of 52.44%. This could be attributed to the high growth of the IPPU & Energy sector emissions. When compared to per capita emissions of India, Meghalaya recorded high growth, though the per capita emissions remained lower than India's per capita emissions. The growth rate for India from 2005 to 2013 was 4.07% (Figure 3).

Figure 4: Sector-wise GHG Emissions Growth Rate from 2005 to 2013

These growth rates have been compounded annually.

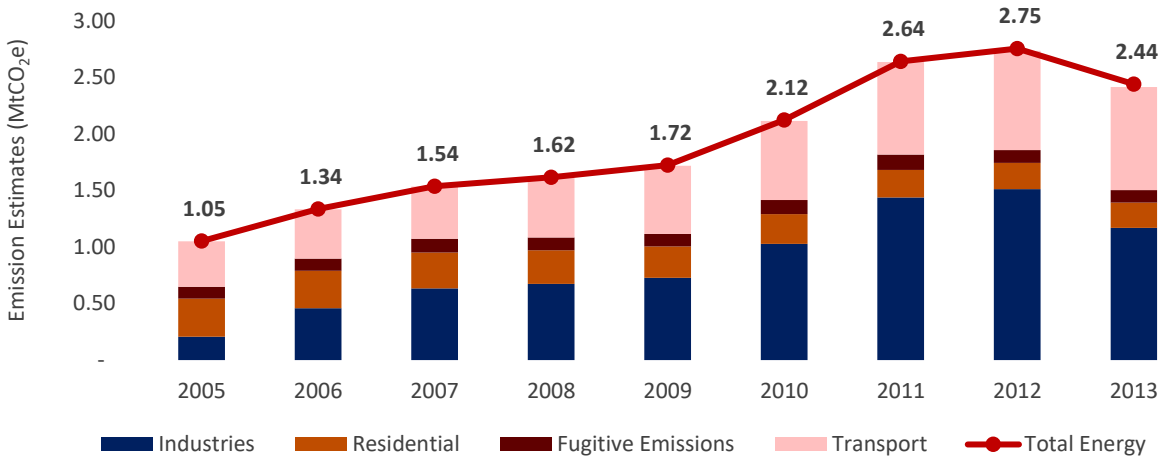


GHG emissions from the IPPU sector of Meghalaya recorded the highest growth rate of 33.5% from 2005 to 2013 amongst all other sectors (Figure 4). This was followed by the Energy sector which recorded an 11.1% growth and Waste sector with 4.37% growth. The AFOLU sector, though a net sink throughout the reference period recorded reduced GHG removals that declined by 17.56%. When compared to India, all of these sectors recorded a higher rate of emissions.

Energy Sector

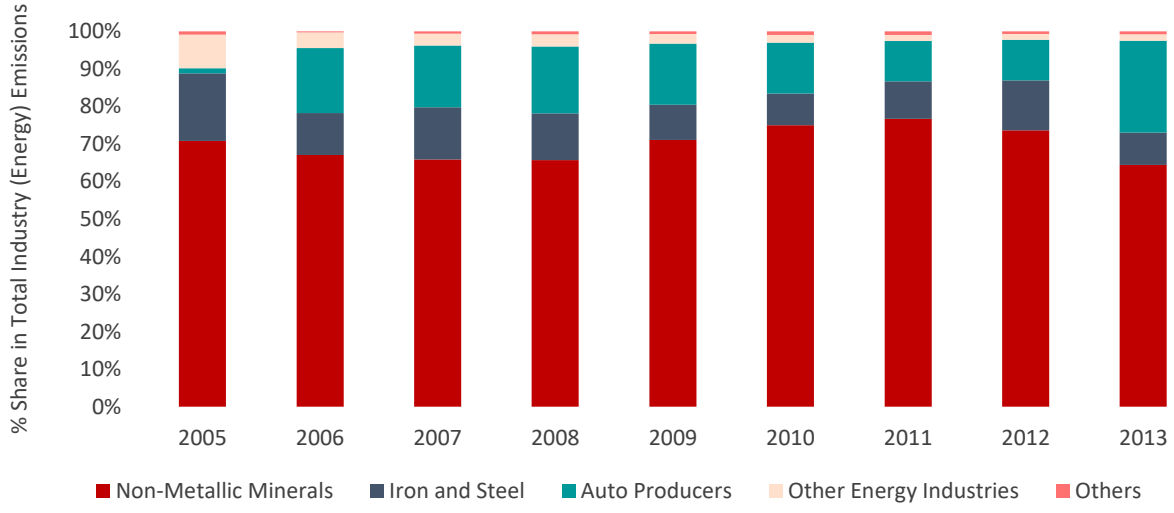
The Energy sector represented nearly 73% of the total emissions in Meghalaya in 2013 (excluding the AFOLU sector). In general, emissions from the Energy sector arise from two main sub-sectors – Fuel Combustion (Public Electricity Generation, Transport, Industries and Agriculture, Commercial and Residential categories) and Fugitive. In 2013, ~96% emissions were from Fuel Combustion and the remaining 4% emissions from Fugitive sub-sector. The Energy sector emissions increased at an observed CAGR of 11.10% from 1.05 $MtCO_2e$ in 2005 to 2.44 $MtCO_2e$ in 2013 (Figure 5). Notably, the emissions increased from 2005 to 2012 but dipped in 2013 due to a decline in emissions from Fuel Combustion in Industries.

Figure 5: GHG Emission Estimates for Energy Sector in Meghalaya (2005 to 2013)



Industries was a major category under the Fuel Combustion sub-sector with ~48% contribution in Meghalaya's Energy emissions portfolio followed by ~37% contribution from Transport in 2013. Under the Industries category, ~64% emissions were due to Fuel Combusted in Non-Metallic Mineral Industries alone, followed by 25% emissions from Auto-Producers in 2013 (Figure 6). The total emissions of the Industries category increased at an estimated CAGR of 24.26% with its emissions increasing from 0.21 $MtCO_2e$ in 2005 to 1.17 $MtCO_2e$ in 2013

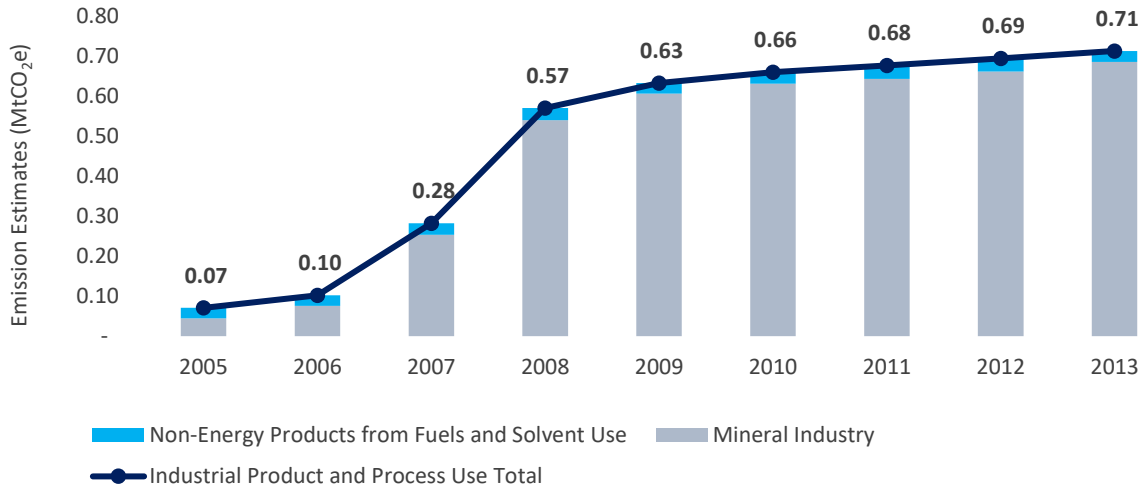
Figure 6: Share of GHG Emissions from Industry (Energy) Category (2005 to 2013)



IPPU Sector

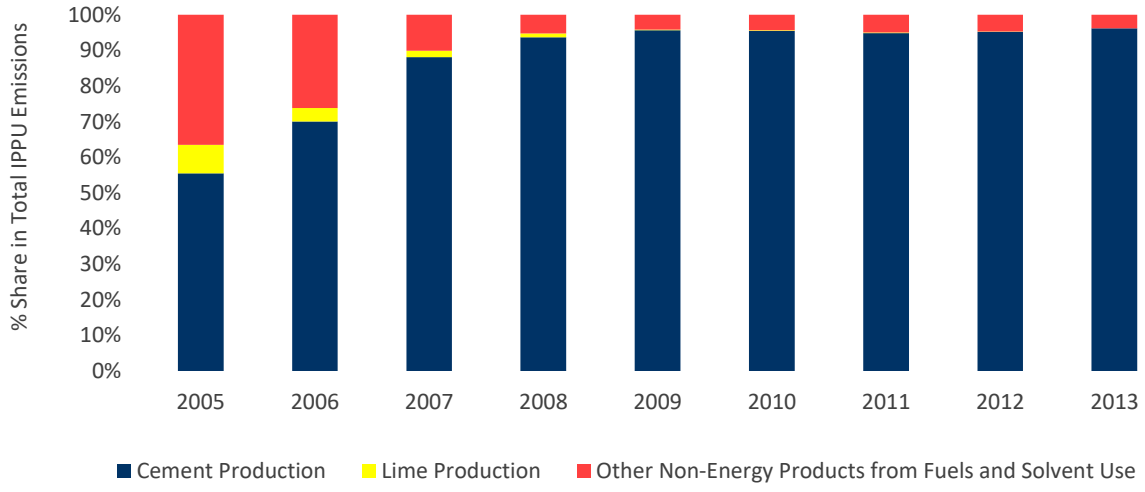
The IPPU sector represented ~21% of the total GHG emissions in Meghalaya in 2013 (excluding the AFOLU sector). IPPU emissions from the state are largely driven by Mineral Industries and Non-Energy Products from Fuels and Solvent Use. Between 2005 to 2013, overall IPPU emissions in Meghalaya rose at a CAGR of 33.5% from 0.07 $MtCO_2e$ in 2005 to 0.71 $MtCO_2e$ (Figure 7). No emissions were recorded from Chemical and Metal Industries while maximum emissions were observed from the Mineral Industries across all the reference years.

Figure 7: GHG Emission Estimates for IPPU Sector in Meghalaya (2005 to 2013)



Cement Production was a key driver of IPPU emissions throughout 2005 to 2013 as shown in Figure 8 below. In 2013, the share of Cement Production was ~96%.

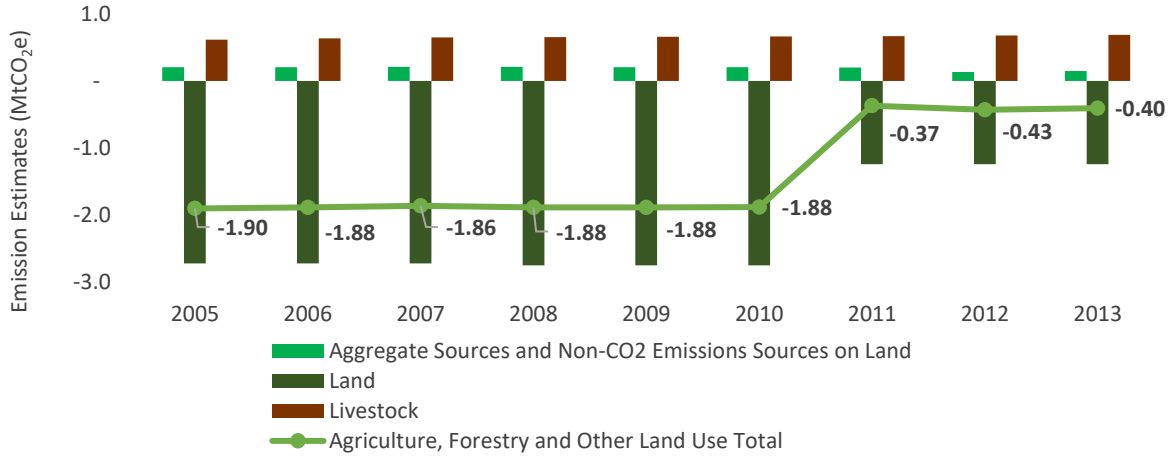
Figure 8: Share of GHG Emissions from IPPU Categories (2005 to 2013)



AFOLU Sector

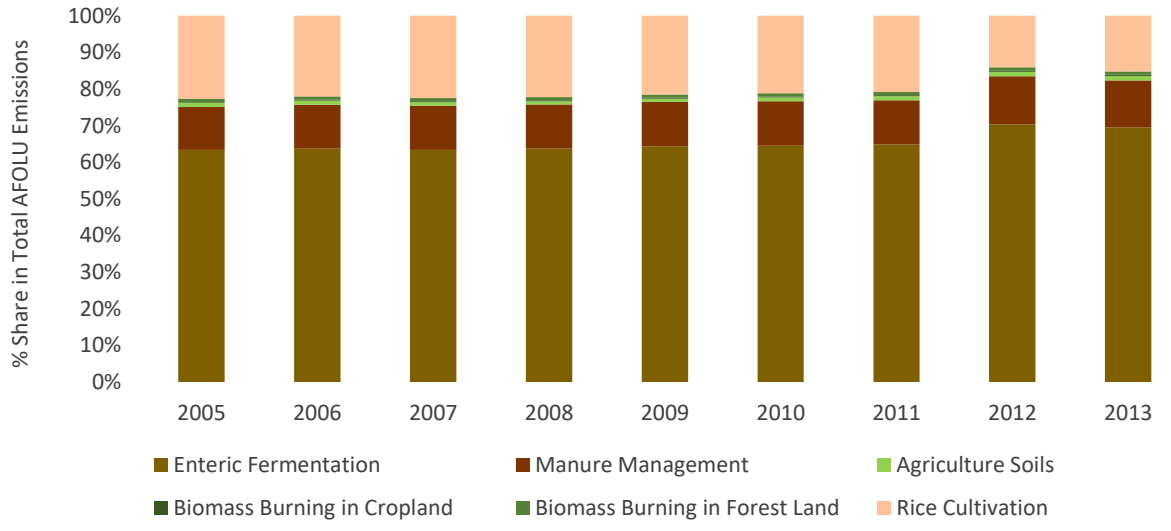
The AFOLU sector of Meghalaya was a net sink of GHGs in India from 2005 to 2013. Emissions/Removals from this sector arise from three main sub-sectors namely Livestock, Land and Aggregate Sources and Non-CO_2 Emissions Sources on Land. The removals decreased at an observed rate of 17.56% (compounded annually) from 1.9 $MtCO_2e$ in 2005 to 0.4 $MtCO_2e$ in 2013 in Meghalaya (Figure 9). Notably, the Land sub-sector was a sink throughout, from 2005 to 2013. The reason for the decrease in removals from the AFOLU sector can be attributed to the decrease in absorption/removals from the Land sub-sector due to some losses in forested areas.

Figure 9: GHG Emission Estimates for AFOLU Sector of Meghalaya (2005 to 2013)



If emissions were to be considered without the removals from Land sub-sector, maximum positive emissions in the year 2013 were from the Livestock sub-sector (82%). Within this sub-sector, Enteric Fermentation was the major contributor of emissions with a share of ~69% (Figure 10). Emissions from Enteric Fermentation had increased from at a CAGR of 1.4% from 0.52 $MtCO_2e$ in 2005 to 0.58 $MtCO_2e$ in 2013. Though the second major contributor of GHG emissions in the AFOLU sector was Rice Cultivation, the share of emissions from this category had declined by 8% during the reference period. Emissions from Rice Cultivation declined at a CAGR of 4.64% from 0.19 $MtCO_2e$ in 2005 to 0.13 $MtCO_2e$ in 2013.

Figure 10: Share of GHG Emissions from AFOLU Categories (Excluding Land) (2005 to 2013)



Waste Sector

The Waste sector contributed ~5% of total emissions of Meghalaya in 2013 (excluding the AFOLU sector). Municipal Solid Waste[3], Domestic Wastewater and Industrial Wastewater are the key sources of GHG emissions in the Waste sector. The Waste sector emitted 0.119 $MtCO_2e$ in 2005, which increased to 0.167 $MtCO_2e$ in 2013. GHG emissions from Waste grew at a CAGR of 4.37% from 2005 to 2013 (Figure 11). However, a spike in the overall GHG emissions was observed in 2011 which can be attributed to higher Domestic wastewater emissions, which reflects changing trends in use of various treatment systems as reported in Census of India 2011.

Figure 11: GHG Emission Estimates from Waste Sector of Meghalaya (2005 to 2013)

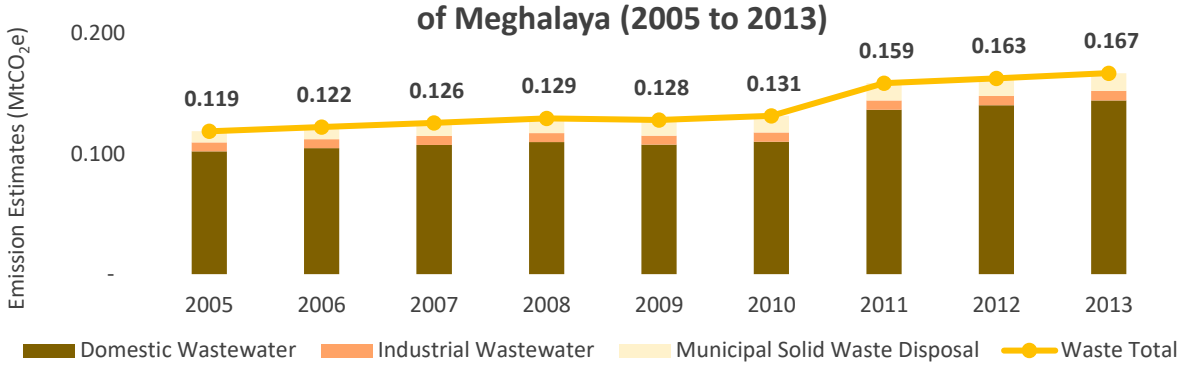
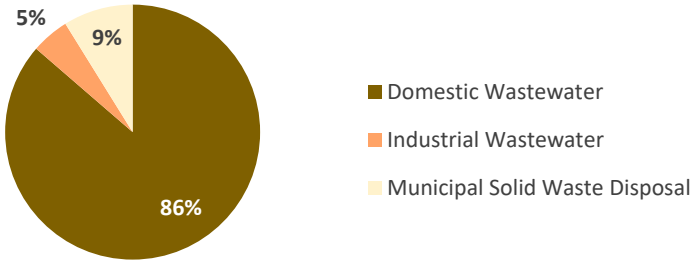


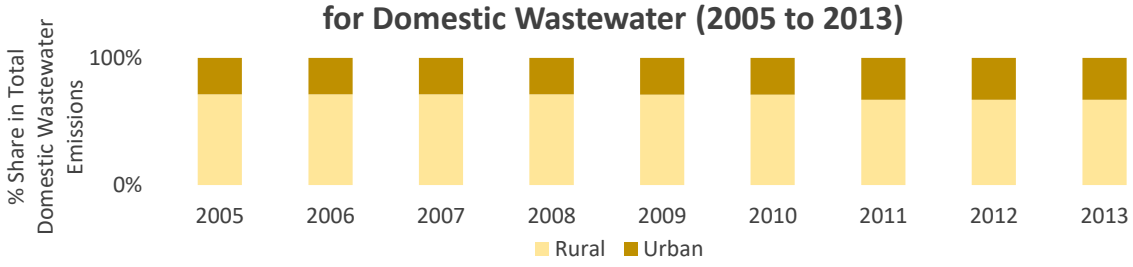
Figure 12: Category-wise Share of GHG Emissions for Waste Sector in 2013



In Meghalaya, maximum emissions (~86%) arose from Domestic Wastewater (Figure 12) from rural and urban areas and had increased at a CAGR of 4.41% from 0.102 $MtCO_2e$ in 2005 to 0.144 $MtCO_2e$ in 2013. Almost 67% of the Domestic Wastewater emissions emanated from rural areas of Meghalaya in 2013 (Figure 13). Discharge of untreated wastewater and use of septic tanks are key drivers of emissions in this sub-sector. Municipal Solid Waste Disposal contributed to ~9% of emissions in 2013.

Changing Solid Waste Composition resulted in an increase in the GHG emissions generated from every tonne of Solid Waste Disposed over the years in Meghalaya and emissions from this sub-sector had increased at 6.24% (CAGR) from 2005 to 2013. Industrial Wastewater also contributed to almost ~5% of emissions in 2013 from Meghalaya's Waste sector (Figure 12).

Figure 13: Areawise GHG Emission Estimates for Domestic Wastewater (2005 to 2013)



[3] 'Refers to emission in urban areas. Emissions from Municipal Solid Waste Disposal in rural areas are not considered, as disposal predominantly occurs in a dispersed manner and does not generate significant CH_4 emissions'

GHG Platform INDIA

The GHG Platform India is a civil society initiative providing an independent estimation and analysis of India's Greenhouse Gas (GHG) emissions across key sectors, namely- Energy, IPPU, AFOLU and Waste.

The Platform comprises of the following civil society:

An initiative supported by

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