

Trend Analysis of GHG Emissions in NAGALAND

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*



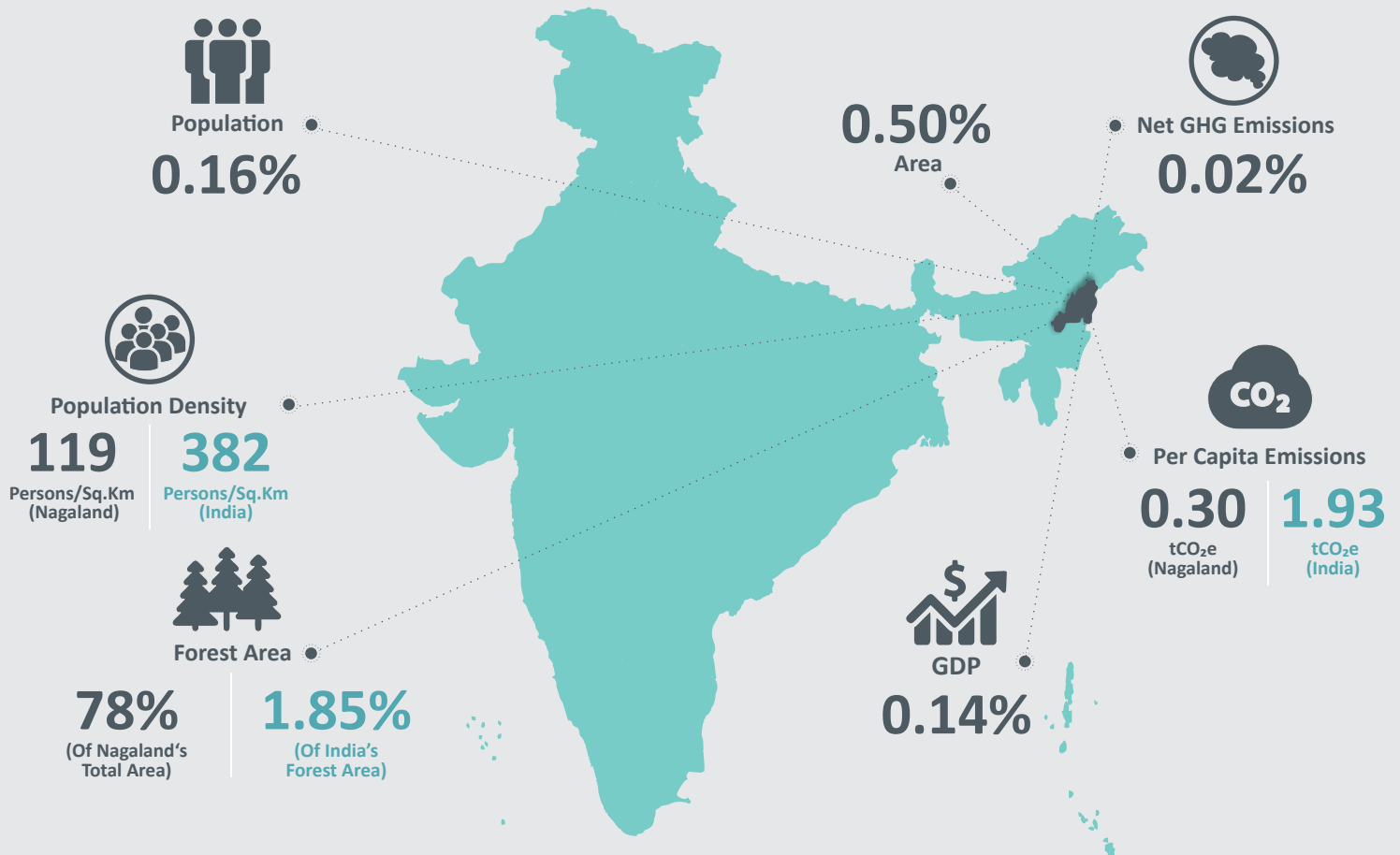
AFOLU



WASTE

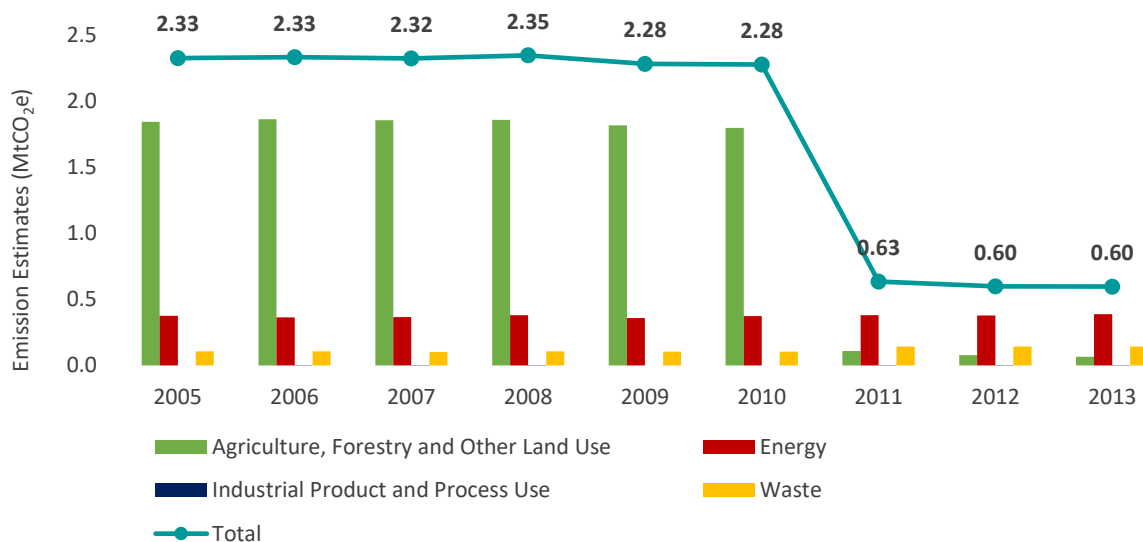
*Fuel combusted for Captive Electricity Generation (Auto-Producers) has been reported under Energy sector.

Nagaland at a glance (2013)



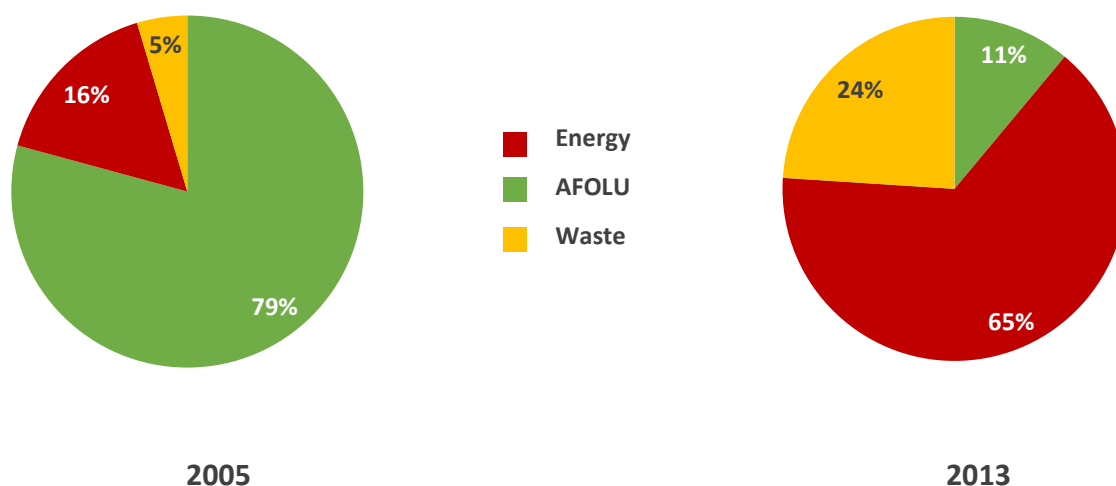
Economy-wide Emission Estimates

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



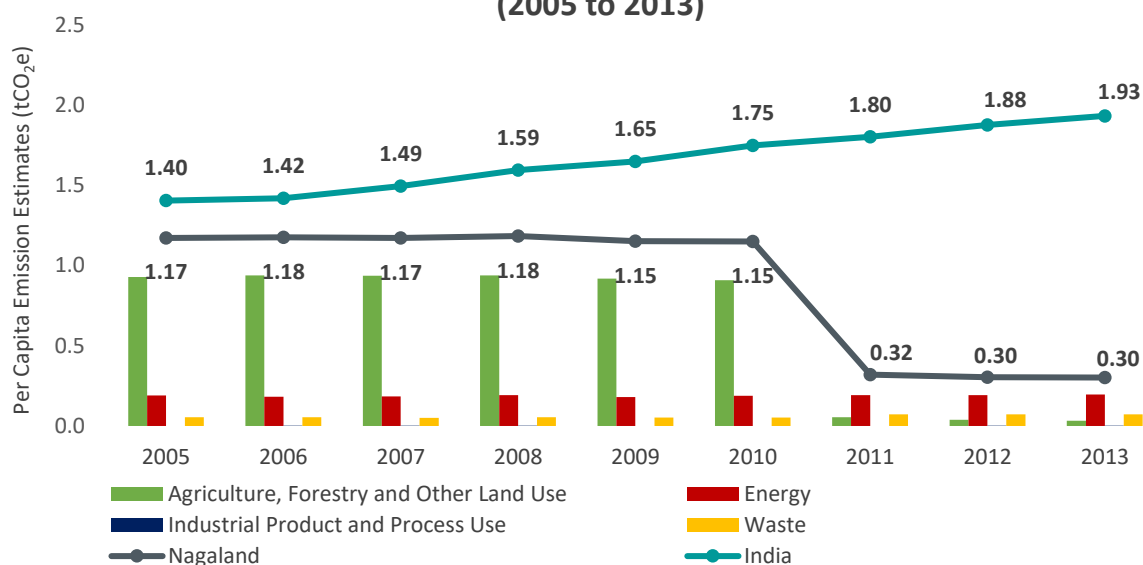
Emissions from the state of Nagaland declined from 2.33 MtCO₂e to 0.6 MtCO₂e at an estimated rate of -15.6% (compounded annually) from 2005 to 2013¹. There was a significant decline in the total emission of Nagaland in 2011 due to decreased emissions of the Energy and AFOLU sectors. Notably, the AFOLU and Energy sectors were the top emitters of GHGs in Nagaland across all the reference years. However, no emissions were registered from the IPPU sector throughout the reference period. In 2005, the AFOLU Sector had the maximum share of ~79% in the total emissions of Nagaland followed by the Energy (~16%) and Waste sectors respectively. The sectoral share of the Energy sector rose to ~65% in 2013 while that of the Waste sector rose to ~24% whereas, the share of the AFOLU sector declined to ~11% as depicted in Figure 2 below.

Figure 2: Sector-wise Contribution to Economy-wide GHG Emissions



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

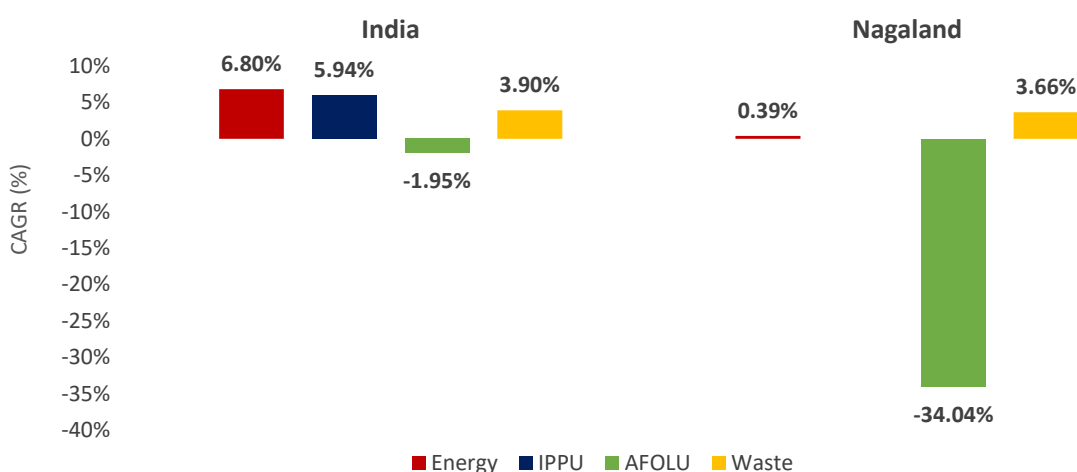
Figure 3: Per Capita GHG Emissions for Nagaland and India (2005 to 2013)



Per Capita emissions from Nagaland declined from 1.17 tCO₂e in 2005 to 0.3 tCO₂e in 2013. When compared to per capita emissions of India, Nagaland recorded relatively low per capita emissions throughout 2005 to 2013. However, from 2011 onwards, Nagaland's per capita emissions dipped further significantly and were very low as compared to India's per capita emissions. The observed compound annual growth/decline rate of per capita emissions in India and Nagaland was 4.07% and -15.6% respectively.

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

These growth rates have been compounded annually.



GHG emissions from the Waste sector of Nagaland recorded the highest CAGR² of 3.66% from 2005 to 2013 amongst all other sectors (Figure 4). This was followed by the Energy sector which recorded a much lower growth rate of 0.39% for the same period. Notably, the emissions from the AFOLU sector declined at an enormous rate of 34.04% (compounded annually) from 2005 to 2013 as illustrated in Figure 4 above. When compared to India's sectoral growth/decline rates, all the sectors recorded a lower growth rate from 2005 to 2013 except the AFOLU sector which recorded a much higher declined rate as compared to India's AFOLU sector (-1.95%).

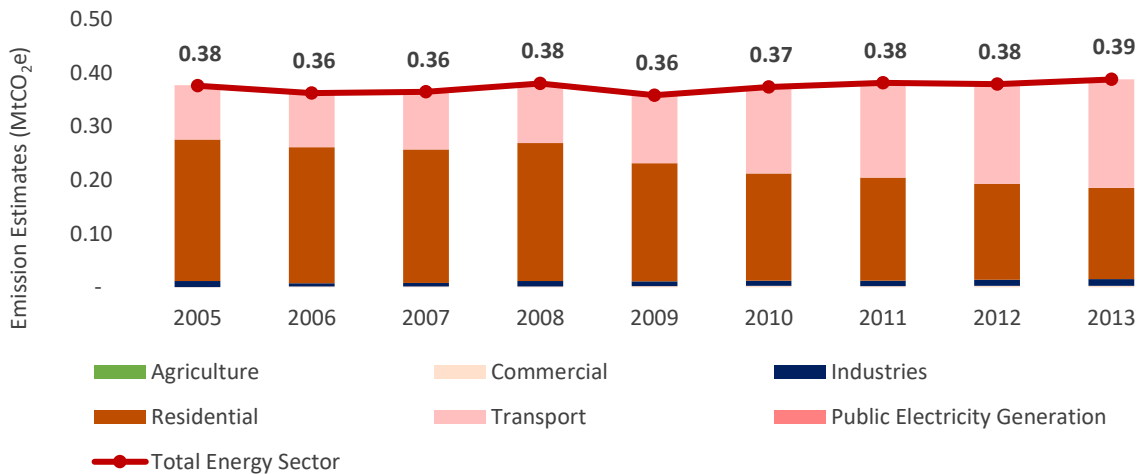
² Compound Annual Growth Rate



Energy Sector

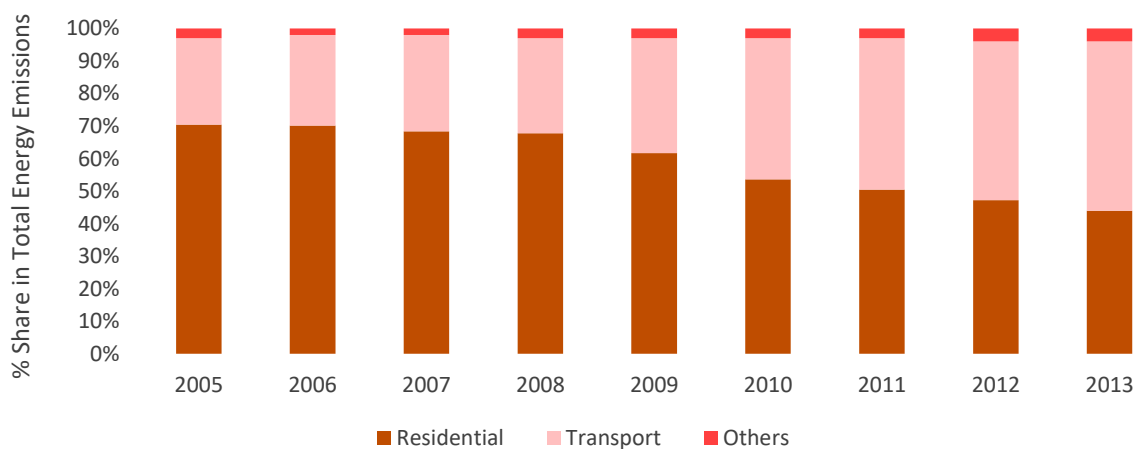
Energy sector represented ~65% of total emissions in the state of Nagaland in 2013. In general, emissions from Energy sector arise from two main sub-sectors – Fuel Combustion (Public Electricity Generation, Transport, Industries and Agriculture, Commercial and Residential categories) and Fugitive. In Nagaland, emissions arose only from Fuel combustion and there were no emissions from the Fugitive sub-sector. The Energy sector emissions increased gradually at a low CAGR of ~0.39% from 0.38 MtCO_{2e} in 2005 to 0.39 MtCO_{2e} in 2013, resulting in a flat growth curve.

Figure 5: GHG Emission Estimates For Energy Sector in Nagaland (2005 to 2013)



Residential and Transport category were the top emitters of GHGs in the Energy sector throughout the reference period. Notably, the share of Residential category declined from ~70% in 2005 to ~44% in 2013 whereas, the share of Transport rose from ~27% in 2005 to ~52% in 2013 as shown in Figure 6 below.

Figure 6: Share of GHG Emissions Estimates from Energy Categories (2005 to 2013)



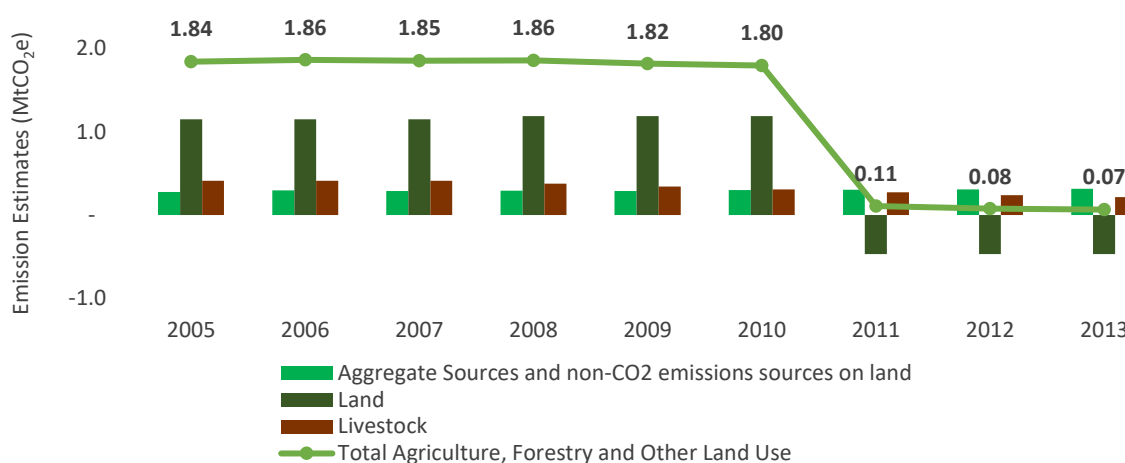


AFOLU Sector

Emissions from AFOLU sector represented nearly 11% of the total emissions in Nagaland in 2013. Interestingly, the share of AFOLU emissions was ~79% in Nagaland's total emissions in year 2005 which reduced drastically to ~11% in year 2013.

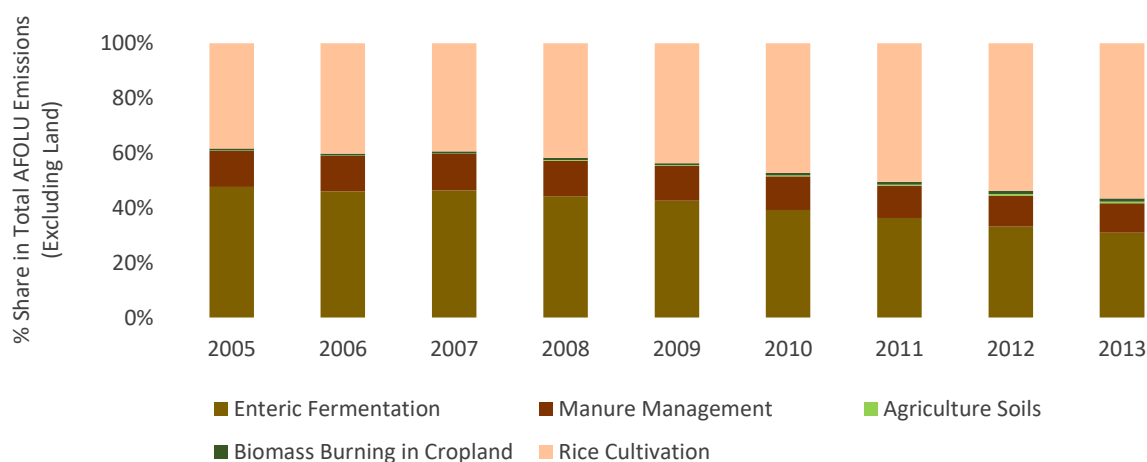
Emissions from AFOLU sector arise from three main sub-sectors namely Livestock, Land and Aggregate Sources and Non-CO₂ Emissions Sources on Land. AFOLU emissions declined at an enormous rate of ~34.04% from 1.84 MtCO₂e in 2005 to 0.07 MtCO₂e in 2013. Notably, Land sub-sector was a GHG emitter from 2005 to 2010 but it became a sink from year 2011 onwards as illustrated in figure 7 below.

Figure 7: GHG Emission Estimates For AFOLU Sector in Nagaland (2005 to 2013)



If emissions from AFOLU sector in Nagaland were considered without taking the Land sub-sector into consideration, maximum emissions were registered from Rice Cultivation (~55%) in 2013. This was mainly due to increased Rice Production in the state. ~41% emissions were registered from the Livestock sub-sector (Enteric fermentation and Manure Management) in 2013. Notably, the share of Livestock reduced from ~60% in 2005 to ~41% in 2013. The decreased emissions of Livestock were primarily due to heavy decline in Nagaland's Livestock population.

Figure 8: Share of GHG Emissions For AFOLU Sub-sectors (Excluding Land) (2005 to 2013)





Waste Sector

The Waste sector contributed to ~24% of total emissions of Nagaland in 2013, a significant increase when compared to its share in 2005 that was ~5%. Municipal Solid Waste³, Domestic Wastewater and Industrial Wastewater are the key sources of GHG emissions in the Waste sector. The Waste sector emitted 0.14 MtCO₂e in 2013 up from 0.11 MtCO₂e in 2005. GHG emissions from Waste grew at a CAGR of 3.66% from 2005 to 2013. 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 9: Category-wise Share of GHG Emissions for Waste Sector (in 2013)

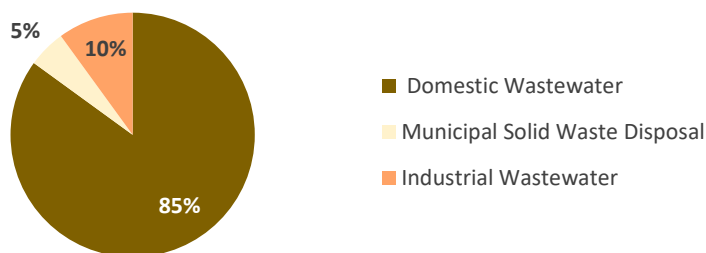
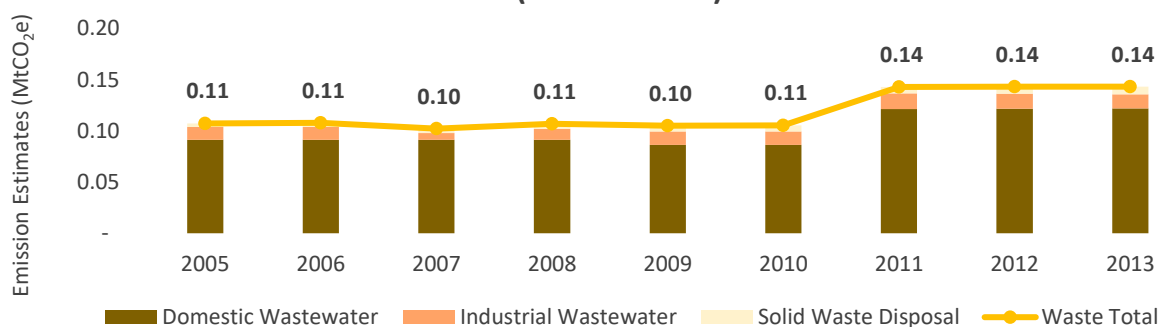


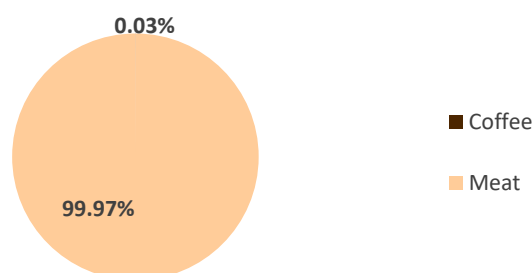
Figure 10: GHG Emission Estimates For Waste Sector in Nagaland (2005 to 2013)



Nagaland's emissions from Domestic Wastewater increased at a CAGR of 3.68% from 0.09 MtCO₂e in 2005 to 0.12 MtCO₂e in 2013. Almost 61% of Domestic Wastewater emissions arose from rural areas of Nagaland in 2013. Discharge of untreated wastewater and use of septic tanks are key drivers of emissions in this sub-sector.

Industrial Wastewater also contributed to ~10% of emissions of Nagaland in 2013. Deep diving into the various Industrial Wastewater categories, almost 99.97% Industrial Wastewater emissions arose from Meat Waste followed by very small contribution from Coffee Waste (~0.03%) in 2013 as illustrated in figure 11 below.

Figure 11: Share of GHG Emissions for Industrial Wastewater Categories (in 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 CH₄ emissions'



IPPU Sector

No emissions were observed from the IPPU sector in Nagaland across the reference period.



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



The **Council on Energy, Environment and Water (CEEW)** is one of South Asia's leading not-for-profit policy research institutions. It uses data, integrated analysis and strategic outreach to explain – and change – the use, reuse, and misuse of resources.

The **International Maize and Wheat Improvement Center (CIMMYT)** is the global leader in agricultural research for development in wheat and maize-based farming systems.

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ICLEI - Local Governments for Sustainability is a leading global network of over 1,500 cities, towns and regions committed to building a sustainable future.

Shakti Sustainable Energy Foundation works to strengthen the energy security of the country by aiding the design and implementation of policies that encourage energy efficiency, renewable energy and sustainable transport solutions.

Vasudha Foundation, set up in 2010, is a not for profit organisation, working in the clean energy and climate policy space.

WRI-India is a research organization that turns big ideas into action at the nexus of environment, economic opportunity and human well-being.

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