GHG Platform INDIA

Trend Analysis of GHG Emissions in MIZORAM

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.

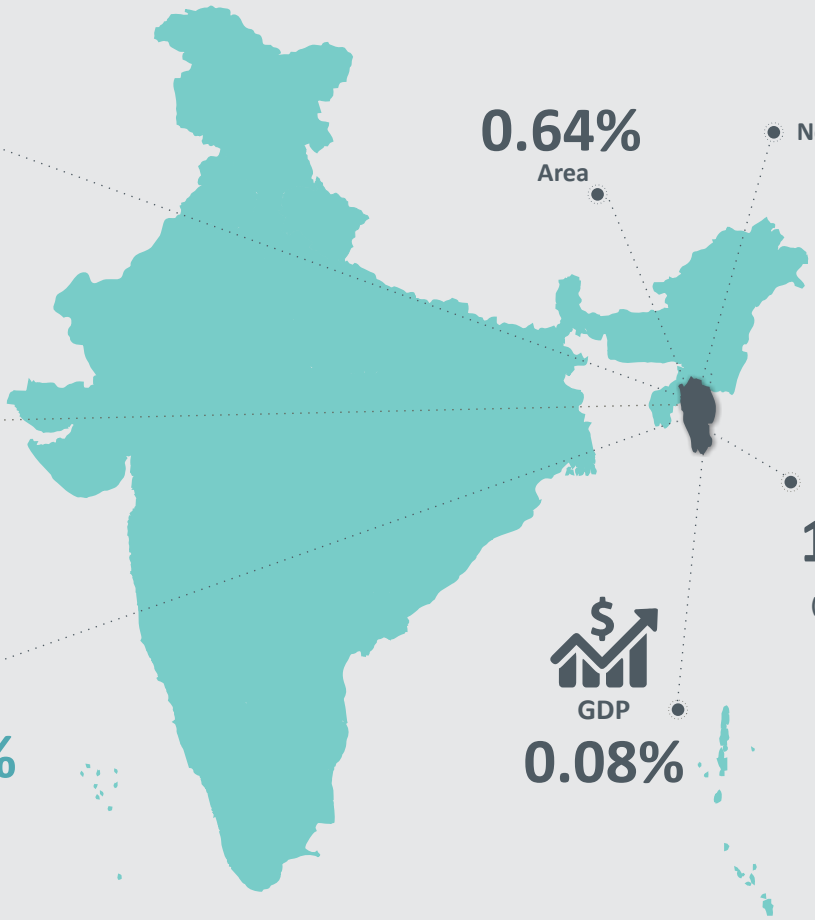
The Platform seeks to add value to the various ongoing GHG emission estimation efforts by helping address existing data gaps and data accessibility issues, extending beyond the scope of national inventories to state inventories, and by increasing the volume of analytics and policy dialogue on India's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

Mizoram at a glance (2013)



Population
0.09%

0.64%
Area

Net GHG Emissions
0.08%

Population Density
52 Persons/Sq.Km (Mizoram)
382 Persons/Sq.Km (India)

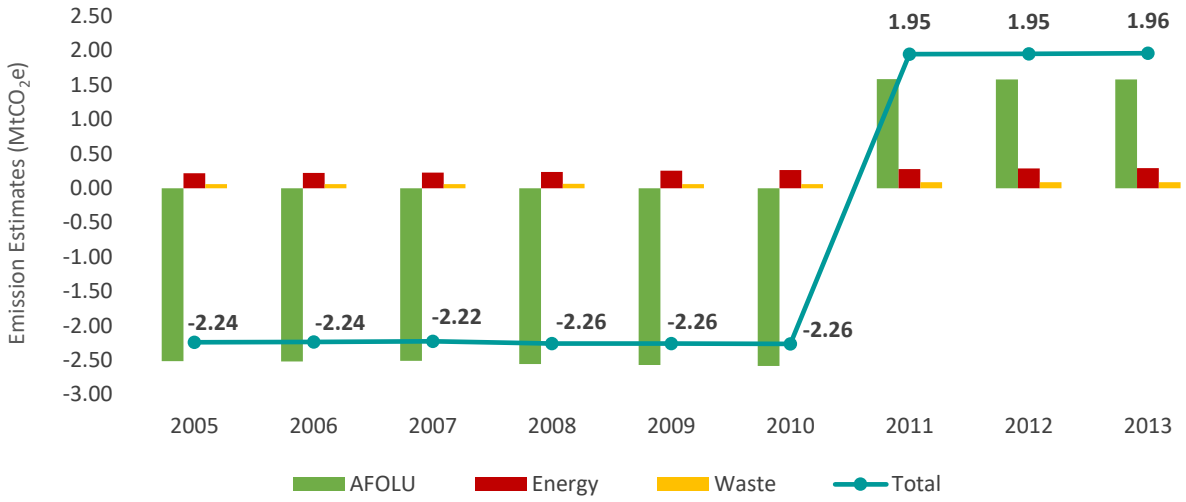
Per Capita Emissions
1.71 tCO_2e (Mizoram)
1.93 tCO_2e (India)

Forest Area
89% (Of Mizoram's Total Area)
2.67% (Of India's Forest Area)

GDP
0.08%

Economy-wide Emission Estimates

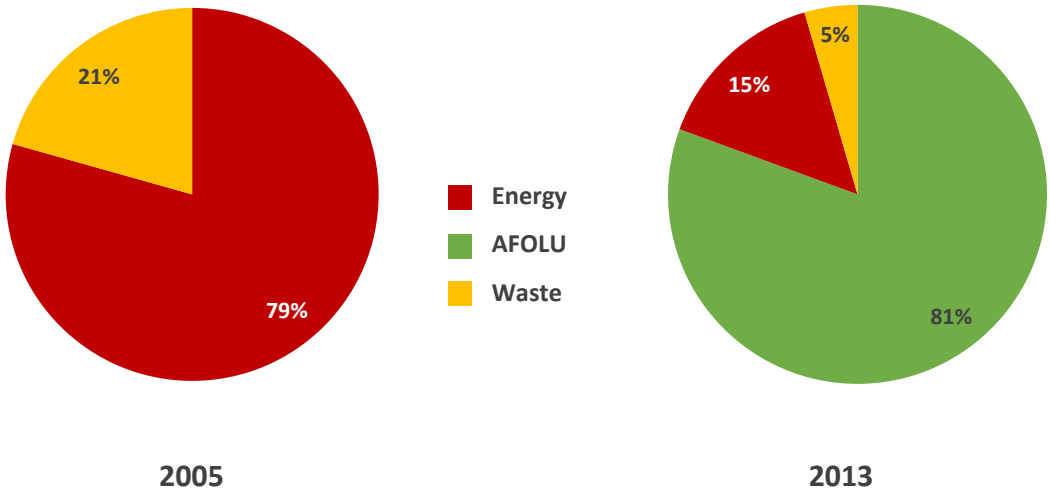
Figure 1: GHG Emission Estimates for Mizoram (2005 to 2013)



Mizoram emitted nearly 1.96 $MtCO_2e$ of GHG emissions in 2013[1]. Mizoram was a net remover of GHGs from 2005 to 2010 but thereafter, it became a net emitter of GHGs owing to the transformation of the AFOLU sector from a net emitter to a net sink of GHGs as depicted in Figure 1 above. GHG Removals from this state grew at a CAGR[2] of 0.20% from 2.24 $MtCO_2e$ in 2005 to 2.26 $MtCO_2e$ GHGs in 2010. From 2011 onwards, however, GHG emissions grew at a CAGR of 0.35% from 1.95 $MtCO_2e$ in 2011 to 1.96 $MtCo_2e$ in 2013. No emissions were registered from the IPPU sector of Mizoram across all the reference years.

If net positive emissions were to be considered (i.e. without the AFOLU sector), ~79% emissions arose from the Energy sector and the remaining 21% from the Waste sector in 2005 (Figure 2). In 2013, however, the AFOLU sector became a net emitter and had the largest share of ~81% in the total emissions followed by the Energy (~15%) and Waste sectors (~5%) respectively.

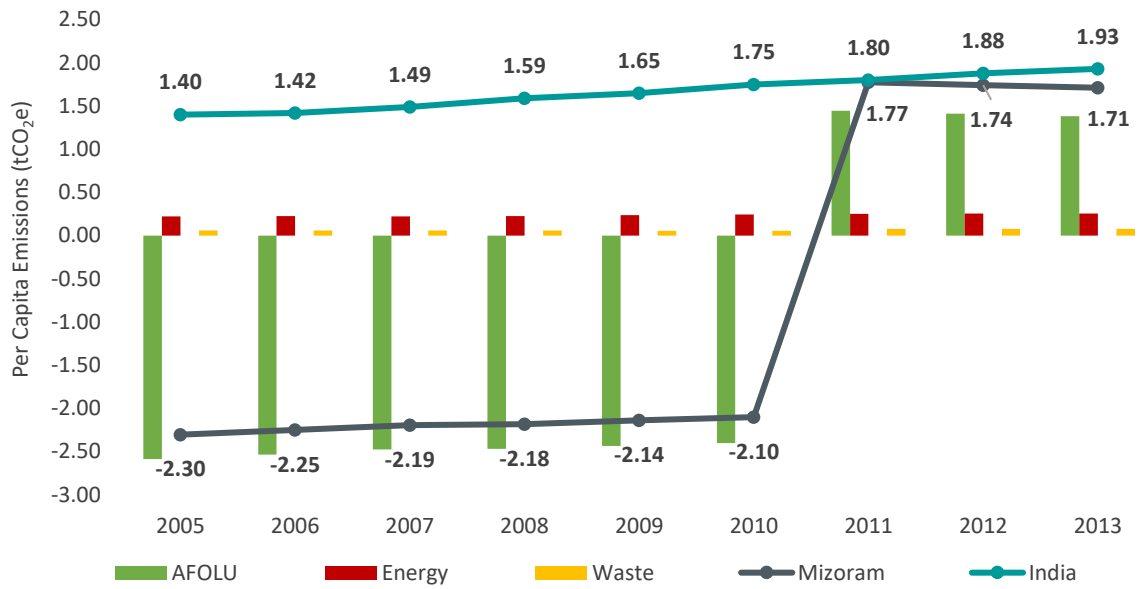
Figure 2: Sector-wise Contribution to Economy-wide GHG Emissions of Mizoram (Excluding AFOLU)



[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

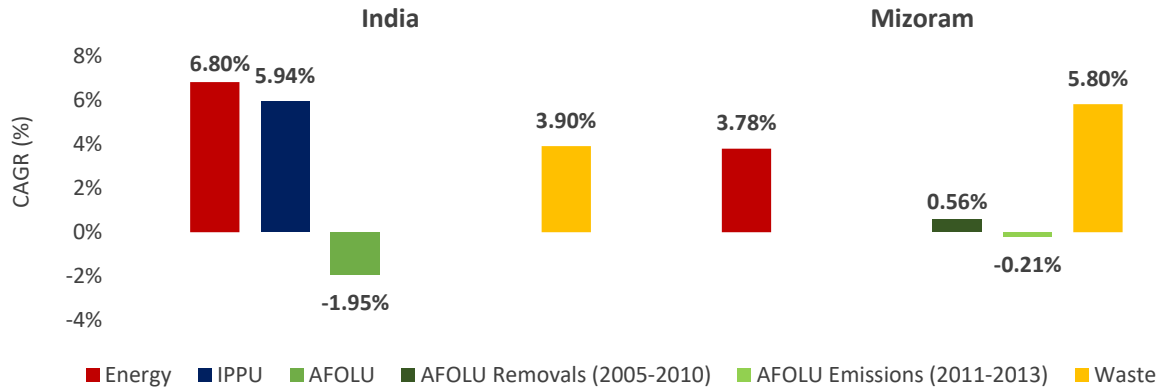
Figure 3: Per Capita GHG Emissions for Mizoram and India (2005 to 2013)



Per Capita removals of Mizoram declined at a rate of 1.81% (compounded annually) from 2.30 tCO_2e in 2005 to 2.10 tCO_2e in 2010. From 2011 onwards, per capita emissions became positive and declined from 1.77 tCO_2e in 2011 to 1.71 tCO_2e in 2013 at a rate of 1.74% (compounded annually). When compared to per capita emissions of India which were net positive throughout the reference period, Mizoram recorded per capita removals of GHGs from 2005 to 2010 and per capita emissions from 2011 to 2013. By 2013, per capita emissions of Mizoram had almost caught up with the per capita emissions of the country as a whole. The CAGR of the per capita emissions of India was 4.07% from 2005 to 2013.

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

These growth rates have been compounded annually.

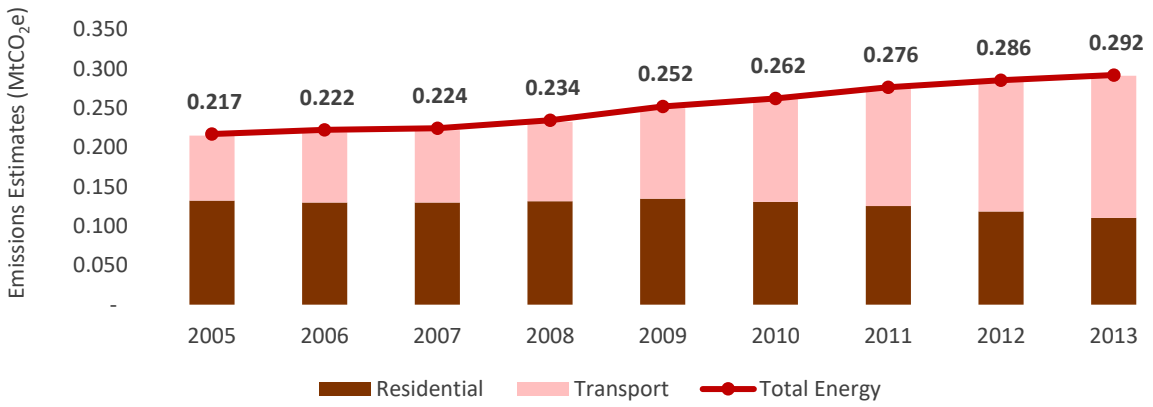


GHG emissions from the Waste sector of Mizoram recorded the highest growth rate of 5.80% (CAGR) from 2005 to 2013 amongst all the sectors (Figure 4). This was followed by the Energy sector which recorded a compounded growth of 3.78%. The removals from the AFOLU sector grew at a minor rate of 0.56% (compounded annually) from 2005 to 2010. However, from 2011 onwards as the AFOLU sector became a net emitter, the emissions declined at a compounded rate of 0.21% till 2013. When compared to India's sectoral emission growth rates, the Waste sector emissions increased at a faster rate while the Energy Sector emissions grew at a lower rate. As already mentioned, Mizoram had no emissions from the IPPU sector, and the AFOLU sector emissions of the state are highly typical, and thus cannot be compared to the GHG emisions trends for the country.

Energy Sector

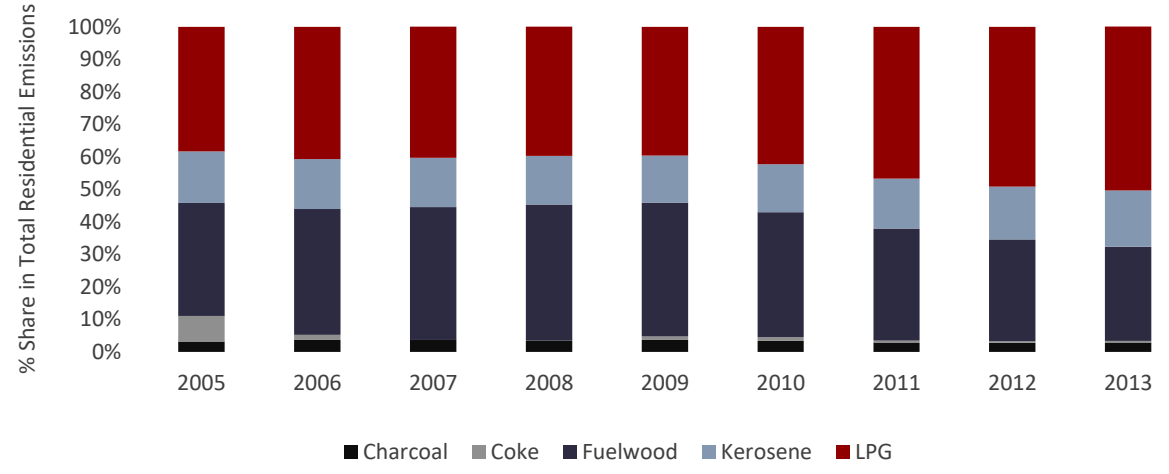
The Energy sector represented nearly ~15% of the total emissions of Mizoram in 2013. In general, emissions from the Energy sector arise from two main sub-sectors – Fuel Combustion (Public Electricity Generation, Transport, Industries and Agriculture, Commercial and Residential categories) and Fugitive. Mizoram's, emissions emanated only from the Fuel Combustion sub-sector. The Energy sector emissions increased at a CAGR of 3.78% from 0.217 $MtCO_2e$ in 2005 to 0.292 $MtCO_2e$ in 2013 (Figure 5).

Figure 5: GHG Emisssions Estimates for Energy Sector in Mizoram (2005 to 2013)



The Residential and Transport categories were the only two emitters of GHGs in this sector across all the reference years. Notably, the share of emissions from the Residential category reduced from ~61% in 2005 to ~38% in 2013 while that of the Transport category rose from ~38% in 2005 to ~62% in 2013. Deep diving into the Residential category, maximum emissions were recorded from the combustion of LPG in the households of Mizoram followed by the usage of Fuelwood in 2013. Notably, the share of emissions from LPG rose from ~38% in 2005 to ~50% in 2013 whereas the share of Fuelwood declined from ~35% in 2005 to ~29% in 2013 indicating the growing adoption of LPG as a replacement of Fuelwood. Significant emissions were also registered from the combustion of Kerosene in this category as shown in Figure 6 below.

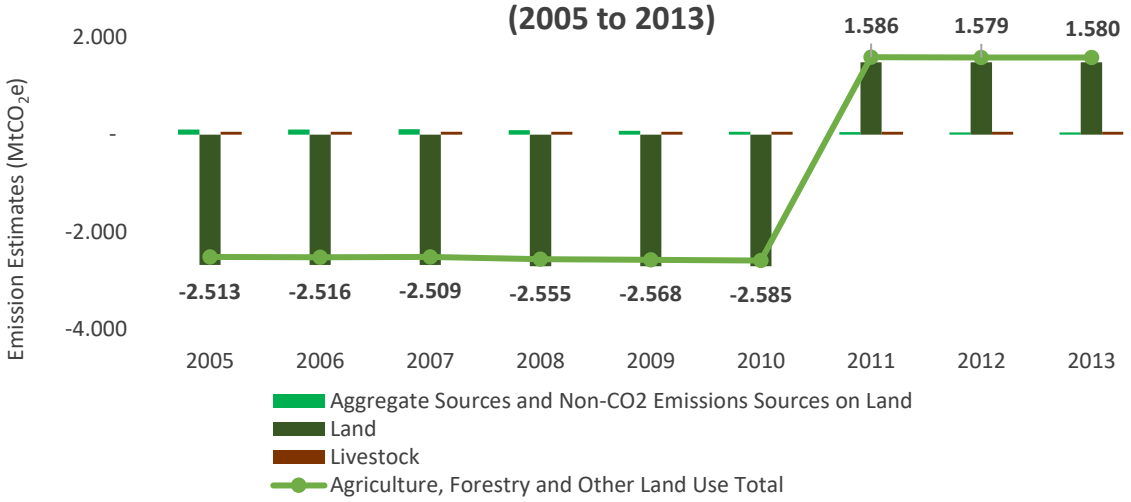
Figure 6: Share of GHG Emissions from Residential Category (2005 to 2013)



AFOLU Sector

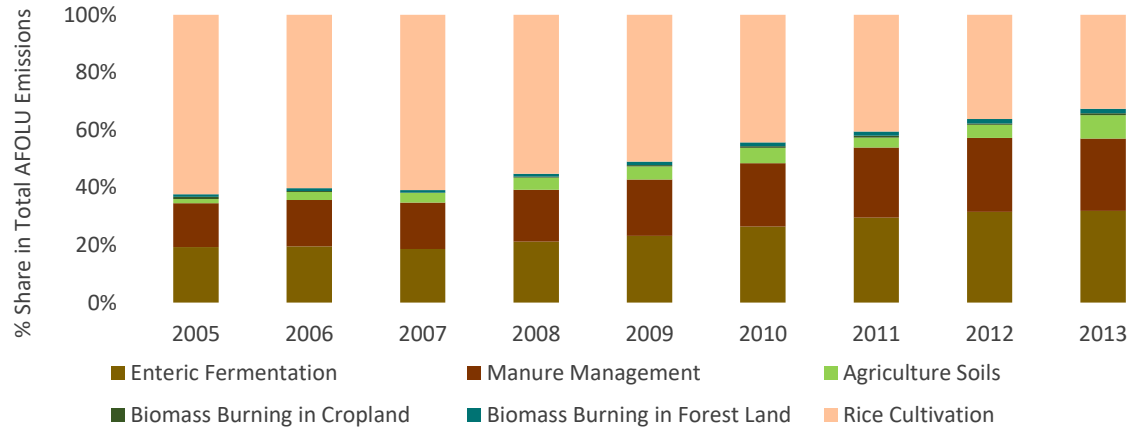
The AFOLU sector of Mizoram emitted 1.586 $MtCO_2e$ GHGs in 2013. Emissions/Removals from this sector arise from three main sub-sectors namely Livestock, Land and Aggregate Sources and Non-CO_2 Emissions Sources on Land. Out of the three sub-sectors, Livestock and Aggregate Sources and Non-CO_2 Emissions Sources on Land were net emitter of GHGs across all the years. Notably, the Land sub-sector was a net sink of GHGs from 2005 to 2010 and a net emitter from 2011 to 2013 making the AFOLU sector a net sink of GHGs from 2005 to 2010 and a net emitter from 2011 to 2013. The removals increased at a CAGR of 0.56% from 2.513 $MtCO_2e$ in 2005 to 2.585 $MtCO_2e$ in 2010 in Mizoram. The emissions of the AFOLU sector declined at a rate of 0.14% (compounded annually) from 1.586 $MtCO_2e$ in 2011 to 1.580 $MtCO_2e$ in 2013 as illustrated in Figure 7 below.

Figure 7: GHG Emission Estimates for AFOLU Sector in Mizoram (2005 to 2013)



If emissions were to be considered without removals and emissions from the Land sub-sector, maximum positive emissions were from the Aggregate Sources and Non-CO_2 Emissions Sources on Land sub-sector across all the reference years. Under this sub-sector, Rice Cultivation was the major contributor of emissions. However, the share of emissions from this category declined from ~62% in 2005 to ~33% in 2013 (Figure 8). This was followed by the Livestock sub-sector under which Enteric Fermentation and Manure Management were the key emitters of GHGs during the reference period. Notably, the share of Livestock sub-sector rose from ~34% in 2005 to ~57% in 2013 while that of Aggregate Sources and Non-CO_2 Emissions Sources on Land decreased correspondingly, as shown in Figure 8 below. Between 2011 and 2013, however, emissions from the Land sub-sector dwarfed all other emissions of the AFOLU sector.

Figure 8: Share of GHG Emissions from AFOLU Categories (Excluding Land) (2005 to 2013)



Waste Sector

The Waste sector contributed ~5% of the total emissions of Mizoram in 2013. Municipal Solid Waste[3], Domestic Wastewater and Industrial Wastewater are the key sources of GHG emissions in the Waste sector. The Waste sector emitted 0.056 $MtCO_2e$ in 2005 which increased to 0.089 $MtCO_2e$ in 2013. GHG emissions from the Waste sector grew at a CAGR of 5.80% from 2005 to 2013 (Figure 9). A significant rise in the total Waste emissions was registered in 2011 owing to increased Domestic Wastewater emissions in 2011 which reflects changing trends in use of various treatment systems as reported in Census of India 2011.

Figure 9: GHG Emissions Estimates for Waste Sector in Mizoram (2005 to 2013)

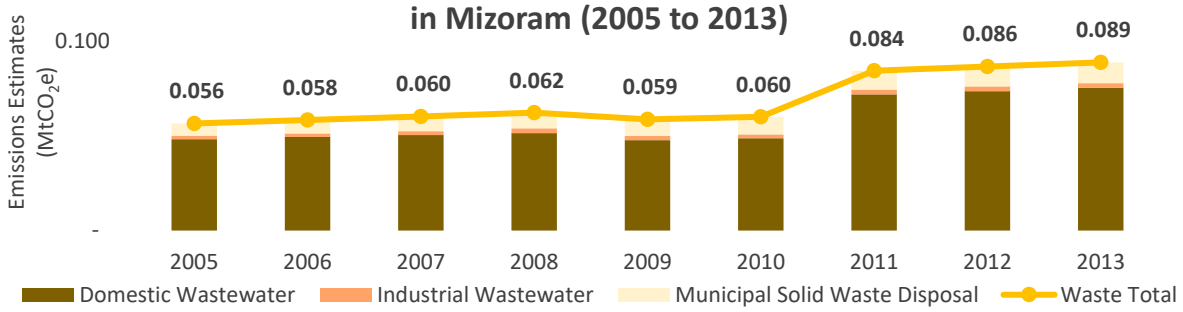
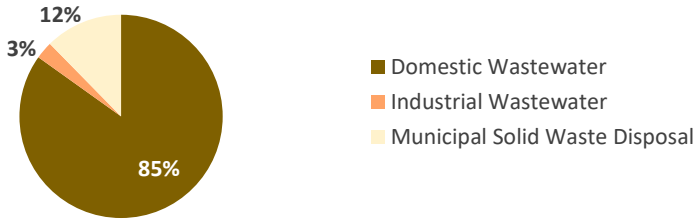
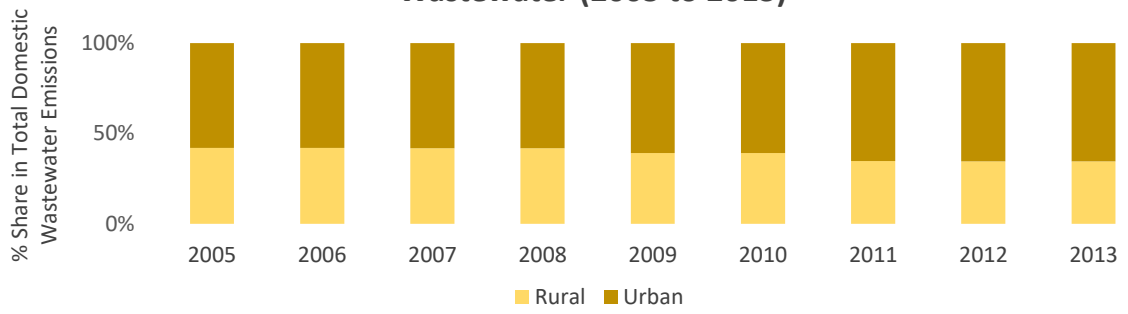


Figure 10: Category-wise Share of GHG Emissions for Waste Sector in 2013



Mizoram's, Domestic Wastewater (Figure 10) from the rural and urban areas had a share of ~85% in total Waste emissions in 2013. Emissions from Domestic Wastewater grew at a CAGR of 5.72% from 0.043 $MtCO_2e$ in 2005 to 0.075 $MtCO_2e$ in 2013. Domestic Wastewater emanating from the urban areas had a major share (~65%) in the emissions of this sub-sector in 2013 (Figure 11). Discharge of untreated wastewater and use of septic tanks are key drivers of emissions in this sub-sector.

Figure 11: Areawise GHG Emission Estimates for Domestic Wastewater (2005 to 2013)



Municipal Solid Waste Disposal contributed ~12% of the Waste sector 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 Mizoram, and emissions from this category had increased at 6.89% (CAGR) from 0.006 $MtCO_2e$ in 2005 to 0.011 $MtCO_2e$ in 2013.

Industrial Wastewater contributed to the remaining 3% of emissions in 2013 from Mizoram's Waste sector (Figure 10). Meat Industry was the found to be the only contributor of emissions in this subsector across all the years.

[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'

IPPU Sector

No IPPU emissions were recorded in Mizoram throughout the reference period.

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The Platform comprises of the following civil society:

An initiative supported by

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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.

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