GHG Platform INDIA

Trend Analysis of GHG Emissions in JHARKHAND

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.

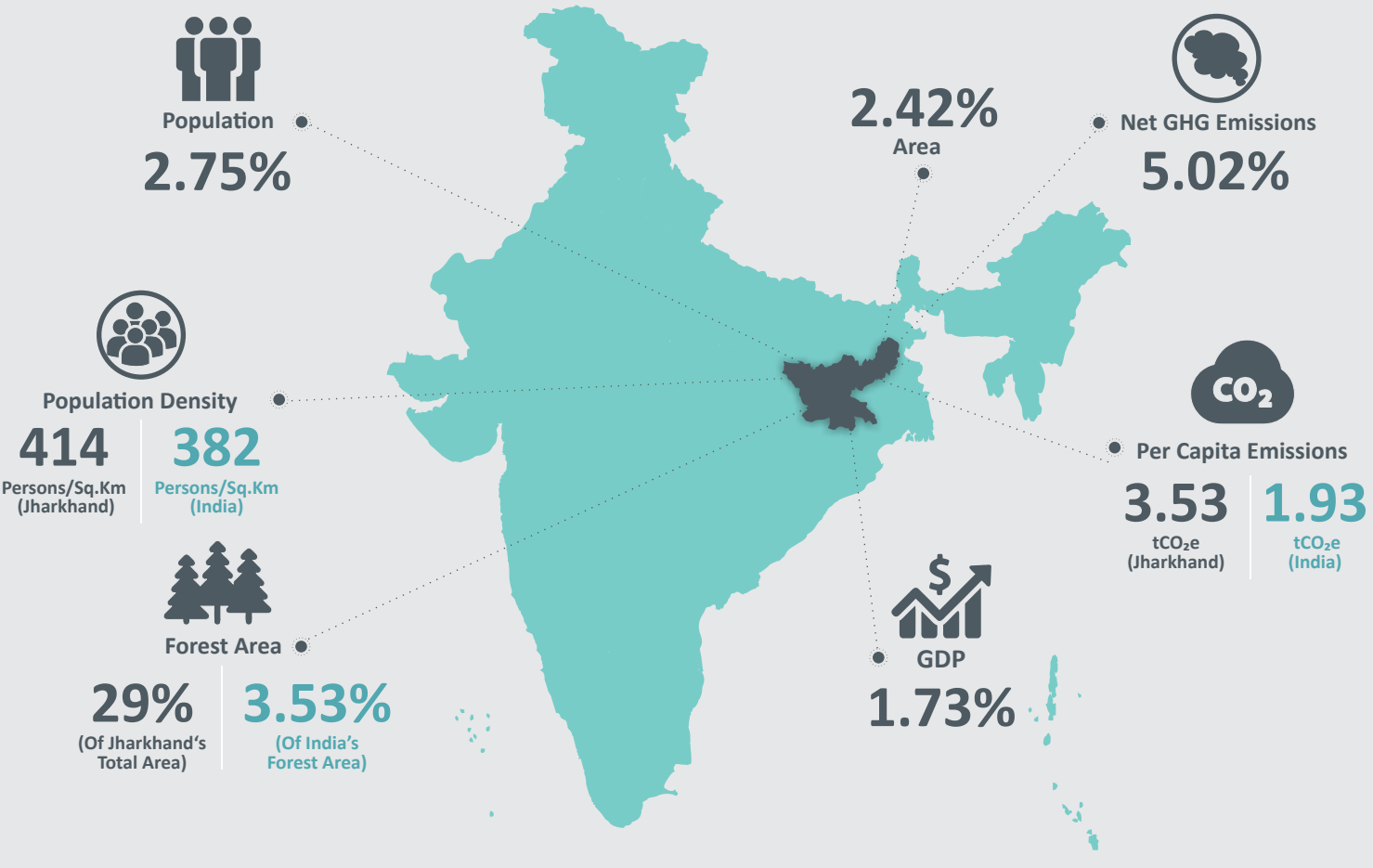
The Platform seeks to add value to the various ongoing GHG emission estimation efforts by helping address existing data gaps and data accessibility issues, extending beyond the scope of national inventories to state inventories, and by increasing the volume of analytics and policy dialogue on India's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

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

ENERGY | IPPU* | AFOLU | WASTE

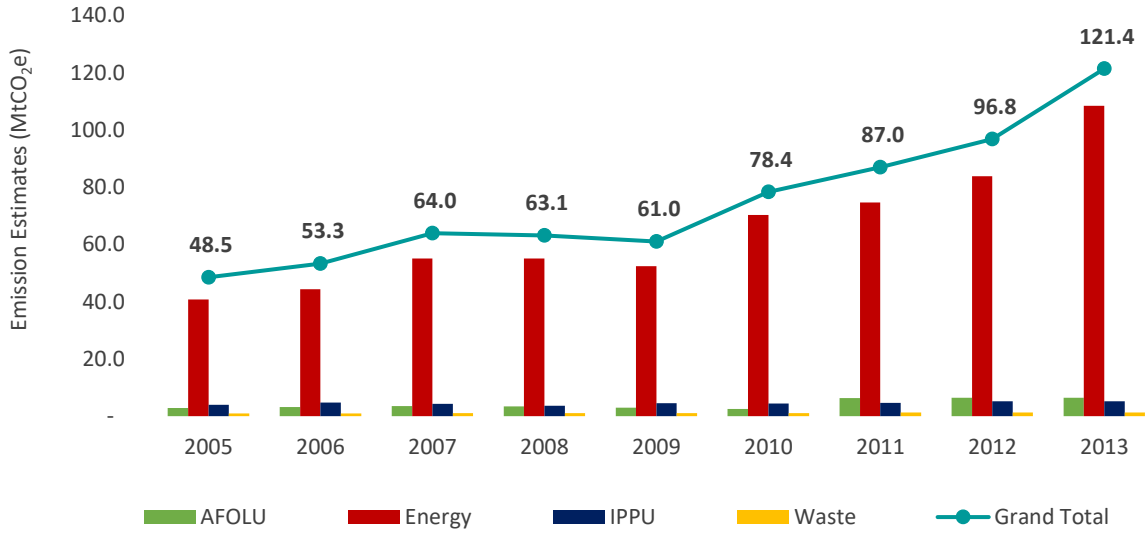
*Fuel combusted for Captive Electricity Generation (Auto-Producers) has been reported under Energy sector.

Jharkhand at a glance (2013)



Economy-wide Emission Estimates

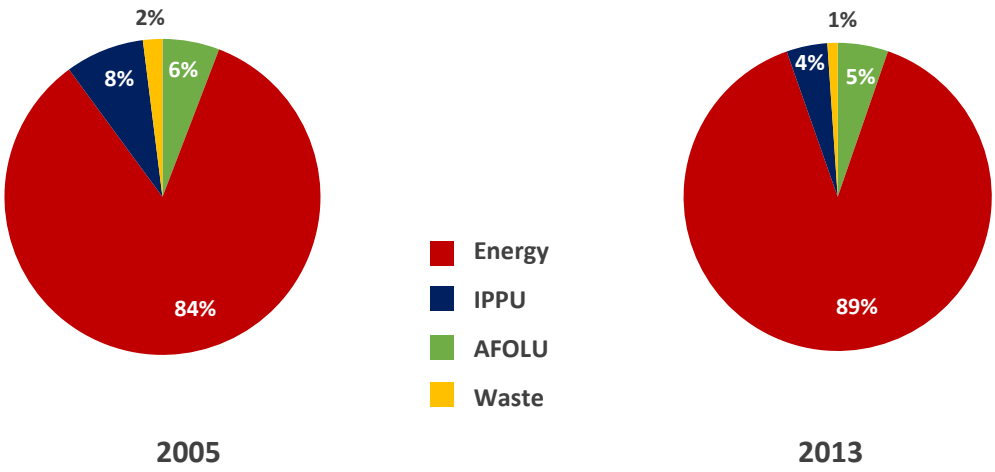
Figure 1: GHG Emission Estimates for Jharkhand (2005 to 2013)



Emissions of Jharkhand grew from 48.5 $MtCO_2e$ to 121.4 $MtCO_2e$ at an estimated CAGR[1] of 12.14% from 2005 to 2013[2] as depicted in Figure 1 above. A significant rise in the overall emissions was observed in 2010 and 2013 owing to increased emissions of the Energy sector.

In 2005, almost 84% emissions were from the Energy sector while the other sectors namely, IPPU (~8%), Waste (~2%) and AFOLU (~6%) contributed nearly 16% to the total emissions. In 2013, the share of emissions from the Energy sector increased to ~89% and that of the IPPU, AFOLU and Waste sectors reduced to ~4%, ~5% and ~1% respectively as depicted in Figure 2 below.

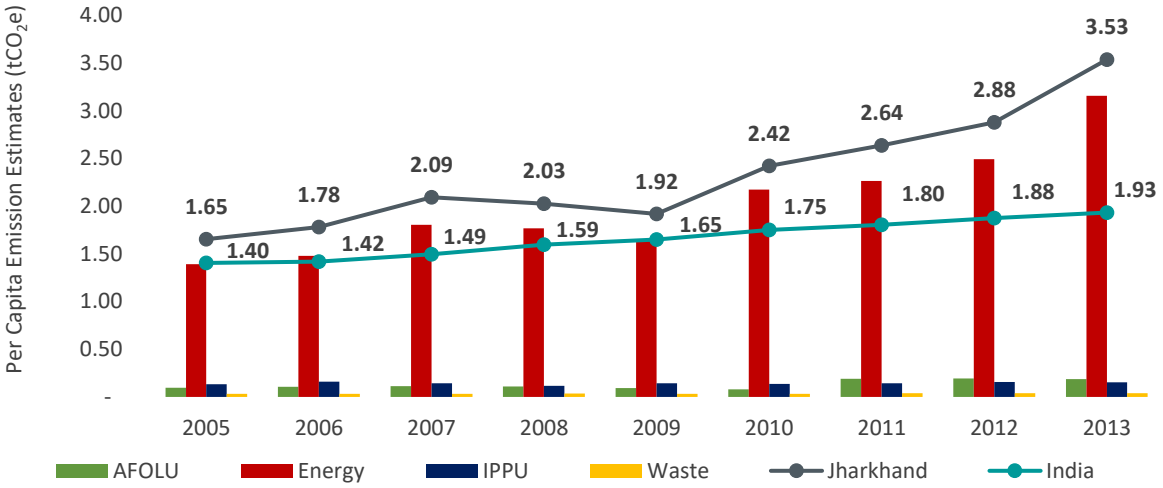
Figure 2: Sector-wise Contribution to Economy-wide GHG Emissions of Jharkhand



[1] Compound Annual Growth Rate

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

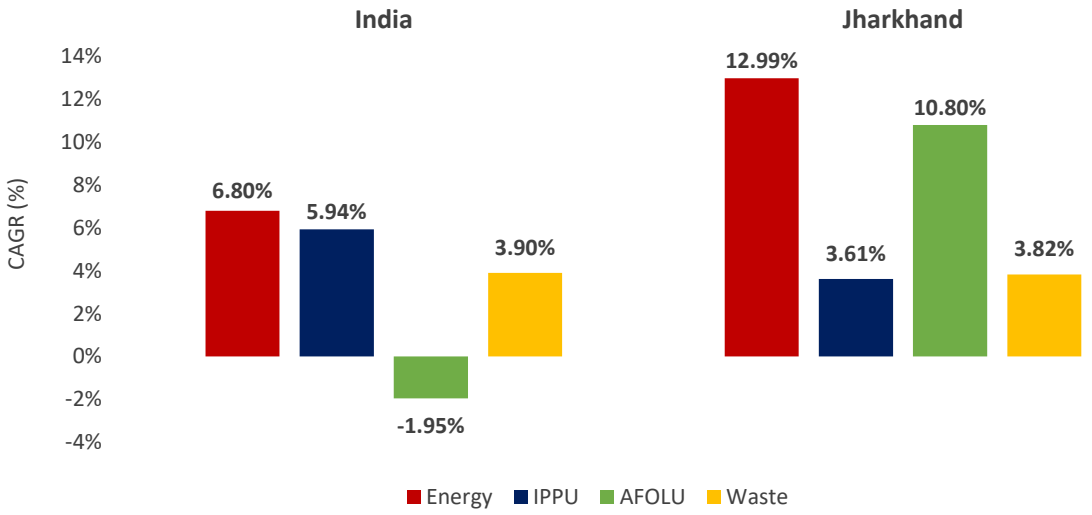
Figure 3: Per Capita GHG Emissions for Jharkhand and India (2005 to 2013)



The per capita emissions of Jharkhand grew from 1.65 tCO_2e in 2005 to 3.53 tCO_2e in 2013 as shown in Figure 3 above. When compared to per capita emissions of India, Jharkhand registered higher per capita emissions across all the years and appeared buoyant in 2013 as they reached a peak of 3.53 tCO_2e. This is perhaps a reflection of increased power production in 2013, perhaps for exports to other states, as well as a concentration of heavy industries in Jharkhand during the reference years. The observed growth rate of the per capita emissions in Jharkhand was 9.96% from 2005 to 2013, much higher than the country's growth rate i.e. 4.07%.

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

These growth rates have been compounded annually.

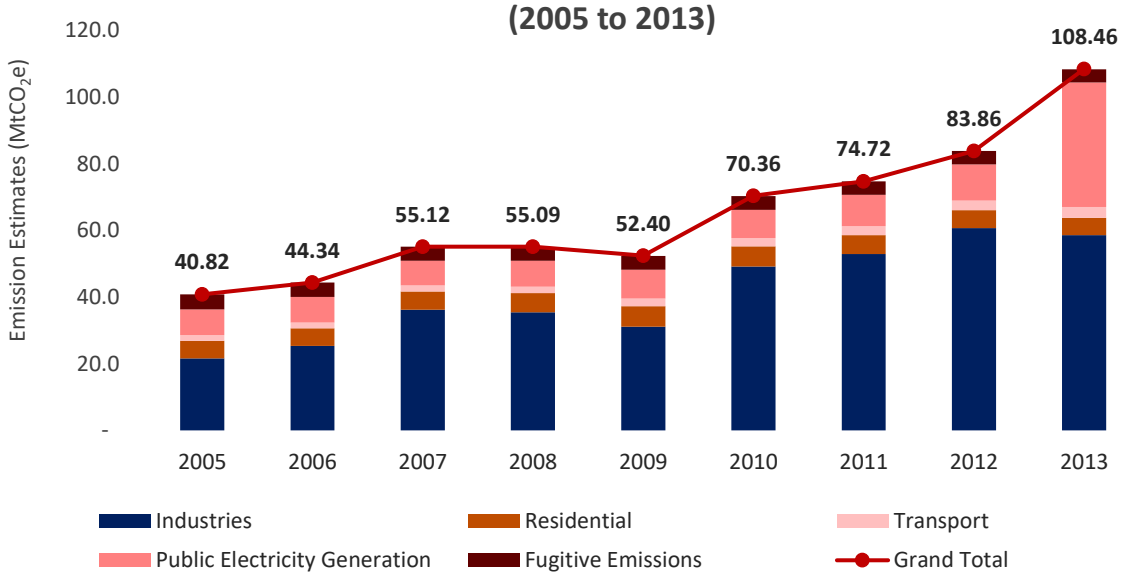


The Energy sector in Jharkhand had the highest observed CAGR of 12.99% from 2005 to 2013. This was followed by the AFOLU sector which had a slightly lower CAGR of 10.80% for the same period. The Waste sector had a much lower growth rate of 3.82% followed by the IPPU sector (3.61%). When compared to India's sectoral growth rates, the Energy and AFOLU sectors recorded higher CAGRs while IPPU and Waste sectors registered relatively lower growth rates as depicted in Figure 4 above.

Energy Sector

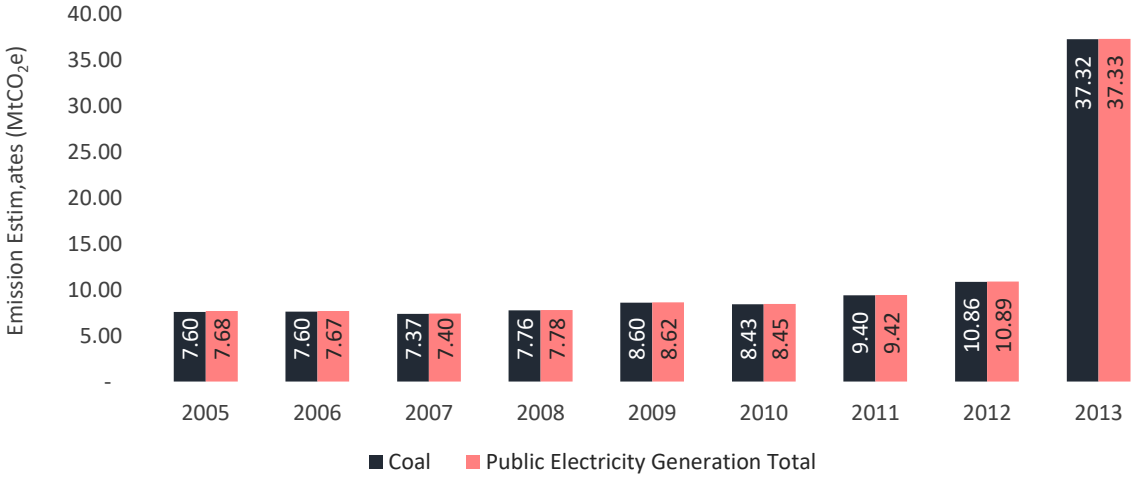
The Energy sector represented almost 89% of total emissions of Jharkhand in 2013. In general, emissions of the Energy sector emanate from two main sub-sectors – Fuel Combustion (Public Electricity Generation, Transport, Industries and Agriculture, Commercial and Residential categories) and Fugitive. In 2013, ~96% of the Energy emissions were from the Fuel Combustion sub-sector while the remaining ~4% were Fugitive. Emissions from this sector grew at a CAGR of 12.99% from 40.82 $MtCO_2e$ in 2005 to 108.46 $MtCO_2e$ in 2013 as depicted in Figure 5 below.

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



Deep diving into the Energy categories, Fuels Combusted in the Industries was a major contributor of emissions across all the reference years with a share of ~54% in 2013. Annual variations in the Energy use emissions from the Industries category were driven by the variations in Coal and Lignite consumption by the Iron and Steel Industries. Emissions from this category was a major contributor to the total industrial emissions during the period, it represented a share of ~81% in the total emissions of this category in 2013. Public Electricity Generation was the second major GHG emitter across all the years with a share of ~34% in 2013. Emissions from this category grew at an estimated CAGR of 21.85% from 7.68 $MtCO_2e$ in 2005 to 37.33 $MtCO_2e$ in 2013. Maximum emissions of this category emanated due to the burning of Coal in Thermal Power Plants of Jharkhand as illustrated in Figure 6 below.

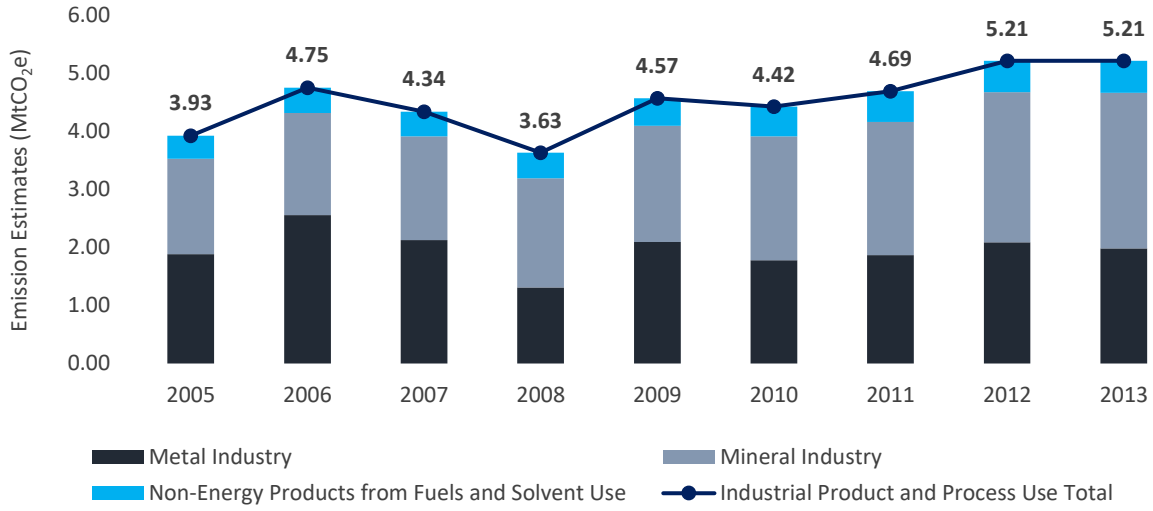
Figure 6: GHG Emission Estimates from Coal-based Power Generation (2005 to 2013)



IPPU Sector

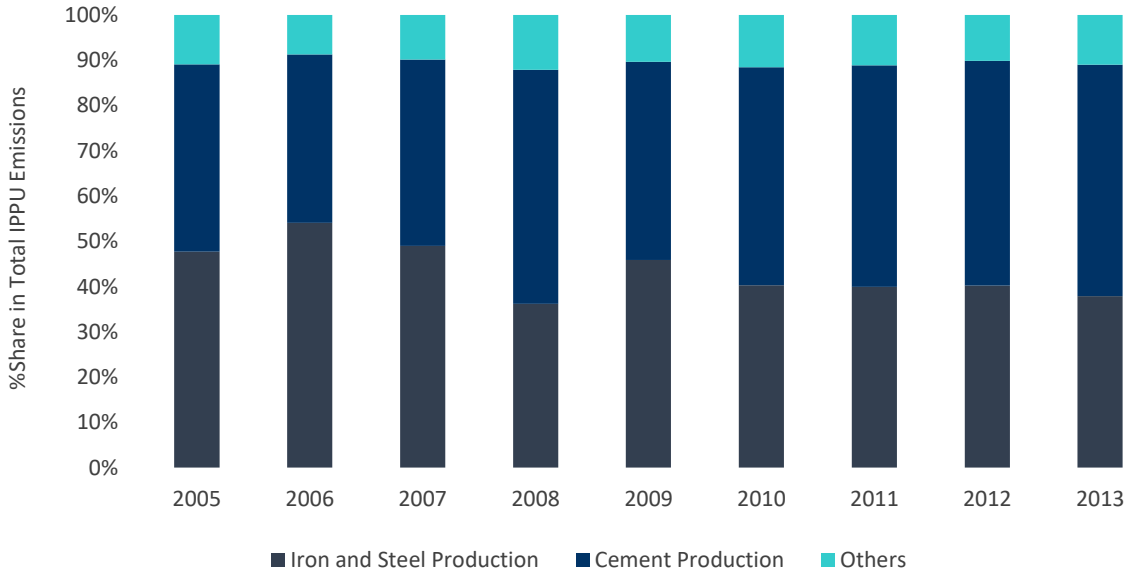
The IPPU sector represented ~4% of the total emissions in Jharkhand in 2013. Emissions from the IPPU sub-sector are largely driven by Metal, Mineral Industries and Non-Energy Products from Fuels and Solvent Use. Between 2005 and 2013, overall IPPU emissions in Jharkhand grew at a CAGR of 3.61% from 3.93 $MtCO_2e$ in 2005 to 5.21 $MtCO_2e$ in 2013 (Figure 7). However, a dip was observed in 2008 due to decreased emissions from Metal Industries (Iron and Steel).

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



A detailed trend of GHG emissions by the various IPPU categories is shown in Figure 8 below. Iron and Steel Production along with Cement Production were the key drivers of IPPU emissions throughout 2005 to 2013. A reduction in the share of emissions from the Iron and Steel Industries was observed in 2008 which led to an interim dip in the total emissions of the IPPU sector as mentioned above.

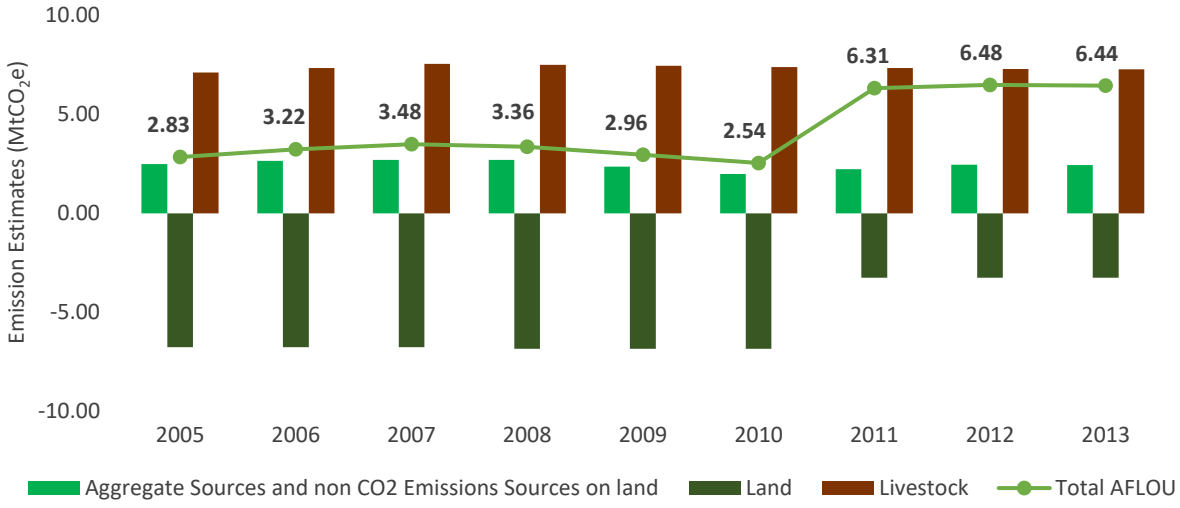
Figure 8: Share of GHG Emissions from IPPU Categories (2005 to 2013)



AFOLU Sector

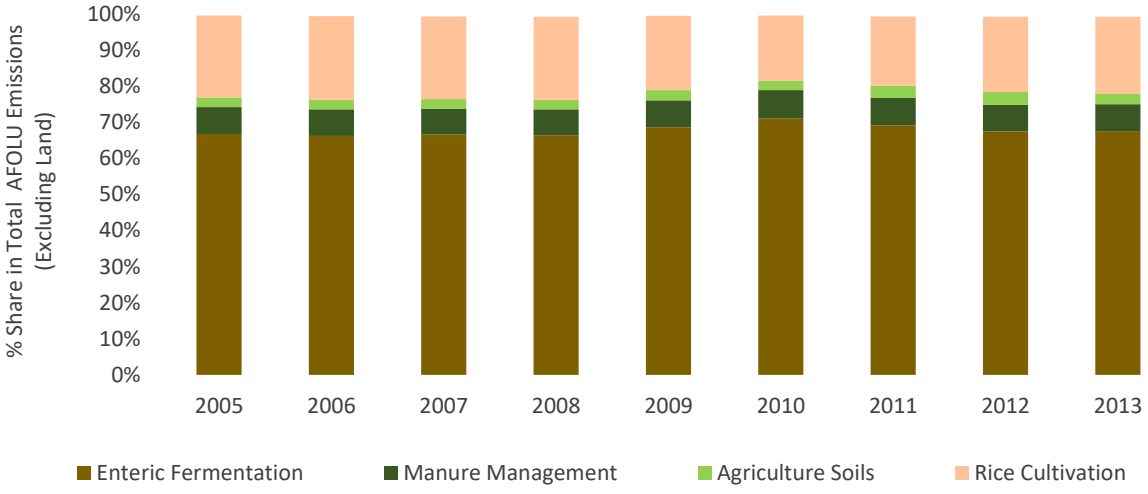
The AFOLU sector represented ~5% of the total emissions of Jharkhand in 2013. Emissions from the AFOLU sector arise from three main sub-sectors namely Livestock, Land and Aggregate Sources and Non-CO_2 Emissions Sources on Land. Emissions of the AFOLU sector grew at a CAGR of 10.80% from 2.83 $MtCO_2e$ in 2005 to 6.44 $MtCO_2e$ in 2013. An interim rise in the total emissions of this sector was observed in 2011 owing to reduced removals from the Land sub-sector. Notably,the removals from Land declined at a compounded rate of 8.72% from 6.75 $MtCO_2e$ in 2005 to 3.25 $MtCO_2e$ as shown in Figure 9 below.

Figure 9: GHG Emission Estimates for AFOLU Sector in Jharkhand (2005 to 2013)



Out of the three sub-sectors, maximum emissions were observed from Livestock (Enteric Fermentation & Manure Management) across all the reference years. Within the Livestock sub-sector, it was found that Enteric Fermentation was the major emitter with an average share of ~68% across all the reference years (if values were considered excluding Land). Rice cultivation was the second highest emitter of GHGs in the AFOLU sector with an average share of ~21% for the reference period.

Figure 10: Share of GHG Emissions from AFOLU Sub-sectors (Excluding Land)



Waste Sector

The Waste sector contributed to almost 1% of total emissions of Jharkhand in 2013. Municipal Solid Waste[3], Domestic Wastewater and Industrial Wastewater are the key sources of GHG emissions in the Waste sector. GHG emissions from Waste grew at a CAGR of 3.82% from 0.97 $MtCO_2e$ in 2005 to 1.30 $MtCO_2e$ in 2013. However, a spike in emissions in 2011 was observed 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 for Waste Sector in Jharkhand (2005 to 2013)

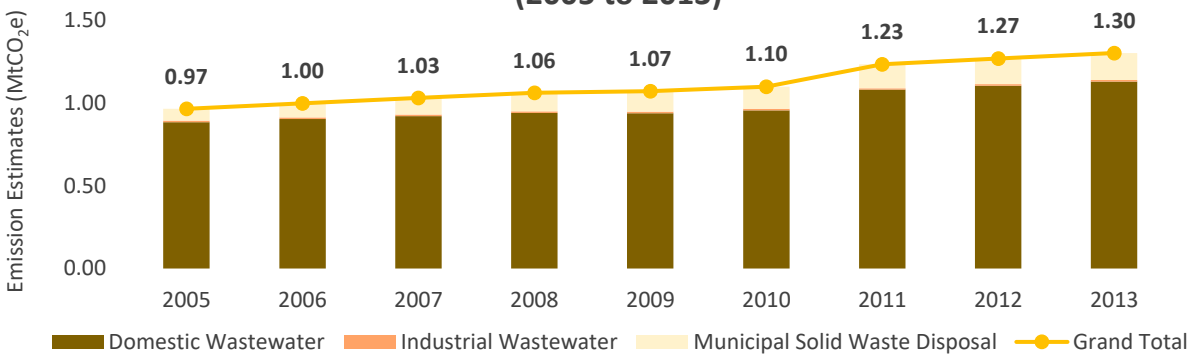
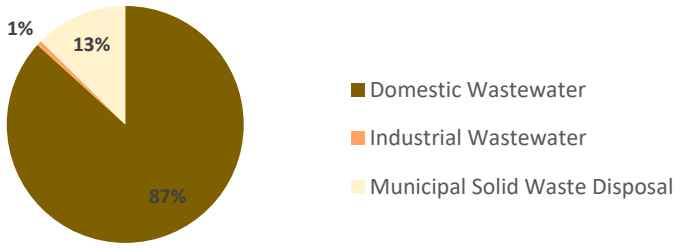
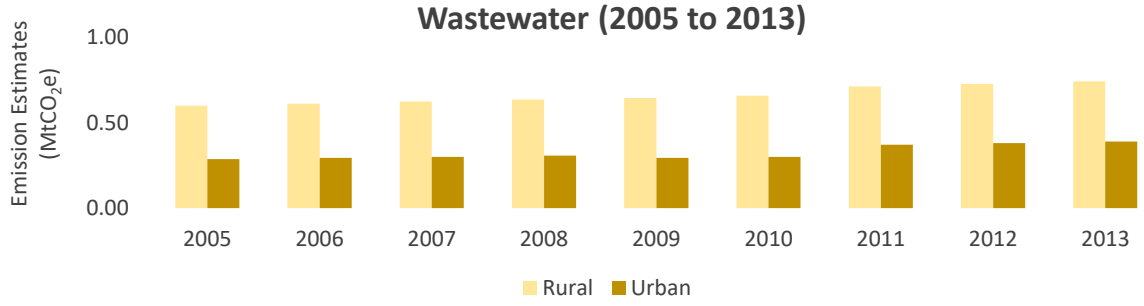


Figure 12: Category-wise Share of GHG Emissions for Waste Sector (in 2013)



Domestic Wastewater had a share of ~87% in the total emissions of the Waste sector in 2013. Emissions from Domestic Wastewater of Jharkhand grew at a CAGR of 3.10% from 0.89 $MtCO_2e$ in 2005 to 1.13 $MtCO_2e$ in 2013. In 2013, ~66% of Domestic wastewater emissions emanated from the rural areas of Jharkhand and the share of emissions from the rural areas remained high across all the reference years as illustrated in Figure 13 below. Discharge of untreated wastewater and use of septic tanks are key drivers of emissions in this sub-sector.

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



Municipal Solid Waste contributed ~13% of emissions in year 2013. Emissions from this category grew at a CAGR of 10.92% from 0.07 $MtCO_2e$ in 2005 to 0.16 $MtCO_2e$ in 2013. Industrial Wastewater had a minor share of ~1% in the total emissions of Jharkhand in 2013. Meat Industry was found to be the only contributor in this subsector.

[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

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The Platform comprises of the following civil society:

An initiative supported by

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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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