GHG Platform INDIA

Trend Analysis of GHG Emissions in ODISHA

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.

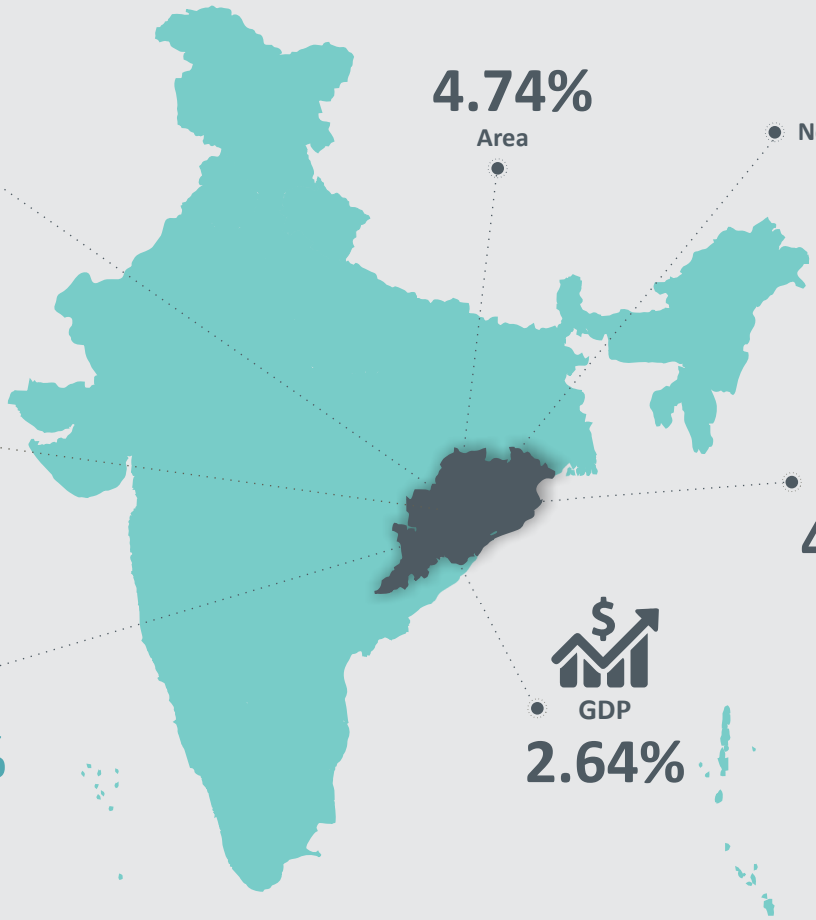
The Platform seeks to add value to the various ongoing GHG emission estimation efforts by helping address existing data gaps and data accessibility issues, extending beyond the scope of national inventories to state inventories, and by increasing the volume of analytics and policy dialogue on India's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

Odisha at a glance (2013)



Population
3.44%

4.74%
Area

Net GHG Emissions
7.86%

Population Density
269 Persons/Sq.Km (Odisha)
382 Persons/Sq.Km (India)

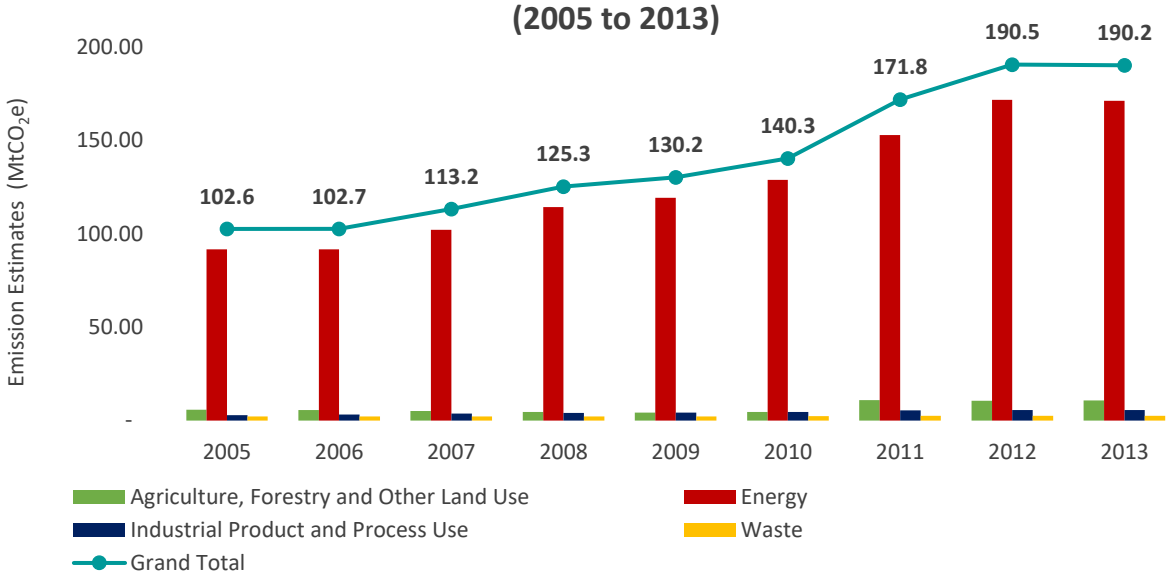
Per Capita Emissions
4.41 tCO_2e (Odisha)
1.93 tCO_2e (India)

Forest Area
32% (Of Odisha's Total Area)
7.18% (Of India's Forest Area)

GDP
2.64%

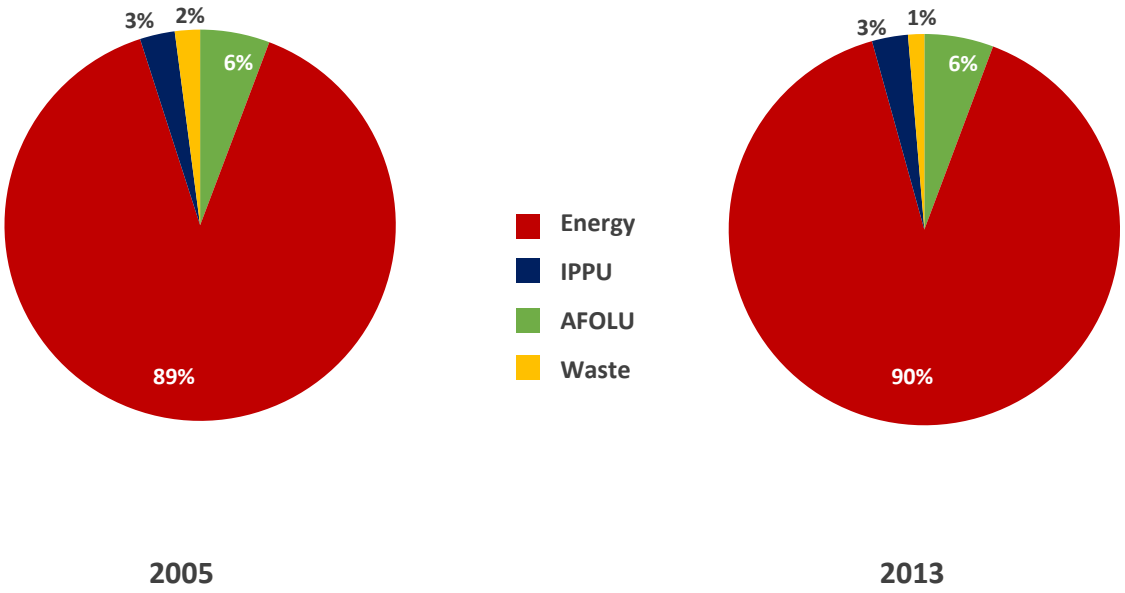
Economy-wide Emission Estimates

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



Emissions of Odisha grew at an estimated CAGR[1] of 8.02% from 102.6 $MtCO_2e$ in 2005 to 190.2 $MtCO_2e$ in 2013[2]. A significant rise in the total emissions was observed after 2010 owing to increased Energy sector emissions during the reference period as shown in Figure 1 above. In 2013, ~90% of the emissions were from the Energy sector while the combined emissions of the IPPU (~3%), Waste (~1%) and AFOLU (~6%) sectors were nearly 10%. Notably, the sector-wise contribution of emissions remained almost the same when compared to 2005 levels as inferred from Figure 2 below.

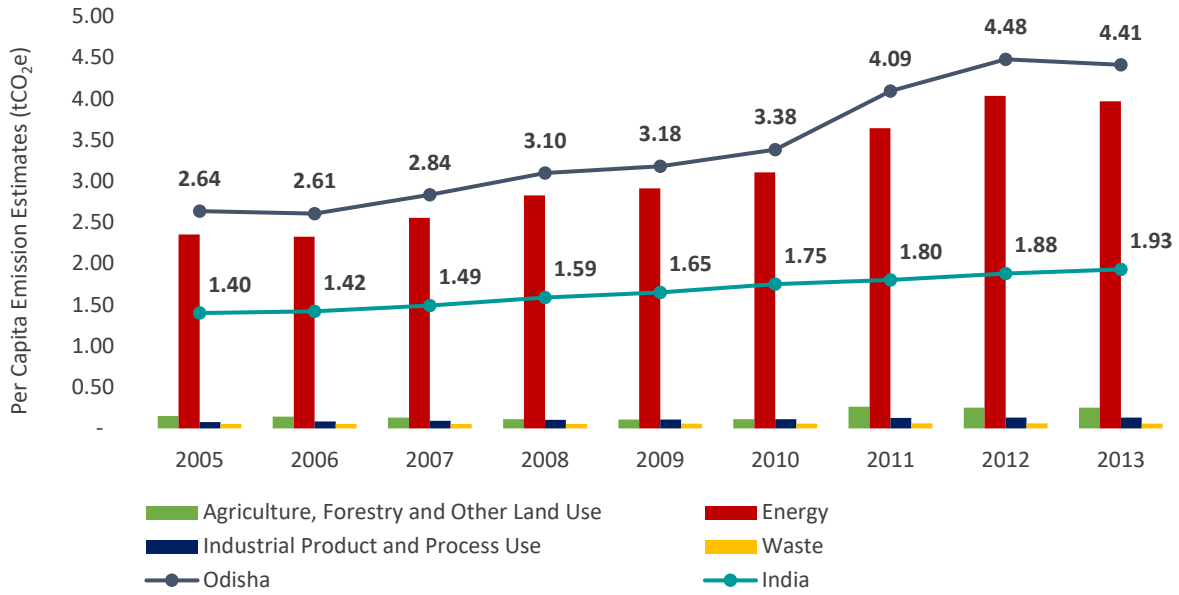
Figure 2: Sector-wise Contribution to Economy-wide GHG Emissions of Odisha



[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.

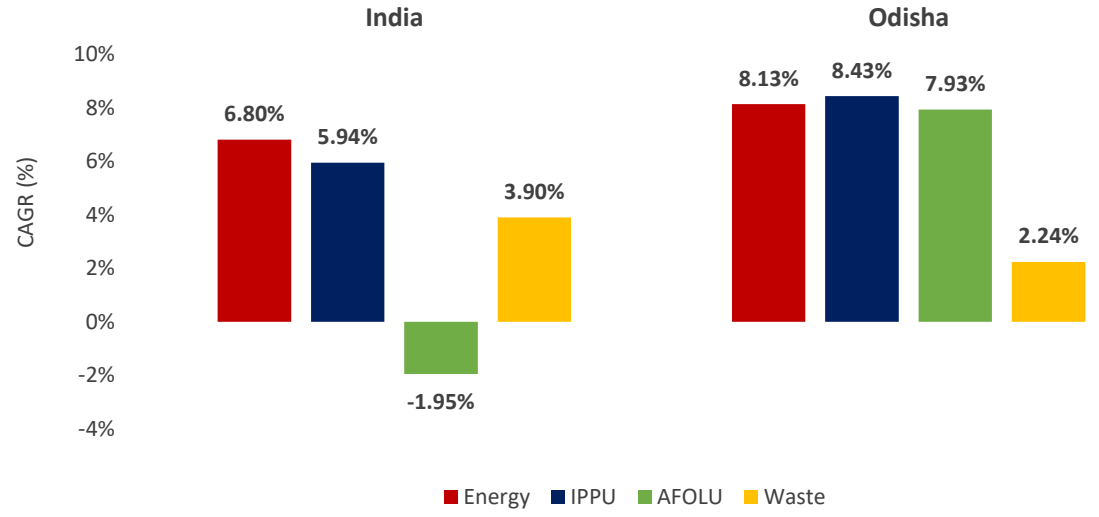
Figure 3: Per Capita GHG Emissions for Odisha and India (2005 to 2013)



Per Capita emissions of Odisha grew at a CAGR of 6.64% from 2.64 tCO_2e in 2005 to 4.41 tCO_2e in 2013. When compared to India, Odisha had much higher per capita emissions than that of the country throughout the reference period. The per capita emissions reached their highest (4.48 tCO_2e) in 2012 owing to increased Energy sector emissions as illustrated in Figure 3 above. In addition, the per capita emissions of India grew at a comparatively lower CAGR of 4.07% than Odisha, during the reference period.

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

These growth rates have been compounded annually.

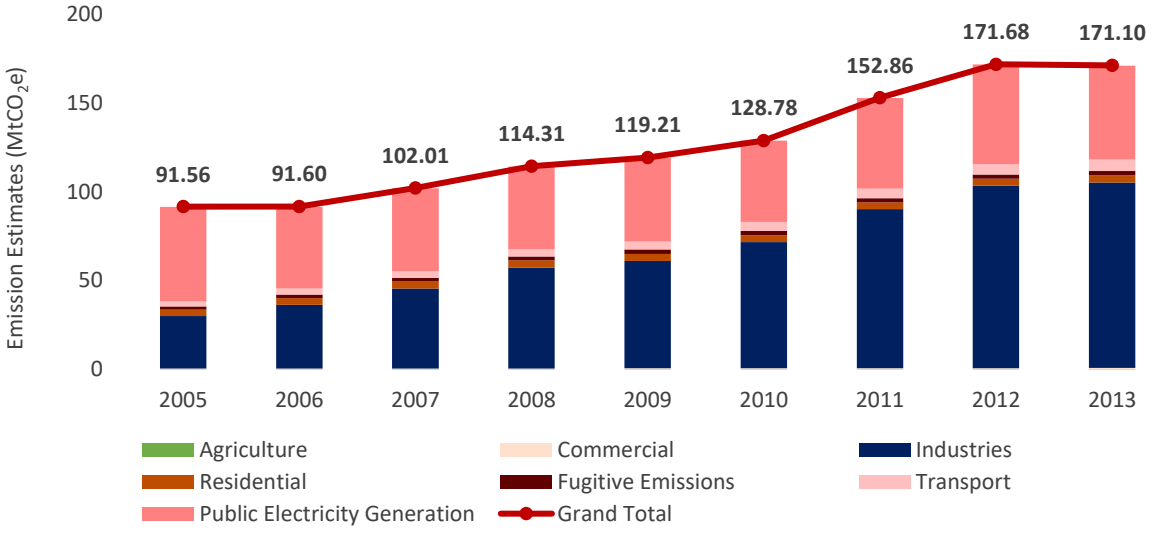


The IPPU sector in Odisha registered the highest observed CAGR of 8.43% from 2005 to 2013. This was followed by the Energy sector, which had a slightly lower CAGR of 8.13% for the same period. Notably, the AFOLU sector recorded a growth rate of 7.93% during the reference period as shown In Figure 4 above in comparison with India's AFOLU emissions that declined. The Waste sector registered the lowest CAGR of 2.24% from 2005 to 2013. When compared to India's sectoral emission growth rates, all the sectors recorded higher growth rates in Odisha except for the Waste sector.

Energy Sector

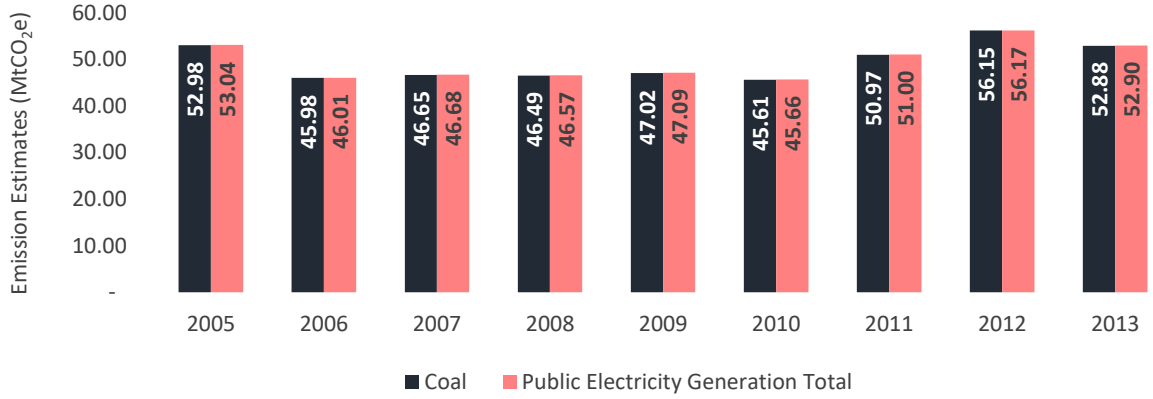
The Energy sector represented ~90% of the total emissions of Odisha in 2013. In general, emissions from the Energy sector arise from two main sub-sectors – Fuel Combustion (Public Electricity Generation, Transport, Industries and Agriculture, Commercial and Residential categories) and Fugitive. In Odisha, maximum emissions arose due to Fuel Combustion and almost negligible emissions from the Fugitive sub-sector. The emissions from the Energy sector grew at a CAGR of 8.13% from 91.56 $MtCO_2e$ in 2005 to 171.10 $MtCO_2e$ in 2013. The overall emissions of the Energy sector reached a peak of 171.68 $MtCO_2e$ in 2012 owing to increased GHG emissions from Industries (primarily from Coal consumption in the Iron and Steel Industries) and Public Electricity Generation as illustrated in Figure 5 below.

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



Public Electricity Generation and Fuels Combusted in the Industries were the top two contributors in Odisha's Energy emissions portfolio. Notably, the share of share of Public Electricity Generation in the total Energy emissions reduced from ~58% in 2005 to ~31% in 2013 while that of the Industries increased from ~32% in 2005 to ~61% in 2013. This transition in the share of emissions can be attributed to the increased emissions from Iron and Steel Industries along with emissions from Auto-Producers in the Industries category. Under the Public Electricity Generation category, almost all the emissions were found to be emanating from the Coal-based Power Plants of Odisha 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 ~3% of the total GHG emissions in Odisha in 2013. Emissions from IPPU sector are largely driven by Chemical, Metal, Mineral Industries and Non-Energy Products from Fuels and Solvent Use. Between 2005 and 2013, the overall IPPU emissions grew at a CAGR of 8.43% from 3.0 $MtCO_2e$ in 2005 to 5.7 $MtCO_2e$ in 2013. A significant rise in the overall IPPU emissions was observed in 2011 owing to increased emissions from Metal and Mineral Industries as illustrated in the Figure 7 below.

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

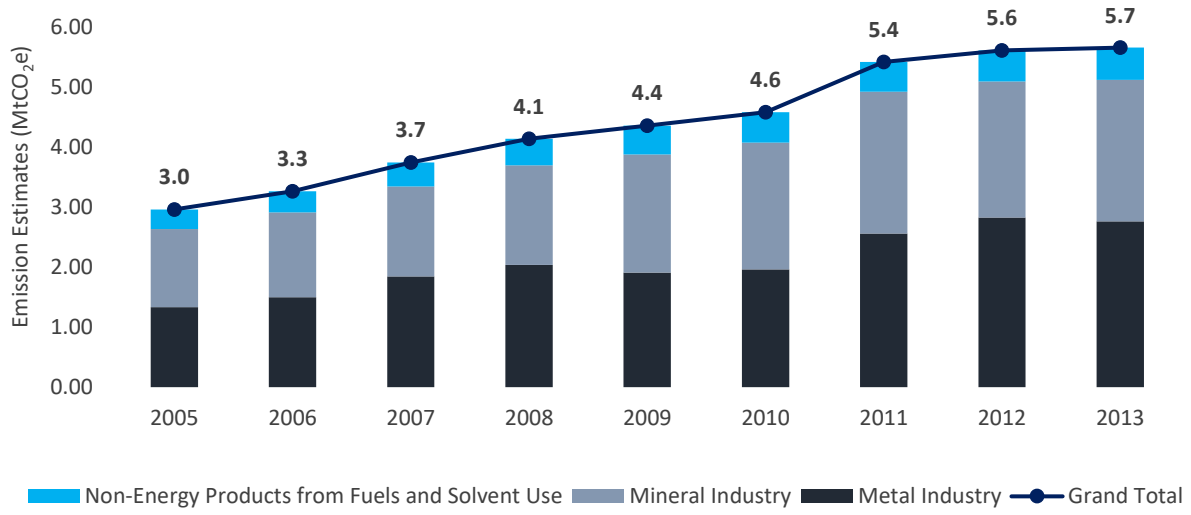
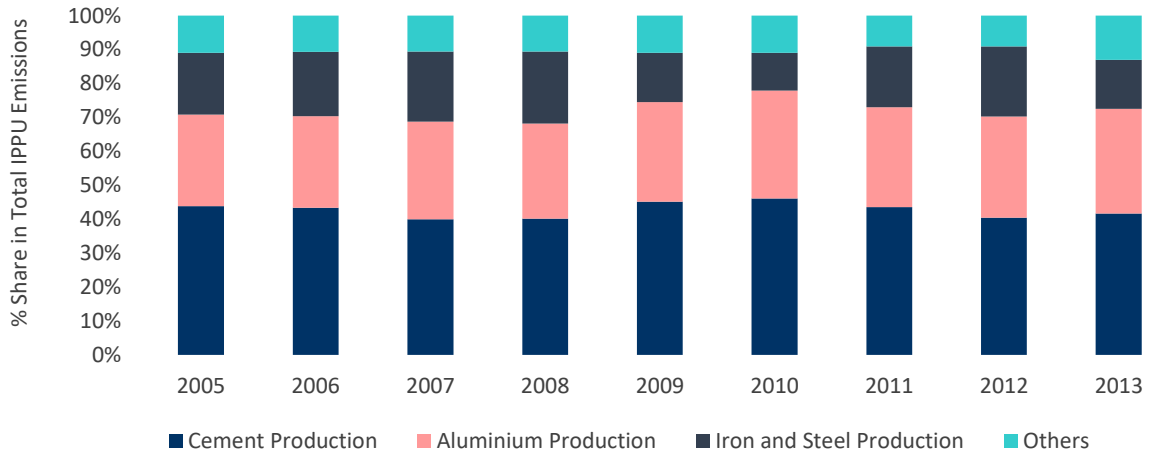


Figure 8 below depicts a trend of GHG emissions by various IPPU categories. Notably, Cement Production was the key driver of GHG emissions across all the reference years. However, its share in the total IPPU emissions reduced from ~44% in 2005 to ~42% in 2013. Significant emissions were also registered from Aluminium as well as Iron and Steel Production in Odisha's IPPU emissions portfolio.

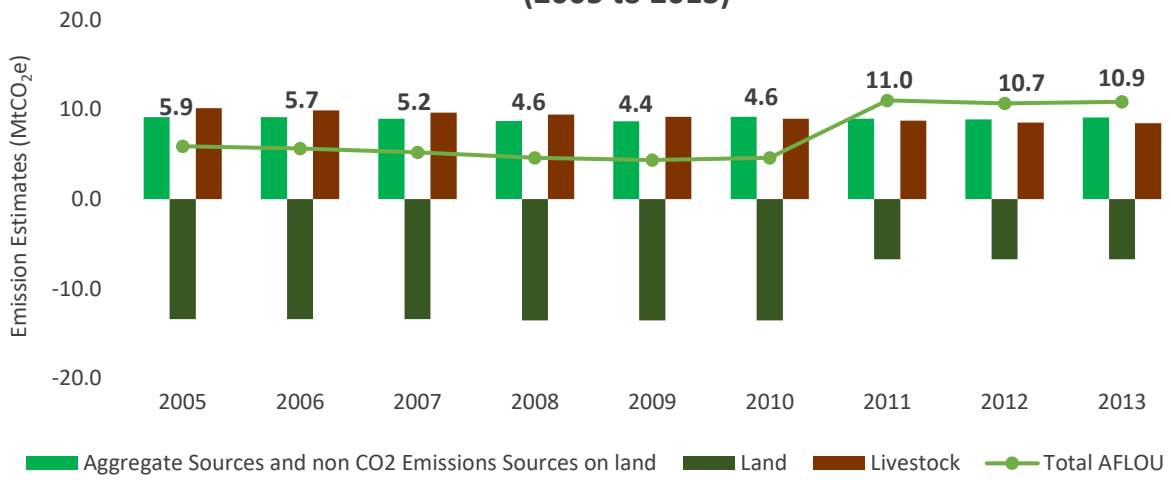
Figure 8: GHG Emission Estimates from IPPU Categories (2005 to 2013)



AFOLU Sector

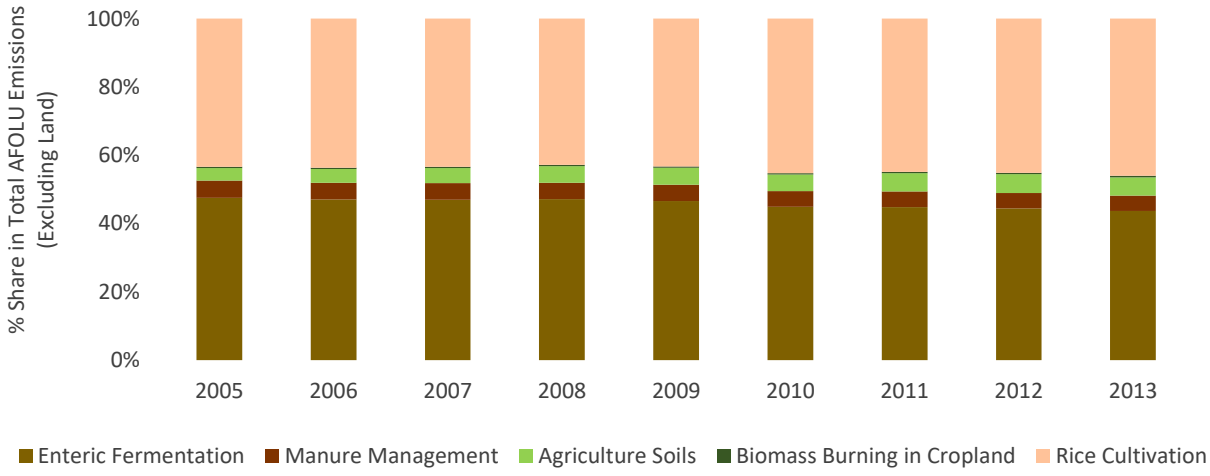
Emissions from the AFOLU sector represented ~6% of total emissions of Odisha in 2013. Emissions from the AFOLU sector arise from three main sub-sectors namely Livestock, Land and Aggregate sources and Non-CO_2 emissions sources on land. Emissions from the AFOLU sector grew at a CAGR of 7.93% from 5.9 $MtCO_2e$ in 2005 to 10.9 $MtCO_2e$ in 2013. Notably, removals from the Land sub-sector reduced to almost half their value in 2013 when compared to 2005. This decline in GHG removals from the Land sub-sector between 2005 and 2013 was of the order of 8.26% (compounded annually). A corresponding rise in the overall AFOLU emissions was also observed in 2011 owing to decreased removals from the Land sub-sector as shown in Figure 9 below.

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



Deep diving into the AFOLU sub-sectors, Rice Cultivation was found to be the major emitter in 2013. The share of emissions from this category increased from ~43% in 2005 to ~46% in 2013, thus overtaking the Livestock category from 2010 onwards. Till 2009, Enteric Fermentation was the major contributor of the AFOLU emissions across all the reference years. Notably, share of emissions from this category reduced significantly from ~48% in 2005 to ~44% in 2013 as illustrated in Figure 10 below.

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



Waste Sector

The Waste sector contributed to nearly 1% of total emissions in Odisha in 2013. Municipal Solid Waste[3], Domestic Wastewater and Industrial Wastewater are the key sources of GHG emissions in the Waste sector. Emissions from the Waste sector grew at a CAGR of 2.24% from 2.13 $MtCO_2e$ in 2005 to 2.55 $MtCO_2e$ 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 11: GHG Emission Estimates for Waste Sector in Odisha (2005 to 2013)

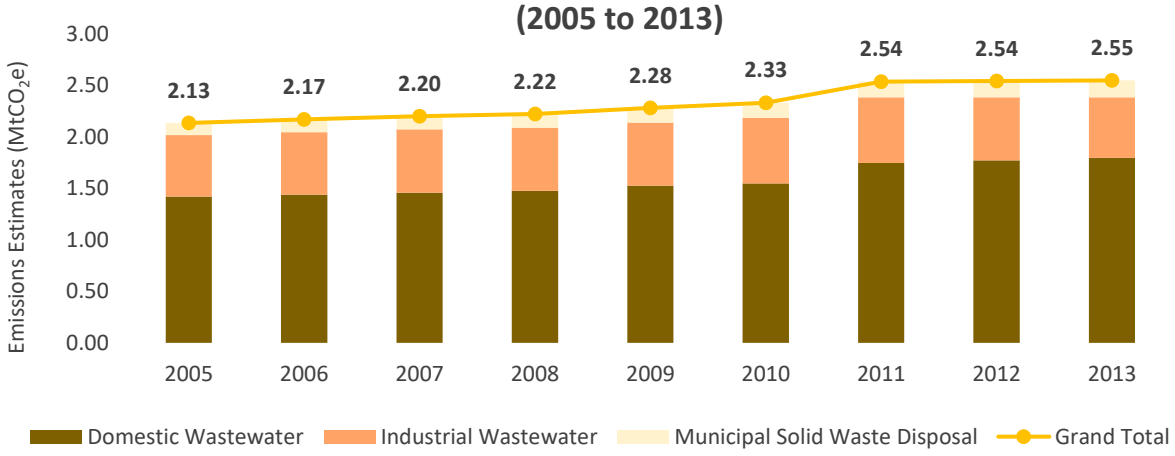
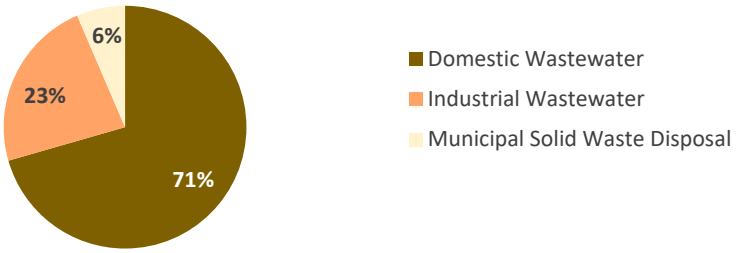


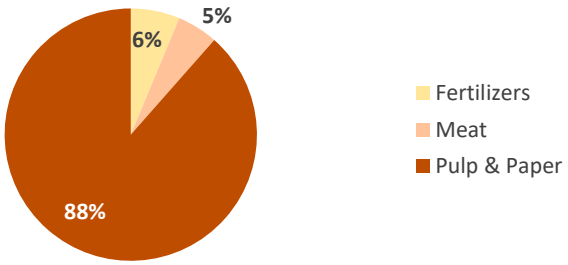
Figure 12: Category-wise Share of GHG Emissions for Waste Sector (in 2013)



Domestic Wastewater comprised ~71% emissions of the Waste sector in Odisha. Emissions due to the Domestic Wastewater from the rural and urban areas rose at a CAGR of 2.99% from 1.42 $MtCO_2e$ 2005 to 1.80 $MtCO_2e$ 2013. In 2013, ~76% of the Domestic Wastewater emissions emanated from the rural areas of Odisha. Discharge of untreated wastewater and use of septic tanks are key drivers of emissions in this sub-sector.

Industrial Wastewater contributed to ~23% of the Waste sector emissions in 2013. Nearly, 88% emissions in this sub-sector were from the Pulp and Paper Industries and the remaining 12% belonged to Fertilizers ~ (6%) and Meat (~5%) Industries respectively in 2013 (Figure 13).

Figure 13: Share of Emissions from the Industrial Wastewater (in 2013)



[3] 'Refers to emission in urban areas. Emissions from 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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Secretariat Contact
Vasudha Foundation, CISRS House, 14 Jangpura B,
Mathura Road, New Delhi - 110014, India
Phone No. - 011-24372680

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