

Government of Sikkim





Sikkim Climate Inventory & Monitoring System









Background

Climate change is an emerging threat for all nations, mainly driven by fossil fuel intensive economic activities pursued worldwide. Sikkim, the smallest State in India, lying in the North East within the very sensitive Himalayan region is highly vulnerable to climate change. The State recognises the importance of conservation. It has been conserving its forests through community and State programmes. As a result, it has been able to keep almost half of its geographical area under forest cover, making it a Carbon negative State.Also, missions such as the Sikkim Organic Mission has converted it into India's first fully Organic state. For this endeavor, Sikkim has been conferred with "Future Policy Gold Award" in 2018 by Food and Agriculture Organisation (FAO).

Going forward, Sikkim envisions to remain carbon neutral while riding the development ladder to cater to the aspiration of its people. As an environmentally responsible State, Sikkim has embarked on the path of developing strategies to remain carbon neutral. It has developed the Sikkim Climate Inventory Monitoring System (SCIMS) having two subsystems, namely:

- ✤ A GHG Inventory Management System with the capability of estimating and generating reports of the annual Greenhouse Gas (GHG) inventory by sources and sinks (CO₂, CH₄ and N₂O and their CO₂-eq. numbers).
- A Climate MRV System to track the impact of the mitigation or sequestration actions taken by the State and those by the private sector as well.



Sikkim's Key Climate Change Initiatives





Energy Sector

The Energy sector emmisions are from combustion of fossil fuel in road transport, aviation, industry, mobile towers, residential and commercial sectors that are operational in Sikkim. Trends of fuel consumption in Sikkim are shown in the graph below.

Overall, energy sector emissions have increased from 182 thousand tonnes CO_2 -eq.

in 2005 to 326.8 thousand tonnes CO_2 -eq. in 2015. Transport sector is the major contributor (61%) to energy sector GHG emissions. Transport sector includes emissions from road and aviation. Aviation contributes 0.22% of total transport emissions in Sikkim. The residential and industrial sectors contribute 20% and 16%, respectively, of the overall energy emissions in 2015.







The actions that are contributing towards mitigation in the energy sector are:

- Ujwal DISCOM Assurance Yojana (UDAY) and Restructured Accelerated Power Development and Reforms Programme (R-APDRP) - 13.207 thousand tonnes CO,-eq.
- National Mission for Enhanced Energy Efficiency 0.58 thousand tonnes CO,-eq.
- Pradhan Mantri Ujjwala Yojana (PMUY) 29 thousand tonnes CO₂-eq.
- Hydropower Production **342** thousand tonnes CO₂-eq.

Industrial Processes and Product Use (IPPU)

The Industrial Processes and Product Use (IPPU) sector covers GHG emissions occurring from industrial processes, use of greenhouse gases in products, and from non-energy uses of fuel. In accordance with the IPCC guidelines, emissions from fuel combustion in industries are not covered in the IPPU sector. In Sikkim, the use of lubricants in industries for non-energy purposes has been identified as contributing to emissions from the IPPU sector. The IPPU sector emitted 0.16 thousand tonnes CO_2 -eq. in 2015 as compared to 0.39 thousand tonnes CO_2 -eq. in 2005. The main activity leading to emissions in the IPPU sector between 2005 and 2015, the use of lubricants, has fluctuated drastically across the years with no set pattern or trend of use.



IPPU sector GHG emission trends for Sikkim





Agriculture, Forest & Other Land Use Sector

The Agriculture, Forest & Other Land Use (AFOLU) sector activities include paddy cultivation area in Sikkim, enteric fermentation, manure management, and agricultural soils. The paddy cultivation area has decreased by 18-20% between 2005-15. The livestock is dominated by poultry and goats, indicating large scale subsistence farming. The Organic Sikkim Mission has led to almost zero GHG emmisions from agriculture soils in Sikkim. As a result of these activities, the agriculture sector emissions have decreased from 163.99 in 2005 to 155.97 in 2015 Co₂-eq. thousand tonnes.





In Agriculture sector, N_2O emissions are only due to Manure Management in Sikkim. In 2015, 0.0018 thousand tonnes N_2O emissions were generated due to Manure Management.

The total forest and tree cover in Sikkim is 47.62% of the total geographical area of the state. Continuation of conservation activities has enabled Sikkim to remain carbon negative as the forest and tree cover together sequester around 650 thousand tonnes of CO₂ annually.







CO₂ sequestration Trends by Forest & Trees Outside Forest for 2005-15

Actions contributing towards mitigation in the AFOLU sector are:

Sikkim Organic Mission - 17.67 thousand

tonnes CO₂-eq.

- Twenty Point Program 7.79 thousand tonnes CO₂-eq.
- Mahatma Gandhi National Rural Employment Guarantee Scheme - 3.35 thousand tonnes CO₂-eq.
- Horticulture Mission for North East and Himalayan States (HMNEH) - 9.28 thousand tonnes CO₂-eq.
- Sikkim Biodiversity Conservation and

Forest Management Project - **3.67 thousand** tonnes CO₂-eq.

- State Green Mission 0.24 thousand tonnes CO₂-eq.
- Integrated Watershed Management Program (under PMKSY) - 7.94 thousand tonnes CO₂-eq.
- Compensatory Afforestation Fund Management and Planning Authority 3.46 thousand tonnes CO₂-eq.
- National Afforestation Programme 3.35 thousand tonnes CO₂-eq.





Waste Sector

The Waste sector includes emmisons from solid waste and domestic wastewater. Industrial wastewater emmisions have not been included as all the industries recycle their wastewater in Sikkim. GHG emissions from the waste sector increased from 33.01 thousand tonnes CO_2 -eq. in 2005 to 53.05

thousand tonnes CO_2 -eq. in the year 2015. CO_2 -eq. emission trend of waste sector in Sikkim is as shown in the graphs below. N_2O emissions in waste sector are only due to domestic wastewater. Domestic wastewater emitted 0.03 N_2O thousand tonnes CO_2 -eq. in 2015.



Actions contributing towards mitigation in the Waste sector are:

- Swacch Bharat Mission 0.266 thousand tonnes CO, -eq.
- Recycling of wastewater in industries.

Proposed Institutional Architecture for SCIMS

State Steering Committee Chair: Chief Secretary

Members PS of all concerned departments



Sikkim Climate Inventory and Monitoring System

Forests Environment and Wildlife Management Depaartment

Enviromental Information System

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Technical Advisory Committee Chair: Principal Secretary

DST Members: Director, ENVIS Sikkim University Others to be nominated

Sikkim GHG Inventory Management System (SCIMS) Sikkim MRV System (SMRVS)

 Animal Husbandry, Livestock, and Veterinary Services Department
 Building and Housing Department
 Commerce and Industries Department
 Commerce and Industries Department
 Department of Irrigation and Water
 Resources Development
 Department of Tourism and Civil Aviation
 Ecclesiastical Department
 Energy and Power Department
 Food Security and Agriculture
 Development
 Food, Civil Supplies and Consumers
 Affairs Department 10. Forest, Environment and Wildlife
Management Department
11. Horticulture and Cash Crop
Development Department
12. Rural Management and Development
12. Rural Management and Development
Department
13. State Pollution Control Board
14. Transport Department
15. Urban Development and Housing
Department
16. Water Security and Public Health and
Engineering Department
17. Other Relevant Departments
18. Corporates

