

# Smart Air – SRPE (Scaled Model Version)

This document presents a scaled computational model for estimating road-based air pollution. Instead of using national-scale vehicle counts, the project applies a physics-style scaling approach to represent realistic conditions using smaller, idealized datasets suitable for simulation.

## Scaling Method (Physics-Inspired Approach)

Large real-world datasets (millions of vehicles) are reduced using proportional scaling. The model assumes that pollution trends remain proportional when values are scaled down. This allows simulation using manageable numbers while preserving real-world behavior patterns.

Scaling Principle:

**Real Value = Model Value × Scaling Factor**

Example: 1 model vehicle may represent 10,000 real vehicles.

## Scaled Simulation Data

Road Type	Length (km)	Model Vehicles/hr	Emission Factor	Estimated CO <sub>2</sub> (Model Units)
Highway	8	120	1.2	1152
City Road	5	90	1.8	810
Village Road	6	40	1.0	240

## Model Concept

Inputs include road type, road length, and estimated vehicle density. The SRPE model computes pollution using proportional emission factors and generates recommendations using a rule-based advisory system.

## Data Reference Note

Scaling assumptions are inspired by publicly available transport statistics from Government of India (MoRTH) and general vehicular emission trends reported by environmental agencies. Values shown here are scaled simulation data for educational and modeling purposes.

## Author: Kishan Singh

Independent Student Research Project – Smart Air (SRPE)