SUPLEMENTARY MATERIAL

Table S1: Annual growth rates (in percent) for traffic\*

|  |  |  |  |
| --- | --- | --- | --- |
| Vehicle type | Year | | |
| 2010-2015 | 2015-2020 | 2020 and beyond |
| 2 Wheelers | 7.37 | 8.13 | 8.89 |
| Car/ Jeep/ Van | 6.41 | 7.03 | 7.79 |
| Mini Bus | 4.32 | 4.74 | 5.24 |
| Std. Bus | 4.89 | 5.37 | 5.93 |
| LCV | 4.81 | 4.74 | 5.24 |
| 2 Axle | 4.32 | 4.74 | 5.24 |
| 3 Axle | 4.32 | 4.74 | 5.24 |
| Multi Axle | 4.32 | 4.74 | 5.24 |

Courtesy: \*BRO.

Table S2: Profile of the panel of experts

|  |  |  |  |
| --- | --- | --- | --- |
| Expert No. | Position | Institute | Specialization |
| 1 | Postdoctoral Fellow | Ashoka Trust for Research in Ecology and the Environment | Watershed Management |
| 2 | Scientific Officer | Bhabha Atomic Research Centre | Environmental Pollution |
| 3 | Scientist | Dart NeuroSciences and Vanderbilt University | Neurobiology |
| 4 | Scientific Officer | Ministry of Environment, Forest and Climate Change | Environmental Pollution |
| 5 | Executive (Environment) | PricewaterhouseCoopers Pvt. Ltd. | Environmental Management |
| 6 | EIA Coordinator | SGS Company | Environmental Impact Assessment |
| 7 | Assistant Professor | Sikkim Manipal Institute of Technology | Civil Engineering |
| 8 | Assistant Professor | Sikkim Manipal Institute of Technology | Environmental Biology |
| 9 | Associate Professor | Sikkim University | Atmospheric Sciences and Pollution |
| 10 | Teacher | Tashi Namgyal Academy | Environmental Sciences |

Table S3: Emission factor for various vehicle types (in g/km)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Vehicle Type | CO | NO2 | SO2 | SPM |
| Car Jeep | 4.225 | 11.010 | 0.053 | 0.380 |
| Buses | 3.243 | 2.543 | 1.420 | 1.144 |
| Light Commercial Vehicle | 6.000 | 9.300 | 1.420 | 0.709 |
| Trucks | 3.600 | 6.300 | 1.420 | 1.240 |

Table S4: Meteorological conditions in the study area

|  |  |
| --- | --- |
| Meteorological parameter | Value |
| Rainfall (Nov-Feb) | 132.25 mm (Post-monsoon average) |
| Temperature | 8.75 0C - 18.8 0C |
| Wind velocity | 0.942 m/sec (average) |
| Direction of Wind | Most of the time SE |
| Atmospheric stability class | B (assumed) |

Table S5: Comparison of observed and predicted measures of various APs at sampling locations.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Location | CO | | NO2 | | SO2 | | SPM | |
| Observed | Predicted | Observed | Predicted | Observed | Predicted | Observed | Predicted |
| Ranipool | 70 | 237.008 | 56.5 | 53.439 | 14.5 | 26.12 | 58.5 | 45.037 |
| Majitar | 299.75 | 272.438 | 26.1 | 15.986 | 5.85 | 8.626 | 83 | 52.274 |
| Middle camp | 1800 | 235.427 | 29 | 28.605 | 27 | 15.435 | 84 | 85.867 |

Table S6: Descriptive statistics of thematic maps of APs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| AP | MIN | MAX | MEAN | STD.DEV |
| CO 2004 | 1.099 | 97.471 | 6.129 | 8.49 |
| CO 2014 | 4.699 | 416.522 | 26.192 | 36.281 |
| CO 2039 | 23.453 | 2079.011 | 130.733 | 181.09 |
| NO2 2004 | 1.291 | 114.42 | 7.195 | 9.966 |
| NO2 2014 | 1.059 | 93.915 | 5.906 | 8.18 |
| NO2 2039 | 4.631 | 410.488 | 25.812 | 35.755 |
| SO2 2004 | 0.254 | 22.526 | 1.416 | 1.962 |
| SO2 2014 | 0.572 | 50.677 | 3.187 | 4.414 |
| SO2 2039 | 2.204 | 195.386 | 12.286 | 17.019 |
| SPM 2004 | 0.256 | 19.159 | 1.393 | 1.904 |
| SPM 2014 | 0.83 | 62.159 | 4.518 | 6.178 |
| SPM 2039 | 4.263 | 319.424 | 23.22 | 31.749 |