

RESEARCH PAPER:

Comparative evaluation of gaseous and particulate pollutant load in some parts of western Madhya Pradesh

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SUMMARY

A large of almost 500 sq. km. region in south west of India, the industrial zone is intersected with two highways. The region experienced significant cumulative pollution load (CPL) of SPM, SO₂ and NO_x i.e. 532mg/m³ during 1986-1990 and 251.66mg/m³ during 2006-2010. The CPL in area decrease during 2006-2010, maximum at Nayagaon-Khor i.e. 75% and minimum at Nagda i.e. 11% than 1986-1990 except Pithampur where 37% increase in CPL. This may be due strong regulatory actions which is resulted in improvement of the ambient air quality. A perusal for the total cumulative pollution load picture exhibit that the total load in the RZ (1.5km against wind direction) is 100mg/m³ which increased by 3.6, 2.8 and 1.7 times at HZ(1-1.2 km), MAZ (2-2.5 km) and LAZ (4.5-5 km) in upwind direction, respectively during 2006-2010. Statistically during last 20-25 years the gaseous pollutant concentration increased by two times in the region while particulate increased by 1.5 times.

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In India problems of air pollution are rapidly increasing on account of industrialization urbanization, and rapid expansion of transport sector and escalating consumption of energy. A significant deterioration of ambient air quality occurs due to an increase in atmospheric concentration caused locally and regionally as well as due to high air pollutant emissions from different kinds of point or non point sources. After emission air pollutants dilute, disperse and travel long distances with air masses, passing through the larger areas. These different pollutants once released into air can not be stopped/ curtailed and ultimately travel to longer distances where they settle and affect.

Though the global air pollution and atmospheric load of air pollutants occupy a crucial role in environment management policy at world level, the regional air pollution problems cannot be ignored because they often pose both local episodic conditions and induced chronic injury to plant and human life as well as edaphic ecosystem (Varshney *et al.*, 1997; Agrawal *et al.*, 1985). The National Crop Loss Assessment network (NCLAN) project was a pioneering effort to assess large-scale effects of air pollutants on crop loss in USA (Adams *et al.*,

1998 and Jager *et al.*, 1994)). Such regional programmes have been launched and executed in Europe as well as in USA (Fowler and Cape, 1982).

This paper refers to a comprehensive long-term study of about 25 years of air quality in the selected sites upto 5-7 km area with wide microclimatic conditions and various types of crops (Dubey, 1990 and 1997).

MATERIALS AND METHODS

An extensive sampling programme was designed for a period of two decades (1986-90 and 2006-10) including all the seasons of these years.

Area and site:

The industrial area selected for the study were Dewas, Pithampur, Nagda, Nayagaon-Khor in Madhya Pradesh and Nimbaheda in Rajsthan of Indian subcontinent (Table 1).

In above study areas wind direction and deflection ranges largely get confined between West-North-East. Since it is well-established fact that maximum load of pollutants occur in vicinity of the source i.e. 0.5 to 1.5 km area. This criteria was effectively applied in the

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