

CHAPTER-V

**CONCLUSION
AND
RECOMMENDATIONS**

Chapter-V

CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION

Air pollution of all the urban areas in the country is on the rise and vehicular pollution plays a major role in it, Kolhapur being no exception.

5.1.1 Air Quality Studies

Ambient Air Quality data of any city or town therefore needs to be monitored to keep track of the level of the pollutants. During the present study air pollution data from three selected locations was monitored for one-year i.e. from September 2006 to August 2007. Conclusions drawn from the study results are as follows.

Site 1 (Shivaji University)

From the selected three study sites this was the least crowded location, with no commercial or industrial area and minimum vehicular traffic and therefore resulted as control station. Minimum value of SO₂ and NO_x in August indicates effect of rainy season. Here again minimum value of RSPM and SPM in July 2007 indicated the effect of rainy season (Table 3.6 Figure 3.7 and 3.10).

One-year data from September 2006 to August 2007 showed that all the four parameters SO₂, NO_x, RSPM, SPM were within the prescribed limits of CPCB range (Table 3.5) as at no time any parameter crossed the standard limit.

All the four parameters i.e. SO₂, NO_x, RSPM, SPM showed good Air Quality Index AQI. Shivaji University Station was in good category (Table no 3.11).

From the Table 3.12 it was clear that all T Calculated values are less than T Table values and hence all parameters were non polluting. Thus Shivaji University Station showed all parameters were within the limits.

Site 2 (Dabholkar Corner)

Out of the three sites this was the most crowded location due to the main traffic road junction in the busy commercial area including hotels, central bus stand, and private travels booking centres etc. The area is active almost throughout the day with heavy vehicular traffic. Minimum value of SO₂, NO_x, RSPM and SPM were recorded in July and August 2007 indicates effect of rainy season (Table 3.7, Figure 3.8 and 3.11). One year data from September 2006 to August 2007 showed that out of the four parameters SO₂, NO_x were below standard limit value throughout the year however Annual average values of RSPM and SPM crossed annual standard limit value. Therefore we can say that air quality of Dabholkar corner was polluted. This was serious indication of air quality degradation. Air Quality Index (AQI) for SPM also indicated poor category (Table 3.11). Similarly T-Test showed significant results indicating SPM was causing pollution at Dabholkar corner (Table 3.13).

Site 3 (Mahadwar Road)

This site was the most crowded location due to its proximity to the entrance of famous Mahalaxmi temple and its location in the well developed commercial cum residential area. Though the area was always very densely crowded by pedestrians had very modest vehicular traffic. Minimum values of SO₂, NO_x, RSPM and SPM were observed in July, August and September 2007 which indicates effect of rainy season (Table 3.8, Figure 3.3, 3.6, 3.9 and 3.12). The concentration of SO₂ was maximum during the summer season.

The annual data from September 2006 to August 2007 showed that out of the four parameters SO₂, NO_x values were below standard limit through out the year while annual average value of RSPM and SPM crossed annual standard limit. However Air Quality Index (AQI) showed good category of air quality. T test showed non significant results confirming that all parameters were non polluting.

In general, It is evident that the average or maximum values of SO₂ and NO_x were never close to the annual standards of MPCB at any of the three sites (Table 3.9). This indicated that there is no SO₂ or NO_x pollution in the city. However, as in case of RSPM and SPM the maximum values at site 1 were higher than the norms. Similarly at site 2 (Dabholkar Corner) the average as well as maximum values of both RSPM and SPM were much higher than the prescribed limits. Site 3 (Mahadawar road) showed mixed results that the annual average RSPM value was just crossed to the limit and the maximum recorded value was much higher. But in case of SPM the annual average as well as maximum values was much higher than the prescribed annual standard of 140 µg/m³. This indicated that there is severe SPM pollution and moderate RSPM pollution in the city. The air pollution monitoring in the study has revealed for the first time that RSPM and SPM levels are crossing the permissible limits and a serious note of this needs to be taken.

5.1.2 Vehicular Exhaust studies

The vintage wise comparison of the two wheeler from three batches (1981-1990, 1991-2000, 2001-2007) clearly revealed that there is correlation between the age and emissions of CO and HC from the vehicles. The average values in CO % and HC ppm showed decline (Table 4.10 and Table 4.11). The same trend is noticed in the maximum

and minimum values in both the parameters, except in case of the minimum value in HC which was increased in the last batch.

It is evident from these results that there is clear positive trend in the exhaust emissions from the three vintage two wheeler groups studied. The improved in the performance of new vintage is mostly due to better maintenance facility, availability of unleaded petrol and the additives like Speed (HP), Power (Indian Oil) used in fuel to reduce emissions etc. The decreasing values for both the pollutants are also attributed to newer technologies used in the manufacture of two wheelers.

From Table 4.12 and Fig 4.5 it is clear that there is rapid growth in the number of vehicles from 1987 to 2007. Especially Motor cycle's, which were 14910 in 1987, and in twenty years crossed 296603 in 2007, which is almost 15000 new motor cycles added each year. If the total number of vehicle increase from 1987 to 2007 is considered the number increased from 86466 to 512394 in 2007.

From the fig 4.5 it is clear that there is growing trend in number of vehicles in Kolhapur district. There are more than 21000 new vehicles added per year. If this trend continues there will be further stress on the already scanty infrastructure of roads and parking places. This will result in serious problem in urban transportation. The present situation leading to road congestion and very slow movement of the vehicles on the roads causing excess fuel consumption and resultant increase in air pollution leading to road accidents and decline in health of the citizens.

This situation demands urgent and serious efforts on the part of the local administrators and the concerned agencies to try to curb pollution

due to vehicular exhausts in the city through integrated traffic management and pollution control measures.

5.1.3 Surveys

As important part of the study surveys were conducted at three levels. As a part of government vehicular air pollution control machinery PUC centres have been authorised by the authorities of monitor levels to monitor level of vehicular exhaust emissions. They can play a significant role in curbing pollution and saving fuel if function as per guidelines. However, the out come of the present PUC centres survey was not much satisfactory.

a) PUC Centres

The observation from the working of the 15 PUC centres was as follows.

- Instruments in many PUC centres were not in working conditions, and still PUC certificates were issued within the prescribed pollution limits.
- PUC centres, those had working instruments, had not calibrated the instrument periodically.
- It could not be ascertained whether the centre were renewed and inspected regularly.
- In most cases the person handling the instrument had no technical background or knowledge.
- The only purpose of the centre seems to be to issue PUC certificate and make money.

In general people did not much bother about PUC test and acquired the certificate just as the compliance or a formality.

b) Mechanic Survey

Questionnaire survey of 25 two wheeler mechanics revealed that, the general observation was most vehicle owners do not visit mechanic unless there is some mechanical problem with the vehicle and are much careless about the routine maintenance.

According to large majority (92%) mechanics feel that following components are related to the good vehicle mileage like Carburettor, Piston Nozzle pump, Oil sill, Sparkplug, Quality of Petrol, Proper maintenance & driving skills. Large majority (94%) said that, there is a positive role of regular maintenance in petroleum saving. 52% felt that vehicles in the city are not well maintained. About 91% mentioned that, there is a positive role of Catalytic Converter to minimise air pollution. 97% feel that good road conditions are must to minimise vehicle damage. Majority (87%) felt that it is necessary to develop public awareness regarding vehicular air pollution and 94% felt that public participation will help to minimise vehicular air pollution.

c) Two wheeler Owners Survey

Questionnaire survey of 103 two wheeler owners revealed that, responding to the availability of the parking facility at the residence for the owned vehicles it was noted that basement / ground floor or under the stairs (38%), common parking (36%) and road (26%) were used as the parking place. For most parking facility at working place was basement (22%), common parking place (41%) and road (37%). About 97% people were not satisfied with the road conditions in the Kolhapur city. Almost 99% felt that there is urgent need to widen as well as repair roads in the city. Though 54% people were not happy with the city vehicular traffic management, 58% felt no necessity to make the traffic rules more stringent. Over 74% respondents mentioned that, bad road condition was mainly responsible for the traffic congestion. Around 79% people said that, there is disturbance on the road traffic due to wrong location of KMT

bus stops, which added to the congestion. Also a large majority i.e. 97% respondents felt that there is disturbance to vehicular traffic due to unauthorised auto rickshaw stops (Wadap). The personal observations revealed hawkers encroachments was a problem. Almost 53% respondents mentioned that the traffic problem was due to encroachment by the shop owners. As most of the roads in the city do not have footpath facility, making life of the pedestrians difficult and risky. Around 63% of the respondents mentioned that there was immediate need to have footpaths in their area.

5.2 RECOMMENDATIONS

Cities play a vital role in promoting economic growth and prosperity. The development of cities largely depends upon their physical, social, and institutional infrastructure. In this context, the importance of intra-urban transportation is paramount. Singh (2005) reviewed the trends of vehicular growth and availability of transport infrastructure in Indian cities and discussed nature and magnitude of urban transport problems such as congestion, pollution, and road accidents. According to him Indian cities cannot afford to cater only to private cars and two-wheelers and there has to be a general recognition that policy should be designed in such a way that it reduces the need to travel by personalized modes and boosts public transport system. This requires both an increase in quantity as well as quality of public transport and effective use of demand as well as supply-side management measures. At the same time, people should be encouraged to walk and cycle and government should support investments that make cycling and walking safer.

Based on the results of the present study it is felt that there is an urgent need of better road traffic management which should essentially consider construction of Flyovers, quality of roads, synchronization of traffic signals, installation of Timer at traffic signals, restriction of plying

certain category of vehicles on certain roads, decongestion of road by altering the office timings, increase in public transport and introduction of parking tax.

The following are some general suggestions based on the present study in order to improve traffic conditions so as to control air pollution problem in Kolhapur.

- Measures should be initiated, phase wise, to fix catalytic converter in every vehicle to minimise air pollution. Its high cost be subsidised by the local authorities / KMC/ Govt. considering long term benefits.
- Licenses should be given only to those vehicles, which conform to the emission standards laid down, by the Government and those who install control equipments. This should also be applicable to the earlier models circulated through second sell.
- Emission standards for various types of vehicles should be revised from time to time and be made known to public. These standards must be strictly employed through traffic police, RTO and other concerned agencies.
- Steps should be taken to prevent adulteration of petrol and diesel since it is the major cause for greater amount of pollution.
- Checking the working of vehicles is necessary to have a control over the bad exhaust and the penalising of the owners of vehicle causing such hazard.
- Inspection and Control on PUC centre's malpractices should be done on top priority.
- Conducting of smoke test in order to measure the amount of toxic elements in the smoke should be made compulsory and through frequent surprise tests. As a result of the follow-up action arising from smoke test, the transport authorities should come into contact with the owners of vehicle and explain them how to maintain the vehicles and hazards of air pollution and how it is economic and fuel saving.

- The Kolhapur Municipal Corporation should take necessary measures for the elimination of roadside encroachment by hawkers and shop owners etc and seating up of areas separately for commercial and official activities, enrooting vehicles through by-pass roads etc.
- The licensing authorities (RTO) should take stringent actions against the polluters and cancel their licenses.
- The roadsides have to be widened and traffic signals and bus stops should be made in such a way that the vehicles move freely without any interruption.
- Above all as a part of the realisation of their responsibility the Maharashtra Pollution Control Board (MPCB) must conduct frequent surveys about the emissions by the transport sector, and the results of the surveys must be published through local dailies and electronic media. This is useful to create awareness among general public.

Apart from the above, the following measures can also be adopted on the basis of local conditions to control air pollution caused by automobiles.

1. Earmarking of percentage of revenues from road taxes, fuel taxes, and vehicle taxes for an 'Environmental Fund', which can take care of measures for environmental protection, research and monitoring?
2. Regulations affecting vehicles with a view to reducing the rate of growth in ownership of personal vehicles and their use.
3. Also, efforts should be made to facilitate movement of non-polluting modes of transport such as bicycles within cities by introducing dedicated lanes wherever possible.
4. Progressive tightening of emission norms and fuel quality specifications.

5. Greater promotion and use of alternative fuels such as CNG/LPG/Propane/battery operated vehicles. Expansion of CNG/LPG dispensing facilities.
6. Improvement in vehicle technology (e.g. restriction on the two-stroke engines, emission performance warranty of vehicles by manufacturers). Phasing out of highly polluting vehicles.
7. Taxes on fuels, vehicles; the revenue so generated could be used for pollution control measures.
8. Introduction and use of electronic two wheelers be encouraged exempting taxes by KMC.

To improve city road transport and ring road development around city and internal road development are the urgent needs. There is also long overdue necessity in increase in the number of parking zones in the city, implementing pay and park system. This may create some more space for parking and improve discipline in the mode of traffic. For heavy vehicles there should be separate parking zones. Also hawker and no hawker zones should be created.

Thus the aggravated environmental problem in Kolhapur city can best be solved by making various corrective measures by the Government as well as by the owners of the vehicles. Public awareness is also a must in tackling this problem, as any Government programme cannot be succeed without full co-operation from the people.
