

1-INTRODUCTION

JICA Environmental Expert stationed at Pakistan Environmental Protection Agency (Pak-EPA) has undertaken number of studies to determine the environmental conditions of different cities of Pakistan. In his three years stay in Pak-EPA, he has published six Reports on Air and Water Quality of different cities of Pakistan.

All previous studies were planned and executed by JICA Expert with the help of Pak-EPA and Provincial EPAs. This study was also planned by JICA Expert to grasp the actual contamination conditions of two cities (Gujranwala and Faisalabad), which are an industrial hub of Pakistan and earn considerable foreign exchange for the country. This study was exclusively undertaken by the Pak-EPA in collaboration with Environmental Protection Department of Punjab (EPD) and the respective District Env. Offices.

1.1 Purpose of Present Study

- To generate background data. Air and Water Quality monitoring were conducted to assess existing level of contamination.
- To define the inter- relationship of sources of pollution in order to evaluate the character and magnitude of existing problems.
- To assess the future worsening or improvement of air and water quality and to obtain the knowledge and understanding, necessary for developing prevention and corrective measures.
- The status of air and water pollution data and trend provide valuable information on which air and water pollution control strategies and objective decisions may be planned for long-term management.
- To generate the air monitoring data, which will also help in establishing the Ambient Air Quality Standards keeping in view the WHO Guidelines.
- To ascertain whether the prescribed National Environmental Quality Standards for Municipal and Liquid /Industrial effluents are being violated or not.

SUMMARY

Ambient air, noise and water pollution in Gujranwala and Faisalabad were determined at various sampling location to find out actual contamination condition of these cities. Air pollutants such as oxides of nitrogen, carbon monoxide, ozone, hydrocarbons and particulate matters (both Total Suspended Particulate (TSP) and respirable Particulate (PM₁₀)) were determined in these cities. SO₂, an important air pollutant could not be determined due to faulty SO₂ analyzer of air monitoring mobile.

TSP and PM₁₀ concentrations are very high at all sampling sites in both cities compare to WHO Guidelines and International Standards set by other countries. In Gujranwala, the Particulate problem is more serious than Faisalabad. TSP concentration (24 hours average) reached to 5190 µg/m³ at Baghbanpura Chowk in Gujranwala, which is more than 30 times higher than WHO Guidelines and International Standards. Maximum concentration of TSP was observed at Kotwali Chowk in Faisalabad, which is 3477 µg/m³. Fine Particles (PM₁₀), which are major sources of public health concerns have also shown very high concentrations in both cities. In Gujranwala, at Baghbanpura Chowk sampling site PM₁₀ concentration was 9 times higher for 24 hours average and 44 times higher for 1-hour average according to WHO Guidelines.

Carbon monoxide (CO) concentration for 8-hours average was 11890 µg/m³ at Baghbanpura Chowk in Gujranwala, which is higher than WHO Guidelines and International Standards. CO concentration remained below at rest of all sampling sites in Gujranwala and Faisalabad.

Nitrogen dioxide (NO₂) concentration for 1-hour average at two sampling locations in Gujranwala namely Pindi Bypass and Baghbanpura Chowk was observed higher than WHO Guidelines. In Faisalabad, high concentration of NO₂ was found at Mian Muhammad Trust Hospital road.

Hydrocarbon (HC) concentrations were detected higher at most of the locations in both cities than the Standards set by both USA and Indonesia.

Noise pollution at various locations in both cities crossed the NEQS of 85dB. Maximum noise level (100dB) was recorded at Baghbanpura Chowk in Gujranwala and Abduallahpur Chowk in Faisalabad.

Wastewater samples collected from both cities are high in COD, BOD and iron than NEQS permissible limits. Toxic metals in few samples are also high than NEQS limits, COD to BOD ratios calculated for both cities wastewater show that these drains mostly carry the domestic/municipal sewage wastes. Industrial contaminants are less in these drains.

Drinking water samples collected from both Cities indicates that 68% and 14% of collected samples from Faisalabad and Gujranwala respectively are contaminated with bacteria.

Keeping in view of all analyzed parameters for drinking water, 28% of collected samples from Gujranwala and 67% of collected samples from Faisalabad are not suitable for human consumption.

RECOMMENDATIONS

The following few recommendations are being forwarded to minimize the air, noise, water and wastewater pollutants in urban areas of the country under the pretext of the present study.

AIR:

- To formulate and notify an Ambient Air Quality Standards (AAQS), keeping in view the present air quality condition of the urban areas and the guidelines set by WHO. Legislative support to AAQS may also be provided.
- To determine the status and trend in ambient air quality and effects of air pollutants in urban environment, fixed monitoring stations are necessary for continuous evaluation of air pollution in urban areas of the country. This will enable the Environmental Protection Agencies to establish the future pattern of air quality and to obtain the knowledge and understanding, necessary for developing preventive and corrective measures.
- Extremely high concentrations of Particulate Matter (PM) were found in both Gujranwala and Faisalabad. High level of PM (e.g. $500\mu\text{g}/\text{m}^3$) known to cause premature death and exacerbate diseases. 50% or more PM source is natural in Pakistan, such as unpaved road and the roadsides are not covered by green grass or trees. Attentions are required from the concerned agencies to minimize the natural sources of PM by treating the dusty surface area.
- Vehicular emission is the second largest source of PM in Pakistan. 2-3 wheelers population in Pakistan is huge and growing rapidly without control. High smoke emissions from diesels vehicles are due to overloading, lack of preventive maintenance, inferior quality of engine replacement parts and fuel adulteration. More efforts should be diverted at improving vehicle emission inspection and enforcing Standards.
- Also need to raise public awareness and create market conditions that make overloading commercially unattractive.

NOISE:

- Proper legislation is needed for industrial, commercial, residential, silence areas etc. and the noise level in these areas should be checked regularly.
- Media should be motivated for creating awareness among the masses, especially vehicles owners and industrialists.
- The use of defective silencers should be banned and those using it should be fined with the help of traffic police.
- Traffic flow, especially in congested areas should be organized and new roads be made broad and wide considering growth of the public and private vehicles.
- To overcome the traffic noise, installation of noise barriers along roads and freeways by using the light and inexpensive materials such as fibro-cement sheet and iron barriers etc.

WASTEWATER:

- Appropriate effluents Standards should be proposed that are feasible for local conditions.
- Use a mix of technological options and managerial approaches including community based development approaches.
- Invest in creating and maintaining awareness among citizens regarding their dual role as polluters and beneficiaries of wastewater management.
- Develop mechanisms that allow civil society and its representatives to hold polluting entities accountable.
- Strive to apply the principal “ The Polluter Pays” in the wastewater management system. Use charges or pollution fees to establish funds for the cofinancing of wastewater treatment facilities.
- Apply more cost effective technologies such as lagoons, anaerobic treatment etc for wastewater treatment.

DRINKING WATER:

- For the provision of safe supply of drinking water depends upon use of either a protected high quality ground water or a properly selected and operated series of treatments capable of reducing pathogens and other contaminants to negligible levels.
- Both the water provider and regulatory inspectorate should have properly equipped laboratory facilities with trained and properly qualified persons for monitoring of drinking water quality on regular basis. The reports of drinking water quality may be published in press on regular basis by the concerned authorities.