

Environmental Pollution From Rickshaws In Pakistan

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INTRODUCTION

Economically sustainable development in Pakistan is blatantly being plagued by continuous environmental degradation affecting both tangible and non-tangible resources of environment and causing serious health problems in the population. Of numerous environmental degrading factors, the environmental degradation has become a matter of grave concern for both developing and industrial countries. Some policy makers have been coining a naive suggestion for shifting the pollutant industry to developing countries, which are less polluted, but this is not the solution as the developing countries are already confronted with so many environmental problems affecting their sustainable development like contaminated water, siltation of dams, toxic wastes, desertification, deforestation, soil erosion and so on.

Apart from these problems, ozone layer depletion and global warming also seek immediate attention. So far as vehicular emission is concerned, it is most potent pollutant causing both air and noise pollution, thus directly jeopardizing the human and plants health.

In Pakistan, air and noise pollution has reached at an alarming level especially in the urban areas. The major cities of the country seem to be enveloped by clouds of smoke, motor vehicles account for 90 percent of total emissions of hydrocarbons, aldehydes and carbon monoxide in cities and for three-fourth of sulphur dioxide and nitrogen oxides emissions.

According Nawaz Tariq and Waris Ali (1985), the average Pakistani vehicle emits 25 times as much carbon monoxide, 20 times as much hydrocarbon and 3.6 times as much nitrous oxides in grams per kilometer as the average vehicle in United States.

Owing to high proportion of old and untuned engines and to reliance on buses and light commercial vehicles in metropolitan area, air

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pollution along busy roads is an order of magnitude greater than would be predicted from the number of vehicles on the road.

Carbon monoxide, the most common urban air pollutant, reduces the oxygen carrying capacity of blood. Eight-hour exposure to levels recorded in Karachi, Lahore, Peshawar and Quetta is known to cause impairment of nervous system functions including sharpness of eyesight. Hydrocarbon is precursors of photochemical smog, an eye and lung irritant. Nitrogen dioxide also has adverse effects on human health.

Finally as lead is added to gasoline to reduce engine knock, an estimated 520 tones of lead per year are released from vehicles when ingested by growing children, lead is deposited in the brain and has been to affect intelligence levels (GNWFP, 1996). A detail of adverse effects of individual pollutant on human health and environment has been given in box entitled Pollution on Roads in Pakistan.

POLLUTION ON ROADS IN PAKISTAN

Substance Effects	Source	Health Effects	Environmental
Carbon monoxide (CO) A colorless & odorless gas.	Mainly from petrol emissions.	Fatal in large doses; Aggravates heart disorders; Affects central nervous system; Impair oxygen carrying capacity of blood, affecting perception, reflexes, and causes dizziness.	Contributes to global warming by removing hydroxyl radical from the air.
Hydrocarbons (HC) Organic compound in gaseous particulate form: e-g Methane, Ethylene and Acetylene.	Mainly from unburnt petrol.	Suspected contributor to cancer, Major precursors in formation of photochemical oxidants through atmospheric reaction, drowsiness, eye irritation coughing. Smog is also known to inhibit plant growth.	Contributes to global warming by forming ground level ozone.
Ground-level Ozone (O ₃) Smog (Hydrocarbon & Nitrogen oxides combines with sunlight to form ground-level ozone We can see it as a haze.	Interaction of hydrocarbon and oxides nitrogen in the presence of sunlight.	Aggravates heart problems and breathing related diseases such as asthma and emphysema especially harmful to children and the elderly.	Damage to vegetation and crops and contributes to global Warming.
Oxides of nitrogen (NO ₂) Nitrogen dioxide brownish red gas with a pungent color often formed from oxidation of nitrogen oxide (NO).	vehicle emission both petrol and diesel.	Aggravates respiratory and cardiovascular diseases and chronic nephritis. Impair Visibility, makes a person prone to viral infections. Responsible for reduced growth and premature leaf drop in plants.	Acid rain, contributes to global warning, help to form ground-level ozone (Smog).

Photochemical Oxidants (OX) Colorless, Gaseous compounds which can comprise photochemical smog e-g Ozone (O ₃) Peroxycetyl Nitrate (PAN), Aldehydes & other compounds. Formed through atmospheric reactions of chemical precursors under the influence of sunlight.	Vehicle emission both petrol and diesel	Aggravates respiratory and cardiovascular illness, irritation of eyes and respiratory tract, impair cardiopulmonary functions. Other effects include deterioration of rubber, textiles and paints. Impair visibility, responsible for leaf injury, reduce growth and premature fruit & leaf drop in plants.	Remain in atmosphere from which it reaches to food chain.
Lead (Pb)	Petrol Additive	Affect nervous system and bloods; Effects bones and kidneys and specially harmful to children, shows significant effect on IQ level. Causes hypertension.	Remain in soil from which reaches the food chain. inhaled directly into blood stream.
Particulate Matter (PM) Solid or liquid particles dispersed in the atmosphere, smoke, soot & lead particles come out of auto tail pipes. Particles are classified according to size as settleable particles (larger than 50 microns), Aerosol (less than 50 microns), fine particles (less than 3 microns), Particles up to 15 microns in size can become lodged in the lungs (inhalable).	Mainly from diesel fuel	Direct toxic effects of aggravation of the effects of gaseous pollutants. Aggravation of asthma or others respiratory or cardio respiratory symptoms. Increase cough and chest discomfort. Souling & deterioration of building materials, impairments of visibility cloud formation, interference with plant photosynthesis.	None identified todate.
Sulphur dioxides (SO ₂) Aldehydes.	Mainly from diesel fuel.	Irritation of respiratory tract, affects those with pre-existing heart and lung disease. Phytotoxic damaging plants.	Source of acid rain.
Polycyclic aromatic Hydrocarbons.	Mainly from diesel fuel	Causes Cancer	Non-identified to date

Sources : 1. PNCS, Pakistan, National Conservation Strategy Government of Pakistan and IUCN.

2. SPCS The Sarhad Provincial Conservation Strategy, Government of NWFP, and IUCN, Pakistan 1996.
3. BCS, Balochistan Conservation Strategy (Third Draft) Government of Balochistan and IUCN, Pakistan 1999.
4. Clean Air Environmental Governance-4 IGIDR, Indra Gandhi Institute of Development Research 1999.
5. Guidelines for Establishment of Vehicular Emission Testing Station (VETS), A handbook for private sector investors, 1999.

As for as noise pollution is concerned unpleasant high pitch sound are major concern in cities where large factories, congested roads and airports produces round the clock noise. This nuisance damage the hearing system of dwellers, continuous exposure to noise pollution causes psychological disorders, hypertension, irritation and sleeplessness.

The intensity of sound is counted in decibels that are read on a logarithmic scale. A change from 10 decibels to 20 decibels actually represents a 100 fold increase in the intensity of sound. A sound is bothersome at a level of 80 decibels, but steadily exposure to noise over 90 decibels can cause permanent loss of hearing (Benjamin 1999).

Noise as per NEQS as required by Environmental Protection Act 1997. Section-15 for motor is 80 db (A) while sound meter at 7.5 meters away from the source (NEQS 1993).

It is, however worth mentioning that rickshaw is one of major sources of air and noise pollution in major cities of Pakistan like Karachi, Lahore, Peshawar and Quetta in Particular and other big cities in general.

In Karachi, the noise emitted by the three wheelers is high that even exceed from the noise level of heavy vehicles. According to the findings of study conducted during late 1980s at 23 different sides of the city, out of total 798 noise events measured 63 percent were emitted by rickshaws.

Statistics shows regarding the lead contains in school going children and traffic constable blood 38 micro grams per deciliters and 46 micro grams per deciliters respectively in sadder area, Karachi, that is more than triple the maximum level permissible by WHO standard. High lead level adversely affects memories (Affridi 1995).

According to survey made by PCSIR (1988) in Karachi the suspended particulate matter in the air is twice in level allowed by WHO.

In Peshawar, there are 7,700, 1996 Motor Registration Authority Go NWFP, rickshaws over half of them are unregistered. The normal noise level is 85 decibels (db) while in most of the areas of Peshawar the minimum level is 90 db and maximum is more than 100 db, (Khan 1998).

Main source of ambient air pollution in the street of Peshawar originates from vehicular emission. This is aggravated by badly tuned engines and high proportion of diesel vehicles. General comprehension is the limiting WHO for visible and invisible pollutant has crossed over this city by a significant margin.

In the old city air can be seen filled with noxious blue smoke exhausted by rickshaws and others two wheelers. The visible particles of diesel soot and burned oil are making life unbearable, in other parts of the city invisible green house gases are alarming increasing (Ali and Malik 1999).

Vehicle population of Peshawar reveals that diesel vehicles dominates the road. further more the rate of diesel vehicles in motor cars is

approximately 35 percent of the total vehicles. This figure is significantly and unusual in comparison to other countries (Khan 1998).

The present conditions are made worse by fuel adulteration. According to initial findings of survey most of the fuel sold in the city is adulterated. Petrol pump owners are of the opinion that without this adulteration, it is very difficult to run a station on a breakeven point. Considering the present regulated price mechanism the facts remain that fuel adulteration is wide spread and is among the major causes of unsatisfactory engine performance as well as vehicular emission in Peshwar (Environ-Tech 1998).

There are 5000 rickshaws on roads in Quetta (1996 in Motor Registration Authority GoB Quetta). They are powered by single cylinder two stroke engines and are fueled by a mixture of petrol and oil. Each rickshaw burns at least 16 liters of leaded petrol and two liters of oil every day (Smith 1996).

Air pollution is chiefly a problem of Quetta where the density of motor vehicles and the concentration of their emissions is so high that air can hardly disperse the pollutants or dilute them quickly enough. Blue smoke pollution originating from the exhaust of two stroke Rickshaws and other motor vehicles is the main environmental pollution of Quetta city (Baig and Gils 1998).

These rickshaws are important sources of income for the poorer people. Two or three drivers working in shifts, operate a rickshaw for eighteen hours a day, each driver supports a family of 5-8 people. At minimum in Quetta 50,000 people may be supported at least in part from rickshaw operation (BCS Third Draft 1999).

A social survey undertaken by a local NGO in Peshawar in which 1443 rickshaw drivers were interviewed, has revealed some very important and interesting findings.

- Thirty Six percent of the respondents were owners of rickshaws while 64 percent were drivers. The drivers were generally poor with eighty to hundred rupees of daily earnings, mostly they were the sole bread-earner of a large family.
- Only 35 percent respondents were found literate. This low literacy rate was found to be the main cause of lack of knowledge about proper maintenance of engine and environment.
- Hundred percent of the respondents were aware of fuel adulteration, out of which only 32 percent were found going to particular petrol station that they thought sell good quality petrol.
- Seventy seven percent of the respondents complained health problems in following categories:
 - Fourteen point six percent were found suffering with hearing disorders.
 - Fourteen point one percent with chest trouble.
 - Five percent with loss of concentration.

- Sixteen percent with irritability.
- Thirty point three percent with others disorders such as burning of eyes.
- Fifty two percent know about the vehicle fitness certificates issued by the motor vehicle examiner, only half of them, however, had this certificate.
- Fifty seven percent were found entertaining themselves with television while rest with radio, newspaper and cinema.
- Hundred percent respondents showed their willingness to spend up to rupees two hundred for purchasing a better silencer.
- Rickshaw driver unions play a vital part in the implementation of any project in this area.

PROPOSED POLICY MEASURES

About more than 50,000 rickshaws are running on roads of major cities of Pakistan.

- These rickshaws, three wheelers, employed with two stroke engines, produces higher emission than that of 4 stroke engines for direct mixing of oil with fuel results in poor fuel efficiency and more pollution.
- The drivers mix lubricating oil with fuel in amount which exceeds the level as specified by the manufacturer. It has been reported that in order to decrease fuel consumption, rickshaw drivers are mixing as much as 12 percent engine oil with fuel as against the recommended value of 2 percent, engine oil with fuel as against the recommended value of 2 percent, that results in excessive carbon, which reduces the engine power output by blocking in the exhaust systems.
- In order to clean the exhaust system and to increase the speed, they remove the silencer.

Keeping in mind the above mention facts about increasing pollution following policy measures are proposed.

- There is a need of complete database for registration of rickshaw with the help of responsible government agencies, the task should be completed.
- Production and registration of 2-stroke rickshaw should be banned following the precedence of Thailand.
- Rickshaws should be installed with hot tube to reduce the hydrocarbons emission.
- Pollution control department of Thailand in collaboration with Dasata a well known manufacturer of catalytic converters is undertaking a similar type of project to install hot tube in rickshaws. The installation of hot tube could reduce hydrocarbons emission by about 50 percent, similarly their experiences of converting rickshaws from gasoline to

liquefied petroleum gas (LPG) has been a valuable one. It resulted in reduced operation and maintenance costs of rickshaws.

- Natural gas kits for 2-stroke rickshaws are available world wide including Thailand and Japan. The concerned government can be convinced for their import and marketing at nominal rates or on loan to the targeted groups.
- Government may initiate special schemes for providing 4-stroke rickshaw at an easy installments.
- The registered vehicles must be required to pass through an emission inspection prior to the renewal of their licenses. Similarly, daily on road inspection of smoke emitting vehicles should be carried out with the help of the line departments like traffic police, metropolitan administration etc. Mobile teams may be constituted for gaining better results.
- Important measures such as designing, promotion and marketing of low noise silencers. Promotion of gas kits for 2-stroke rickshaws and for ensuring the use of right quality oil should officially be taken.
- The target group should not be limited to only the rickshaw drivers but also their owners and rickshaw unions because they are the real decision takers.
- The silencer manufacturer should also be made target.
- There is only one Vehicular Emission Test Station (VETS) in Peshawar, Pakistan that is insufficient to meet the demand of the entire country, there is a need to establish more such station, especially for two or three wheelers, having 2-stroke gasoline fueled engines.
- There is need to develop and implement National Environmental Quality Standards (NEQS) for rickshaws.
- In order to check the illegal and unauthorized assembling of rickshaws, the government should strictly monitor these units and only well-equipped unit be allowed.
- Straight measures should be taken to check fuel adulteration to ensure 2-stroke engine oil available at affordadable prices, encourage CNG kits for rickshaws and to install oil pumps for rickshaws in order to avoid mixing of petrol and oil.
- The agencies as well as NGOs presenting fake testing results must be stopped to do so.
- Publicity and education are two most power methods of bringing about the behavioural changes needed to improve situation.

CONCLUSION

The developing countries, especially in India, Thailand and Nepal both the government and the people are seriously contemplating the environmental hazards.

In India, the government has once tried replacement of old rickshaw, The Vikram Tampoo, by new one and subsidized the poor drivers for conversion. Noise polluting and air polluting diesel-run Indian Vikram Tampoo, three wheelers, remains largely responsible for vehicular pollution in Kathmandu, Nepal. The Thailand manufactured Tuk Tuk, Cooking gas-run three wheelers, and SAFA, battery charged zero polluting environment friendly three wheelers, which remain thin in number need to be increased in number. They are appreciably brilliant in two aspects : least noise pollutant, least vehicular pollutant. The Tuk Tuk and SAFA have played an important role, they could help to reduce the degree of vehicular pollution in Kathmandu, Nepal.

In Thailand, a sizable work has been done to manage the environmental problems while in India a research to this connection is still in progress.

In Pakistan though, NGOs can play an active role in this connection, the government participation and interest is very important and highly required. The experiences of South Asian Countries may be a guiding beacon for our policy makers. In this regards, desirable result bearing measures as motivated by India, experience of Nepal and Thailand may be benefits oriented, if be applied and tried in Pakistan.

Public awareness programmes and establishment of environmental research cell are desirable policy measures to overcome this problem, active government participation and support, exclusively with regard to formulation of comprehensive policy reforms programmes to check the pollution of rickshaws and implementation of legislative laws in this connection, is deemed inevitable, indispensable and valuable.

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