

Environmental Pollution: Legislation and Remedial Measures

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Abstract

Environmental pollution is a major concern for a developed country. The share of pollution contribution is much higher from developed countries however developing countries are subjected to the effects of environmental pollution. Air, water, noise, soil and industrial pollution are the main types of polluting elements in Pakistan. Legislation exists in the form of National conservation strategy and PEPA act. Few units of industrial sectors are monitoring effluents however maximum units are neither installing recycling plants nor monitoring the effluents. Ground water in areas adjacent to industrial sectors is getting adversely affected.

Keywords

Environment, Pollution, Act, Strategy, Industrial, Air, Water, Recycle, Treatment

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1. Introduction

An environment is defined as natural world, as a whole or in a particular geographical area, especially as affected by human activity. Natural world, Eco system, the nature, bio sphere and the world are the synonyms for environment. Oxford dictionaries define environment as surrounding conditions in which a person, animal, or plant lives or operates. Ecology is defined as air, water and all other external factors surrounding and affecting given organism at any time. Environment is also defined as the natural world comprising land, water, air, plants and animals especially when something is affected by human activity.

World is safe but not safe enough. Health can only be achieved if pure drinking water is available and pure oxygen is available. Money cannot guarantee quality of life if the living environment is un-hygienic and polluted. It is surrounded in the multiple hazards ranging from green house gases, global warming to environmental pollution. Industrial revolution laid the foundation for the development of

industrial progress but generated effluents and green house gases are hazardous for environment. Deforestation, cutting trees, industrial pollution, transport and environmental pollution, green house gases and carbon mono oxide emission in cities are main environmental issues faced by Pakistan [1]. A country's growth rate in terms of Gross domestic product (GDP) and population has lots of implications on its environment. Better quality of life can only be achieved if we are healthy and prosperous. Environmental pollution in Pakistan is mainly attributable to uncontrolled industrial emission without treatment, outdated pesticides, increasing use of chemicals and medical waste. Effluent discharge of industrial sector owes to improper maintenance and non provision of recycling plants.

During past history, environmental issues were not focused in Pakistan till 1990s. Sanitation and potable water were available with only about 6 percent of rural inhabitants and 51 percent of city residents. About 79 percent of the Pakistani

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residents had no access to flush toilets. Fifty percent of Pakistani population was provided access of cleaning water by 1990. Legislation is the primary base for building framework of environmental protection. National Conservation Strategy (NCS) of Pakistan was approved in year 1992. For the protection of environment, pollution control, Pakistan environmental protection act (PEPA) was implemented in 1997. National Environment Quality standards (NEQS) were described as the minimum value of discharge defined in PEPA Section 13 and 14. Implementation of legislation was the most difficult step in environmental protection mechanism of country. In this regard, Self monitoring and reporting (SMART) program was initiated for implementing NEQS in consultation with representatives of industry, NGOs, government and research development institutions [2,3]. This system persuades industries to monitor their environmental performance and report the performance data to provincial environment protection agencies (EPAs). Industries are made socially and legally bound to respond and take pre-emptive measures. Government environment inspectors are not deployed in this smart concept. In case of liquid elements, three categories of industries are formulated keeping into consideration the specific reporting frequency. Category "C" deals with industries requiring reporting once in six months (bi annually). Category "B" is concerned with quarterly reporting frequency. Monthly reporting is required for Category "A" industries. Similarly in case of gaseous effluents, monthly and quarterly reporting is required. Pakistan Environment Protection Agency (PEPA) developed self monitoring and reporting tool. This tool has been successfully implemented in pilot phase program as joint venture between "Federation of Pakistan Chamber of commerce and industry" (FPCCI), Pakistan EPA and sustainable development institute. This venture contributed a lot in raising awareness. Industries learnt what measures are to be opted for waste minimization and pollution control.

2. Results and Discussion

Sustainable development is incomplete without ensuring environmental protection. Federal government's historic Perspective Plan from year 1988 till 2003 and previous five-year plans do not point out sustainable development strategies. Pakistan's National Conservation Strategy Report year 1992 discussed environmental problem at first instance. Deforestation at an annual rate of 0.4 percent in 1989-90 has resulted in severity of the flooding problem. National Conservation Strategy Report recognized that solid and liquid effluents as major source of water pollution in the country and the cause of widespread waterborne diseases.

With the progress in industrial sector of Pakistan, factories

have been emitting much higher poisonous effluents in the atmosphere. The trend of pesticides and fertilizers is on a rise in order to promote more production of crops and food production. The health of groundwater has also suffered substantially due to the pesticides and unsafe disposal of industrial effluents [4]. The textile and food processing mills have increased considerably consequential in contamination of rivers and canals.

The National Conservation Strategy questioned the accountability of disposal, magnitude, or lethal composition of industrial toxic wastes in municipal disposal areas. Ground water in Karachi is required to be boiled before drinking. Close proximity of sewerage and water lines were located in close proximity of Karachi city. Air pollution in most of cities mainly owes to vehicular pollution and improper maintenance of industries. It was stated in National Conservation Strategy Report that the typical Pakistani vehicle emits much higher carbon monoxide, hydrocarbons and nitrous oxide per mile as the normal automobile in the United States.

Water pollution is a major concern in country. National Conservation Strategy Report stated that solid and liquid effluents are the reason of water pollution in the country and the cause of extensive waterborne diseases. Only three major sewage treatment plants operate in the country. The sewage without treatment is disposed into irrigation systems. Vegetables cultivated from such wastewater have serious bacterial contamination.

Environmental managers have very important responsibility. During feasibility study, development projects are required to be made environment friendly. Professional capacities of environment managers need to be enhanced through qualification. Environmental studies can be promoted in research institutions. Environmental pollution is contributed by a number of sectors ranging from sugar sector to textile, agriculture sector and water pollution. Sugar sector is one of the most important sectors in industrial zone of Pakistan. This industry with more than four million metric ton of sugar production has potential environmental hazards in the absence of required pollution control measures. Discharged water is dumped without processing in adjacent water ponds. Effluents especially pollutant carrier waste water are produced during processing, boiler function, cooling and distillation. Pollution control measures are required to be planned for better environment impacts [5].

The by products of sugar manufacturing are used in other industries as well. Once the effluents of sugar process are discharged in open water body, water chemistry of the adjacent water channel is changed. Bad odor in the environment is experienced in environment by the residents

of attached community due to decomposition of effluents. Plants production and aquatic life is seriously disturbed due to inclusion of high total dissolved salts (TDS) in discharged water. Fish and aquatic life is also disturbed due to waste water with high chemical oxygen demands (COD) and Biological Oxygen Demands (BOD) which diminish oxygen in water channel [6,7].

In order to minimize the water pollution, spills and leaks from pumps, pipes of sugar industrial units are to be prevented for fuel leaks. Additionally inflow and outflow water may be monitored with flow meters. The mills are to be operated at optimum capacity for avoidance of over consumption of raw water. The recycling of water is to be emphasized for reducing waste water volume. Effluents should be screened from dirt, dust and large particles by using filter cloth washing. Sugar mills may be encouraged to install pre-treatment process to reduce the generation of waste. Air and Water quality may be monitored on regular basis to regulate the atmosphere contamination level. Awareness program may be in-doctrine to encourage mill owners and investors to invest in recycling, pre-treatment and pollution precaution.

The textile sector in Pakistan is incomplete without mentioning the city of Faisalabad. Industrial estate in Faisalabad is governed by Punjab small industries corporation. Textile products are the hall mark of the district. Domestic sewage lines are used by industrial units for sewerage of industrial waste water. Fertilizers, cotton spinning, hosiery, cloth weaving, processing and tanneries constitute worth mentioning industrial sectors in the district. As per 1998 census, approximately 12300 industrial units ranging from small to large units were reported [8]. The power loom sectors comprise about 80% of textile industrial in Faisalabad.

Textile industry causes discharge of polluting elements like chemicals, discharge of dyes and heavy metals in atmosphere. Effluents from fertilizer industry at Jaranwala include thermal effluents, Sulfur compounds, ammonia gas, Nitrogen and Carbon dioxide. Solid waste from fertilizers includes heavy metals spent catalyst and chromate sludge. Caustic soda plants located 30 kilometer away from city poses a serious environmental risk. Chlorine gases, solid sludge, mercury concentrates in waste water stream are the effluents disturbing the environment. Likewise Cotton spinning 47 units in Faisalabad provides contamination through lint and dust. Noise pollution is associated with cotton weaving. Sizing agents and liquid effluents are drained in sewage system. Combined waste water from textile processing is alkaline and contains organic matter, fiber, grease and heavy metals (Copper, Iron, Lead). Chemicals, dyes and presence of heavy metals make them highly toxic.

In case of leather tanning units, high level of sludge (50-75% inorganic matter, 20-50% volatile matter and 3.5-6.5% solid content) and presence of chromium makes the tannery waste waters as highly polluted. Similarly waste water from paper board mills contains high organic matter and suspended solids. Chlorinated compounds used in bleaching process are dangerous for human health. Two studies were conducted by agriculture university of Faisalabad on sewage carrier water adjacent to factories along side industrial area. The study revealed that inflow of heavy metals on annual basis in ground water makes ground water not suitable for drinking. Level of total dissolved salts (TDS), Sodium, chloride and heavy metals (iron, copper and lead) in the sewage waste water were analyzed during the study [9].

It is interesting to learn that environmental obligations with existing laws are not known by most of industries. Caustic soda unit, Nishat, Sitara textile mill and Rafhan Maize products have established separate organizational arrangements for environmental protections. Technical staff of remaining units is not aware of environmental issue and hazards generated because of industrial pollution. Punjab provincial environmental protection department (EDP) staffs do not have integration with most of remaining industries. Most of the industries in Faisalabad region discharge waste water without treatment in public water sources and sewage.

Environmental impact assessment has not been implemented by any of the Faisalabad region factories. This assessment is required as per PEPO of 83 and PEP act of 97. Monitoring of environmental discharge is being complied by only five factories [10]. National environmental quality standards (NEQS) are not monitored by majority of industrial units. As per PEP Act 1997, environmental committees at provincial and division level are constituted in Punjab (Lahore) and Sindh (Karachi). Chamber of commerce and industry, Environmental protection department (EPD), Government departments and NGOs constitute Divisional environmental committee. Positive development in this regard had been issuance of "Hearing Notices" by EPD as per section 16 of PEP act to potential pollution contributing 41 industrial units. Few of cases are also referred to tribunal. Government may support industrial sector in technical assistance and financial support but only after stakeholders' willingness of stakeholders.

World wide fund (WWF) for nature Pakistan and International Union for conservation of nature (IUCN) has been putting in efforts to make Northern areas of Pakistan enabled with enhanced capacity. Awareness rising at community level and school is being emphasized by WWF-Pakistan. Initiative of developing countries in reducing carbon emission from De-forestation (REDD+) awards financial benefits to countries who take steps in reducing deforestation. In this regard, \$3.8 million readiness fund has

been awarded to Pakistan by forest carbon Partnership facility (FCPF) to combat climate change and tropical deforestation [11]. Reduction in carbon emission, conservation of forests and mitigating climate change in Pakistan would be supported by readiness fund. Readiness fund of FCPF would help country in increasing re-forestation and persuade investment in renewable energy projects.

Government of Pakistan has introduced climate change adaptation project that focuses on reducing risk from glacial lake outburst floods and flash floods. Climate change division succeeded in getting 135 million rupees allocated in year 2012-13 for mitigation of climate change issues. However the allocated amounts were reduced to 58.8 million rupees in year 2013-14 budgets. Sufficient allocation in budget, promulgation of concrete steps, raising awareness among masses, encouraging plantation, recycling waste water, post treatment of effluents are the need of hour that can enable our future generations to live in peaceful environmental and healthy bringing.

Pollution due to pesticides is a major factor in agriculture sector. Artificial fertilizer and the use of pesticides are in practice. Agri farm workers are encouraged to use new chemicals which are harmful for environment and soil. During cotton picketing, time frame at Sindh and southern Punjab provinces, lots of women suffered a variety of diseases. Pesticides pose a serious threat to soil and plants. These pesticides weaken the immune system of human being posing more liable to cancer, Gastro intestinal infection and tuber culosis. The fertilizer companies use artificial fertilizers and pesticides for their own motives. The government needs to emphasize 'National Environment Policy' with considerably increase in the budget for environment.

Environment observing agencies "German watch institute" developed Global climate risk index (CRI) in 2014. According to Index, Haiti and Philippines occupy first two seats whereas Pakistan is ranked number 3 with respect to most affected by climate change. It means that Pakistan is facing 3rd highest worst impacts of climate change. It is worth highlighting that Pakistan is contributing relatively very less in respect of Green house gas (GHG) emissions. Ranking of Pakistan is 135th as far as GHG emission per capita basis. Inter governmental panel on climate change (IPCC) published a report in year 2007 which advocates that glacier in northern areas of Pakistan are receding slower than other glacier across world but they are melting at steady rate. From year 1944 till 2014, Baltar, Daintar and Kukuar glacier have retreated by 8 km, 2.5 km and 8 km. Indus River will experience lesser inflow of water owing to the retreating glaciers in due course of time [12].

Ecosystem of elevated area of Pakistan is getting adversely

affected by climate change. The affect is directly proportional with increase in elevation. Above 4000 m (12800 ft), the most adverse weather affects can be experienced. Two main reasons for climate change are de-forestation and burning fossil fuels. Pakistan is cutting its forest trees and plants at an increasing rate of 2.1 % per annum as per food and agriculture organization (FAO). Chopping down of forest would result in release of Carbon dioxide in environment averted adding in GHG. Unprecedented increase in temperature in Northern areas has caused melting of Karakoram and Hindukash glaciers. Lack of capacity and serve climate change is making the situation adverse. Land slide in Hunza valley blocked the river Hunza and thus buried the Attabad valley. A number of villages were drowned as a result of newly emerging 14 mile long lake. Climate change would bring secondary hazard along. Agriculture in mountain areas is dependent upon ice and snow melt [13]. Arable lands and cash crops are being adversely affected by the climate change. Decrease in annual snow fall and swift snow melt results in decrease of snow cover.

3. Conclusion

Industries carry lots of weightage for the progress of country but not at the cost of compromising on climate change. The de-carbonization and reduction of emissions intensity is the only way out. Industrialization has to be supplemented with de-carbonization for progressive economy. Clean Air Program can be introduced with respect to motor vehicles. The older vehicle causes much more pollution and environmental degradation. Pollution controlling standards need to be emphasized. Motor vehicle testing program for environmental control should be introduced. Motor vehicle fitness certificate may be made mandatory after every two years. IT technology based software programs can be introduced for registration of industrial statistics on atmosphere pollution control measures. Internet based software would enable ministry of industries and commerce to have centralized database monitored at central control centre. Higher qualification in environmental studies can be promoted. Environment budget needs to be regulated through environment managers. Re-known universities Karachi University, Punjab University, Quaid-e-Azam University are offering BS and MS programs in environmental studies.

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