ENVIRONMENTEL PROBLEMS OF LAHORE AND THEIR REPORTING

By

Sara Ali

Thesis submitted to the Lahore School of Economics

in partial fulfillment of the requirements for the degree of

M.Phil Environmental
Sciences

2010-2012

[20,863 Words]

Supervised by: **[Prof. Dr. Mohammad Nawaz Ch.]**

ABSTRACT

Today Pakistan faces serious environmental problems despite the laws seeking to protect the environment. The issues are multidimensional involving various actors and institutions that need to act today in order to tackle the looming crisis. In this scenario print media has a vital role in building consensus among different stakeholders including policy makers, NGO's, and the public at large. One cannot deny the integral role played by the news media as it is still the main source of information and opinion for millions of readers and viewers and voters through newspapers, magazines etc.

There are hundreds of Pakistani newspapers from the large national Urdu newspapers to the small local vernacular papers. Besides the Urdu-English and Rural-Urban divide, Pakistan media is also divided linguistically with a series of media in vernacular languages, such as Punjabi, Pashto and Sindhi.

In this study Content analysis of environmental reporting is done. Daily Dawn and Daily Jang were selected and a comparison was drawn about the quality and quantity of environmental news stories appearing in these newspapers. These newspapers were chosen because they are dissimilar basically because both of these newspapers are prominent print media and contribute greatly towards understanding the trend of environmental reporting in the country. Plus since are in two different languages therefore it provides opportunity for comparison.

Eight categories of environmental problems were studies pertaining to Lahore based on their importance and appearance in the newspapers. These categories were Air Pollution, Noise Pollution, Water Quality, Sanitation, Solid Waste Management, Legislative Compliance,

Industrial Effluents and Global Warming/ Climate Change. Their frequency (appearance), length, placement and framing were studied. Interviews with environmental reporters and environmental researchers were also conducted. The study has explored that to whether and what extent print media has managed to report on environmental issues with research and follow up. The focus is to evaluate and study the scientific aspects of the reporting in the newspapers.

Dedicated to….

My loving parents whose continuous efforts and encouragement made it possible for me to do this work…

Table of Contents

List of Tables

List of Figures

List of symbols

BOD	Biological Oxygen Demand
BOT	Build, Operate and Transfer
CDGL	City District Government Lahore
COD	Chemical Oxygen Demand
EIA	Environment Impact Assessment
EPA	Environment Protection Agency
LDA	Lahore Development Authority
NEQ's	National Environmental Quality Standards
PEPA	Pakistan Environment Protection Act
PHA	Parks and Horticulture Authority
PM	Particulate Matter
TSS	Total Suspended Solids
WASA	Water and Sanitation Authority

1. Introduction

1.1. Lahore and its Environmental Situation

According to 1998 census Lahore had a population of 6.3 M (Mazhar and Jamal, 2009) and its population has increased to 9 M in the year 2012. Lahore is the first largest populated city and the provincial capital of Punjab. Being economical and industrial hub of the province, Lahore serves as a highway where heavy traffic is coming in from different cities. The use of different types of fuels contributes to air quality issues in many mega cities like Lahore (Waheed et al., 2006). The rate of pollution is expected to increase and worsen due to lack of pollution control strategies and planning (Hameed et al., 2000; Biswas et al., 2008). Extremely high levels of particulate matter (PM), total suspended particulate (TSP), SO_2, NO_x, and O_3 concentrations have been reported for Lahore (Smith et al., 1996; Ghauri et al., 2007). This air pollution can contribute to the increases in mortality through cardiac and respiratory diseases (Dockery et al., 1993, Schwatrz 1994). Elevated levels Pb, Cd, and Ni and other toxic metals were found in human blood samples exposed to air pollution (Younas et al., 1998; Kadir et al., 2008).

Municipal solid waste (MSW) management is a highly ignored factor of environmental management in almost all low and middle-income countries. Poorly managed waste system causes serious environmental impacts and result in health hazards among the people (Misra & Pandey, 2005). Lahore is also facing solid waste management issues. In developing countries a large portion of the population suffers from health problems due to lack of the quality drinking water and presence of microbial contamination (Hashmi et al., 2009). Contaminants such as nitrates, sulfates, metals, dissolved gases, soluble organic compounds and dissolved salts are

commonly reported in a water system (Manzoor et al., 2006). Diarrhoea is a water borne disease and is reported to be the leading cause of death in infants and children in Pakistan. Every fifth citizen in Pakistan suffers from diseases caused by the polluted water coming from different sources (Kahlown et al., 2006). Furthermore, disposal of wastewater above discharge standards from households or other units can result in adverse soil pollution and surface water contamination (Tanner et al., 2012). The other important sources of pollution are industrial effluents, which pollute subsoil and drinking water. Out of total 392 tube-wells in Lahore, high concentration of arsenic was found in 168, while in 82 the arsenic was between 10-50 ppb (Haydar et al., 2009).

1.2. Importance of Media

In the world today thousands of events are occurring simultaneously and we remain aware about them only due to media. Based on the journalists' framing of the news; our pictures of the world are shaped and refined (Shoemaker and Reese, 1996). Media organizations influence the public's perceptions of what are the most important issues of the day according to them (McCombs, 2002). It has been studied that in a typical daily newspaper more than 75% of the potential news of the day is rejected and never transmitted to the people. Newspapers clearly state the importance of a news item through their given page placement, headlines and length etc. Media shapes and influences the prominence of certain elements in the news (Altschull, 1984).

It is well established that mass media reporting can influence the issues the people will perceive as important. This is a phenomenon known as agenda setting (Yagade and Dozier, 1990). Reporters and editors who do the gate keeping have some factors imposed on them such as financial limitations and economic pressures because at the end of the day media organizations

have to survive as profit making organizations. Their primary goal is profit maximization. (Bartels, L. M. 1996).Numerous studies have shown that people's choices can be influenced by the manner in which a problem is presented in the mass media (Kahneman, 2003). Another view is that the influence of the mass media on public opinion is short lived because media preferences changes from day to day and they report different stories each day (Driedger, 2007). But still many public opinion surveys in the developed countries have also shown that television and daily newspapers are used as primary sources of information (PEJ, 2006). Thus, mass media is a powerful tool for increasing public awareness of environmental issues (Schoenfeld et al., 1979; Slovic, 2000). Many campaign programs in various environmental issues such as energy conservation and waste reduction have used the mass media as a tool (Viklund, 2004; Davies, 2008). As people abundantly look towards mass media to understand the complexities relating to environmental science therefore, environmental reporting is complex and tricky field (Boykoff, 2009). An environmental reporter should have an understanding of scientific language, awareness with historical environmental events, updated with the environmental policies, understanding of current environmental concerns and the ability to communicate all of that information to the public in easily understandable language (UNEP, 2006). The level of public concern about environmental issues is influenced by the amount of media attention they receive and not by the content of the news reports (Mazur and Lee, 1993).

Print media in Pakistan has undergone significant changes since 2003. The number of newspapers has decreased but the daily circulation has increased. In 2003 daily distribution of newspapers was 6.2M (International Media Support, 2009). The main objective of the study was to assess the role of print media in creating awareness about environmental problems and in promoting environmental education. Daily Dawn and Daily Jang were chosen for this purpose

because both are the leading and widely circulated newspapers in the country. The study evaluates the continued media efforts to pinpoint local problems of Lahore by continuous reporting of environmental issues.

1.3.Framing

Agenda setting theory is closely linked with the framing theory. This theory discussed the real meaning of an issue. According to framing theory the media focus its attention on certain issues and events, give a specific meaning and depicts in a particular way in which they intend to.

1.4. Entry of Environmental News in Newspapers

Environment's entry in newspapers is not very old. It was not until the 1950's that environment and related terms entered the mass media dictionary. It was a new way of looking at humankind-nature relationships. Although journalists began to cover environmental issues early in the 1950's in the U.S, environmental reporting was not recognized as a distinctive beat for a long time. The press rarely reported the bad news of industry pollution and mostly reported about the good-news releases concerning industry pollution controls and the many benefits offered to the community by local industry (Clay Schoenfeld, Journalism Quarterly 1983).

The environment is in part a government story. Government officials and agencies are directly involved in decision-making that will determine the future quality of life, and they are responsible for a great amount of the public relations environmental material received and used by the mass media. Their words and deeds are regularly covered by the press.

1.5. Print Media's Environmental Reporting

Environment is a multidisciplinary field involving science, politics, economics and society. Few people are even aware of the environment but most of them still envisage it as a complex, unified system that needs constant protection. Environmental reporting is tricky as there is a risk of losing a potential reader if some unexplained jargon is used.

Environmental journalism in reality is civic journalism which means raising public awareness of important issues, and helping the public to resolve those issues themselves. They influence public opinion. They get people involved; they put issues on the table. The thrust of environmental journalists is that they must keep themselves constantly up to date and fluent with the subject they write about.

The role of the environmental journalist is to help readers understand environmental issues that are often complex. Each issue has many different dimensions: For instance, when writing about the plight of solid waste management issues of the city, a reporter should look at the whole picture involving all the actors, the voice of sanitary workers should also be highlighted as they are an integral part of the system. Furthermore there are political dimensions to the problem. In a country like Pakistan, information for environmental stories is not easy to come by, particularly when those stories are related to land issues. Authorities may well refuse to comment, decline to take the reporter's calls and block information. An effective use of Freedom of Information Act here would be helpful to dig out the required information. A reporter should have the knowledge of the use and application of FOI ordinance 2002 which states to provide for transparency and freedom of information to ensure that citizens of Pakistan have improved access to public records and for the purpose to make the Federal Government more accountable to its citizens.

Environmental issues are influenced by mass media reporting like other important issues. If they believe that environment is important then the public will also perceive it as important.

1.6. About the Newspapers of the Study

For content analysis Dawn and Jang were selected. They were chosen because they are dissimilar. They are leading print media newspapers so they are important in understanding about environmental problems and the type of reporting done. Plus choosing two different languages provides the basis for comparison. Environmental news items in these newspapers about the Lahore city were chosen for the content analysis.

1.6.1. Study Area

The study area for this study was Lahore. The population of Lahore according to 1998 census was 6, 318, and 74 and is the largest city of Punjab. (Faiza Mazhar & Tabassum Jamal, 2009). The population has increased to 7,214,954 in the year 2010 (Population Census Organization, EA Wing).

1.6.2. Selected Newspapers

The two news papers were selected depending on their daily circulation and popularity within the readers. Also one news paper was in Urdu and the other in English language, this was done to see the difference in the news preference with the qualification of readers.

1.6.3. Daily Dawn

Daily Dawn is the oldest and largest widely circulated English newspaper of Pakistan. It is published simultaneously from Karachi, Lahore and Islamabad. Dawn is published by Pakistan Herald Publications. It's week-day circulation is over 138,000 and the total readership base is 759,000. Dawn is recognized at international level due to its international and high professional standards (Dawn official Website).

1.6.4. Daily Jang

Daily Jang is the largest widely circulated Urdu newspaper of Pakistan. It is published by Jang Group of Newspapers. It is simultaneously from Karachi, Lahore, Rawalpindi, Islamabad, Multan, Quetta and London. Jang's per day circulation is over 800,000 copies and readership of over 7M (Jang official Website).

Now a brief overview of the eight chosen issues for the content analysis is presented. Scientific aspect of these categories is explained here which is lacking in their coverage news discussed in the later sections of the research.

1.7. About the Issues of the Study

Following is description about the selected categories for content analysis.

1.7.1. Air pollution

Air pollution has many sources that include:

Stationary Sources

Stationary sources are further classified into:

Point sources

These sources are discrete and defined location, such as a power plant

Fugitive (non-point) sources

These sources are the one from an open area such as a construction site or farmland

Area sources

They include several sources within a well-defined area, such as an urban area.

Mobile Sources

Moving sources are the ones coming from automobiles, aircrafts etc.
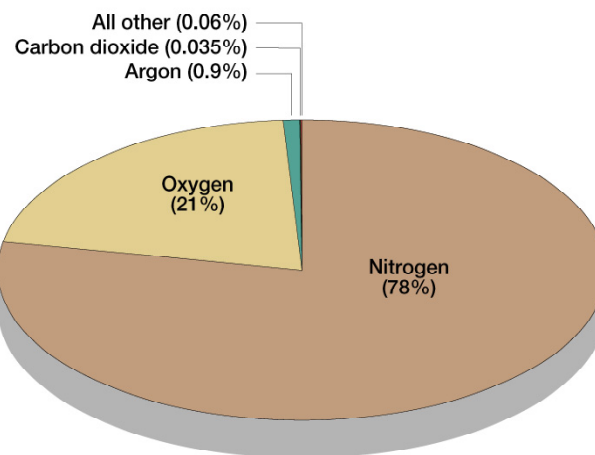
Figure 1-1: Composition of Air Pollution components

○ **Air Pollutants**

Air pollutants in Physical state are

➢ Gaseous form: SO_2, NO_X, CO, O_3, volatile organic compounds (VOCs)

➢ Solid or liquid form: Particulates, PM-10 (less than 10 μm) or PM-2.5 (less than 2.5 μm)

➢ Air toxins: These are the pollutants causing cancer or other serious health problems.

1.7.2. Urban Air Pollution

Air pollution is not distributed uniformly, mostly concentrated around urban areas. Sources of pollution in and around urban areas are automobiles, industrial emissions. In urban areas it appears as urban smog which is affected by meteorology and topography.

1.7.3. Air Quality Standards

Many nations have their own standards; however, no international standards are in place. In the U.S., the Clean Air Act was formed in 1970 and subsequent amendments took place in 1977 and 1990. The goal of air quality standards is to reduce carcinogens up to 90%. Air Quality Index (AQI) is the standard used for measuring the air quality.

1.7.4. Control of Air Pollution

Air pollution can be controlled in several ways such as be reducing emissions (conservation and improved efficiency); e.g., refineries. The other method could be collecting, capturing, and retaining pollutants before entering the atmosphere through gas stations. By regulating automobile exhaust using catalytic converter control of sulfur dioxide through scrubbing can be done. Varied pollutant-control strategies and new and improved technologies could be implemented as well.

As the air pollution particles are Gaseous and Particulates in nature they have different control strategies. For gaseous pollutants the methods are absorption, adsorption and combustion.

Flue Gas Desulfurization (FGD)

Flue Gas Desulfurization (FGD) is another method that has two processes such as Non-regenerative which is non-recovery and reuse of chemical reagents is done while Regenerative type is the one in which recovery and reuse of chemical reagents is done.

Wet Type

Wet type methods include Venturi, Static packed, Moving bed, Tray tower and Spray towers.

Figure 1-2: Vertical Venturi Scrubber

Figure 1-3: Packed Bed Scrubber

The air quality of Lahore is categorized as severe which means that it is a serious threat to the health of citizens. The air pollutants include NOx, CO, SO2 and respirable dust which have a particulate matter size of 2.5. The levels of these pollutants were found to be greater compared to the the National Air Quality Index (Environment Protection Department EPD 2011).

Table 1-1: NEQ's for Sulphur Dioxide in the atmosphere.

Sulphur Dioxide Background Levels (ug/m3)			Standards	
			Criteria I	Criteria II
Background Air Quality	Annual Average	Max. 24 hours	Max. SO2 Emission	Max. allowable ground level
(S02 Basis)		Interval	(Tons per day per Plant)	Increment to ambient (ug//m3) (One year average)
Unpolluted	< 50	<200	500	500
Low	50	200	500	50
High	100	400	100	10
Very Polluted	> 100	> 400	100	10

 In this study air pollution refers to report which discussed introduction of chemicals, particulate matter, or biological materials that cause harm or discomfort to humans or other living organisms, or cause damage to the natural environment or built environment, into the atmosphere.

1.8. Noise Pollution

Noise pollution means any unwanted and damaging sound that pollutes the environment. Noise is one of the most widely and most frequently experienced problems of the urbanized areas.

Noise sources:

According to WHO (World Health Organisation) the main sources of noise are the following:

Industry: the machinery used is the principal source of noise in industrial activities. More power, more noise.

Transport: Especially the road transport, depending on the speed and way characteristics.

Building activities: The machinery used in building activities causes noise.

Domestic activities: Such as cleaning, TV and radio sets, appliances, family life, pets, pipes, tank which produce private and uncontrolled noises.

Table 1-2: Values for Community Noise

Environment	Critical Health Effect	Sound Level (db)	Exposure Time (hrs)
Outdoor living areas	Annoyance	50 - 55	16
Indoor dwellings	Speech intelligibility	35	16
Bedrooms	Sleep disturbance	30	8
School classrooms	Disturbance of communication	35	During class
Industrial, commercial and traffic areas	Hearing impairment	70	24
Music through earphones	Hearing impairment	85	1
Ceremonies and entertainment	Hearing impairment	100	4

1.8.1. Noise Pollution effects

It has following major effects:

- Noise pollution can make people nervous.

- It can prevent people from sleeping.

- It can change a man's physiological state by speeding up pulse and respiratory rates.

- It can damage the sense of hearing permanently or temporarily.

- It can also influence blood circulation and cause stress and other psychological effects.

Table 1-3: Effects of Noise Pollution

Effects	Noise Type (example)	Subjective Sensation	Noise Level (db)	Conversation Possibility	Places Where Noise Occurs
Deafness Auditory capacity loss	Turbojet Pneumatic drill Horn	Pain deafness	130	Impossible	Airport runway Garages Workshops
		Unbearable noise	120		
		Painful	110		
	Motorcycle Shout Children playing	Terrible noise	100	Shouting	Garages Discos Street
			90		
Discomfort			80	Hard	
	Extractor fan Washing machine Alarm clock Snores	Bearable environment	70	Loudly	Traffic congestion Living room (TV) Offices Commercial centres
			60		
			50	Normal	Normal traffic Noisy apartment
		Normal noise	40		
Comfort level	Cloth rubbing To chew gum Fridge		30		Parks and gardens Library Classroom
	Watch Mosquito flight	Silence	20	Low	Recording study Acoustic laboratory
			10		

1.8.2. Solutions to Noise Pollution

Correction Measures: These initiatives are based on the noise limitation and reduction in the emission source, and on the exposed population protection. The measures can be:

Administrative Regulations intended to establish the emission minimum levels of noise according to its origin.

Direct actions about emission sources, how to limit the activity level or to reduce the noise, geographical isolation of noisy activities, building soundproofing, etc.

Preventive Measures: These are the initiatives based on plan intended to prevent noise pollution.

- Land use planning restricting certain activities to in specific areas.

- Urban planning, building under sustainability criteria: suitable location and distribution of housing and other of similar nature.

- Environmental awareness and education addressed to aware population about the noise, problems and effects.

- Environmental impact studies intended to help the decision makers in the policies design, especially in land use planning and location of industrial activities.

In Lahore, the noise pollution is very common. Vehicle horns, low maintenance quality of vehicles are the major culprits. Especially the people near the busy road crossings are very much affected due the traffic noise. A distractive and distinct feature of the Lahore City's vehicle population is the use of two stroke engines in trucks, buses, vans and three wheel vehicles.

The road space being limited, the growing number of vehicles forces low gear driving, pushing up the pollutant levels to an undesirable limit. The absence of a strong public transport system, failure of pollution control norms, poor quality of fuel and ignorance of vehicle maintenance all contribute to the environmental mess. The vehicles emission represents the greatest source of noise and dust pollution in Lahore.

There are 19, 44,709 approximately (Punjab Development Statistics, 2009) vehicles on the roads of Lahore. EPD survey shows that the level of noise in the residential areas of the city now exceeds 60 decibels. According to 2010-2011 standards, the average Leq in residential areas should not exceed 45 decibels at night and 55 decibels in the day. In commercial areas, the

average should not exceed 65 decibels during day and 55 decibels at night; and in industrial areas, 75 decibels at day and 65 decibels at night. The standard noise level in 'silence zones' are 50 decibels during the day and 45 decibels at night.

Table1-4: National Environmental Quality Standards (NEQS) for Motor Vehicle Exhaust and Noise

Parameter	Standards which means maximum permissible limits
Smoke	40% or 2 on the Ringlemann Scale or equivalent smoke number at end of exhaust pipe during engine acceleration mode.
Carbon Monoxide	Emission Standards : New Vehicles 4.5 %. Used Vehicles. 6 %
Noise	85 db

In this research noise pollution mean a news report discussing excessive environmental noise that disrupts the activity or balance of human or animal life.

1.9. Water Quality

Water quality is the physical, chemical and biological characteristics of water. The vast majority of surface water on the planet is neither potable (fit for drinking) nor toxic.

Factors effecting water demand are climate conditions, cost of water, habits of people, population density, sewerage system, level of industrialization, distribution pressure, quality of water and system of supply.

Global climate change is causing significant disruptions in the world's natural hydrological cycles. These hydrological changes are having significant impacts on water quality and supply and how we manage water resources. Most affected areas in the world include the Middle East, Asia and North Africa. Increased acceptance and reliance on reclaimed water will play a key role in mitigating the impacts of global climate change.

Today Pakistan faces many water challenges including trans-boundary management of water extremes; frequent floods triggered by climate shifts, water scarcity and high stress, growing population and accelerated demand, inefficiencies in water allocation, spatial and temporal variability, climate change impacts on supply and demand and problems of governance and institutional arrangement. Pakistan's Water Availability is decreasing from year 2000 in which it was 1700 cubic meter per capita, in year 2005 it was 1500 cubic meter per capita and is projected to be < 1000 cubic meter per capita in year 2035. Trans- boundary water conflicts, climate change will lead to 3Ds such as destructive, dry or dirty water, jobless, poor and hungry population. Pakistan has a National Water Policy which was formulated in 2005. It gives top priority to the provision of safe drinking water for all, along with hygienic sanitation for urban and rural populations. The NWP establishes important basic principles including protection of sources, monitoring and maintenance of drinking water quality, and progressive upgrading of facilities for the provision of water and sanitation, on a sustainable basis.

The water available too is not fit for drinking and other purposes. For that matter water has to undergo treatment process. Water treatment involves various steps.

1.9.1. Water Treatment

Water treatment transforms raw surface and groundwater into safe drinking water. Water treatment involves two major processes: physical removal of solids and chemical disinfection. Water treatment of surface water process includes the following steps. These are called as unit processes. They include Chemical Mixing, Flocculation, Sedimentation, Sand Filter, Disinfection, Flouridation and then is pumped to community.
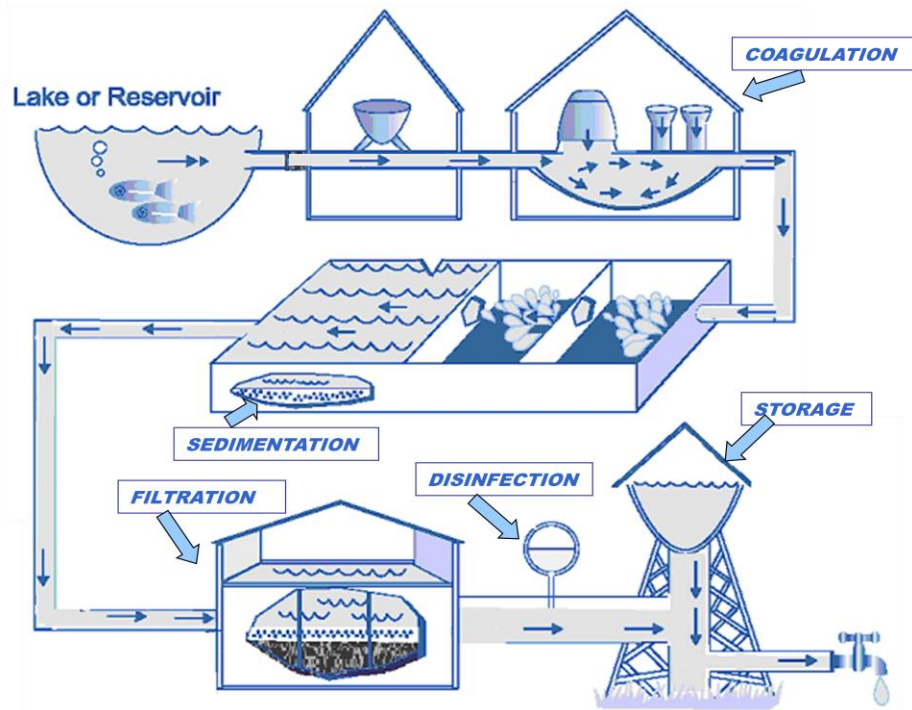
Figure 1-4: Schematic of Water Treatment Processes

Screening

Screening is a simple process which may incorporate a mechanized trash removal system. During the screening process large solids, logs, branches, rags are removed.

Sedimentation

Sedimentation is the next step in water treatment. It is the oldest form of water treatment which uses gravity to separate particles from water. It is often followed by coagulation and flocculation. Sedimentation is affected by the particle concentration. In dilute suspensions particles act independently while in concentrated suspensions article-particle interactions are significant, particles may collide and stick together (form flocs), particle flocs may settle more quickly and article-particle forces may prevent further consolidation.

Unit Processes for Groundwater Treatment

Unit processes for ground water treatment involve the following steps. Aeration, Disinfection, Flouridation and finally pumped to community

Coagulation

Coagulation is the chemical alteration of the colloidal particles to make them stick together. Particles are of two types i.e. Hydrophilic particles which are water loving as they absorbs to water. The others are hydrophobic particles which are water hating as they does not absorb to water**.** Hydrophobic particles are negatively charged and don't like to aggregate and are hydrophobic**.** A positively charge coagulant destabilizes the negatively charged particles and brings them together. Coagulants lower the negative repulsion force of colloids. Rapid Mixing is done for 20 to 60 seconds. Flocculation gentle mixing is done 20-60 minutes to aggregate the

particles. Coagulants may be of several types like Aluminum sulfate (alum) – corrosive alone, packaged in water, Ferrous sulfate (ferric) and Ferric chloride.

Settling

When flocs have been formed they have to be separated from the water through gravity settling tanks. All sedimentation tanks are modeled as plug flow reactors. They are rectangular or circular in design. Their design is determined by the Vs of the particle size to be removed.

Filtration

Settling is followed by filtration. There are two types of filters slow sand filters and rapid sand filters.

Slow Sand Filter

This filter runs 3 – 6 months where top of filter does most of the work.

Rapid Sand Filter

This filter runs for hours to 2 days. The entire filter is removing. The Multi-media is used in this which is activated carbon, garnet and sand.

Disinfection

These are the oxidizable compounds which become food for microbes in distribution system. The commonly used disinfectants are chlorine, chlorine dioxide, chloramines, ozone and UV light.

In Pakistan, water supply coverage through piped network and hand pumps is around 66%. It is estimated that, in Pakistan, 30% of all diseases and 40% of all deaths are due to poor water quality. Pakistan has no national drinking water quality standards and WHO guidelines are followed. Access to safe drinking water in Punjab's urban areas in 2005 was 95 percent against 87 percent in rural areas. Lahore's water contains high levels of iron, arsenic and bacteria. The average groundwater depth in Lahore in east Lahore is 100 feet, while it is 40 feet in west Lahore (Basharat and Rizvi, 2011).

Lahore has no public storage capacity and water supply lasts for a few hours a day and remains highly variable. In addition, there is crumbling distribution network with leaks and 'unaccounted for' water plus there is no method for effective metering of water use.

In the study Water Quality means an article which concentrates on water contamination by various sources and its effects on animal and plant life; their costs to the economic system; and the various methods of control.

1.10.   Sanitation

Sanitation is generally referred as the "silent crises". 2.4 billion People (40% of the world's population) lack so called adequate sanitation. 18% of the world's population lack safe water supply. 10% of all wastewater in developing countries is treated. Malnutrition is a major factor making us more vulnerable to disease and death, thus food security is important. The combined effects of poor personal and domestic hygiene and lack of safe water and good environmental sanitation is considered the most important risk factor for disease and death.

Figure 1-5: Animals scavenging organic material and clogged storm water drains
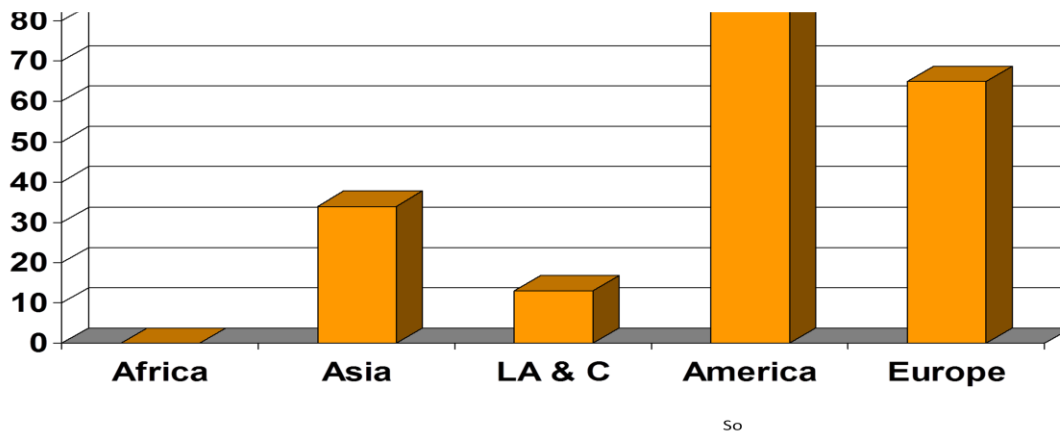
Figure 1-6: World-wide statistics on backlogs (SEI 2005:40)

Table 1-5: Proportion of households in major cities connected to piped water and sewers

(Source: *Stockholm Water Front*, No. 4 December 2007)

	House or yard connection for water (%)	Connected to a sewer (%)
Africa	43	18
Asia	77	45
Latin America & Caribbean	77	35
Oceania	73	15
Europe	96	82
North America	100	96

Only 58 percent of the country's population has access to proper sanitation facilities; the remaining 42 percent relieve themselves in the open, which creates serious risks of exposure to a variety of diseases. Rs.112 billion out of a total Rs.365 billion estimated cost of environment degradation in Pakistan is associated with inadequate water supply, sanitation and hygiene. This situation is leading to malnutrition, anaemia and retarded growth. People are suffering from waterborne diseases occupied about 25 per cent of hospital beds. Access to sanitation in urban areas in Punjab is 92 percent and 35 percent in rural areas. The 20 districts of Punjab have less than 60 percent sanitation coverage, with eight districts falling below 40 percent coverage. Almost half of all households lack toilets connected to any sewage system and therefore use open drains, or underground septic tanks (National Sanitation Policy, Ministry of Environment Government of Pakistan 2006).

Sanitation refers to a report that highlights the situation of sanitation facilities in Lahore, means of spreading hazardous and toxic waste.

Hazards can be physical, microbiological, biological or chemical agents of disease. Wastes that can cause health problems are human and animal feces, solid wastes, domestic wastewater (sewage, sullage, greywater), industrial wastes and agricultural wastes.

1.11.   Solid Waste Management

Solid Waste Management (SWM) includes control of generation, collection, storage and disposal of solid waste in a manner that is in accordance with the best principles of public health, economics, engineering, aesthetic and public attitude.

Solid waste affects strongly the social, ecological, esthetical, ethical and economical lives of people by the facts described below:

- The heaps of solid waste placed openly produces a platform for breeding of flies, rats and disease causing germs. These flies can act as a passive vector in disease transmission.

- In a US public health service report it has been published that 22 diseases arise only due to the improper solid waste management.

- The ecological impacts on water and air pollution can be attributed to improper solid waste management.

- The problems associated with the management of solid waste in Pakistan are due to the quantity and diverse nature of waste.

- The development of extensive urban areas.

- The engineering limitations of the impacts of technology, energy and raw materials

- So, to achieve a goal of proper solid waste management in an efficient and orderly manner, the fundamental aspects and relationships involved must be identified and understood early.
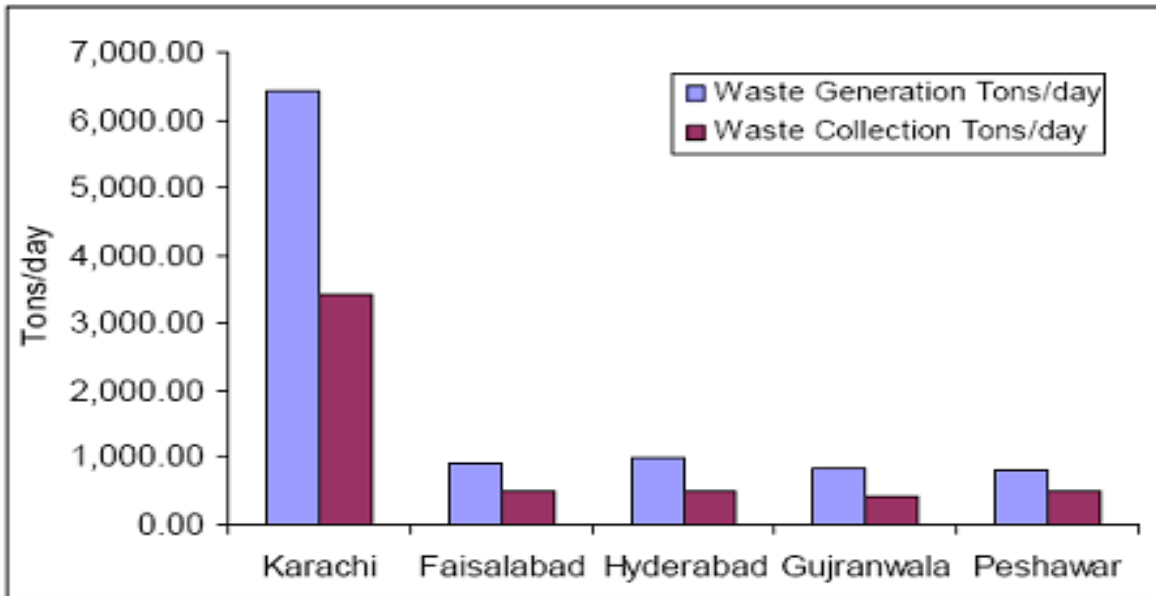
Figure 1-7: Generation and collection patterns of solid waste in major cities of Pakistan

The population of Pakistan is growing at about 1.8 percent annually (World Bank 2011), the volume of solid waste is also increasing but unfortunately there is no single city in Pakistan which has a proper solid waste management system (SWM) starting from collection of solid waste up to disposal (Aman Mahar, Riffat Naseem Malik 2007).

Densely populated cities like Karachi and Lahore do not have any appropriate landfill or disposal site, instead, un-engineered land filling, open dumping and open burning is being practiced.

At present total solid waste generation in Pakistan is about 20.024 million tons a year, which is approximately 59,000 tons per day, according to an environment ministry study. This study also revealed that the rate of waste generation on average varies from 0.23 kg/capita/day to 0.61 kg/capita/day in rural and urban areas respectively. The study also showed that the growth rate of solid waste generation is about 2.4% per annum.

Lahore, having a population of approximately 10 million (projected population for year 2011), is experiencing urban sprawl and industrialization leading to a generation of enormous amount of solid waste from many sources, like household waste, commercial activities, industries, hospitals, animal waste, all of which are contributing in creating environmental and health hazards the residents of the city (Aman Mahar, Riffat Naseem Malik 2007).

The city is divided into nine major towns and 150 union councils. About 5,700 tonnes of solid waste is generated from different sources with high percentage of organic waste (67 percent) daily with a generation rate of 0.84kg/capita per day. The rest is recyclable or unclassified in composition. Waste storage capacity is about 3,200-3,800 tonnes/day and lifting capacity is only about 3,800-4,400 tonnes/day. Approximately 2,000 tonnes/day waste remains uncollected. Around 350-450 tons of organic waste is utilized for compost preparation by private contractors on build, operate and transfer (BOT) basis under public-private partnership contract with City District Government Lahore (CDGL). Currently, 60 percent of the MSW is stored, collected, transported and disposed in open dumps (on dumping sites of Saggian, Bagarian, Kahna Kacha and Mehmood Boti) while 40 percent remains uncollected and lies along roadsides, streets, railway lines, depressions, vacant plots, drains, storm drains, in or around waste containers (where available), open heaps at road sides, informal collection points and open sewers.

21.2 percent of all recyclable waste in Lahore is successfully recycled, and the industry generates an amount of Rs 271 million per year (Mahar and Malik 2007).

Segregation at source is lacking, shortage of human resources, inadequate tools and equipments, lack of civic awareness, poor infrastructure, poor town planning, inappropriate placement of containers, shortage of educated and skilled professionals, and political concerns are major problems that creates hindrance in proper management of the city's Solid Waste.

Established waste treatment technologies include composting, incineration, landfill, recycling and Windrow composting. Alternate waste treatment technologies include anaerobic digestion, alcohol/ethanol production, bioconversion of biomass to mixed alcohol fuels, biodrying, gasification, gas plasma, in-vessel composting, mechanical biological treatment, mechanical heat treatment, plasma arc waste disposal, pyrolysis, tunnel composting and waste autoclave.

Solid waste Management in this study refers to the collection, transport, processing or disposal, managing and monitoring of waste materials. This relates to materials produced by human activity, and the process is generally undertaken to reduce their effect on health, the environment or aesthetics.

1.12. Industrial Effluents

Untreated effluents from communal and industrial sources are significantly polluting the surface and groundwater in Lahore. Due to surface and groundwater contamination, negative environmental impacts are increasing. Local villages and suburb populations along the Ravi River downstream of Lahore city are under serious threat.

After agriculture the second largest use of fresh water in Pakistan is industrial use (Tariq, 2010). These facts increase the scope of industrial wastewater reuse in industry or agriculture. For

hygienically safe reuse of wastewater it must be treated before reuse. The effects of wastewater discharge from industries have striking negative impact on the streams and rivers flowing through the cities. Consequently the discharge from densely inhabited areas and industrial estates has transformed streams and rivers into open sewers (Qadir et al., 2007). Textile industry is one of the largest industries in pakistan and contributes much towards the economy. Pakistan exports textile of 8.52 billion US $/ year (Chen et al., 2007). The textile industry is one of the largest water consuming industries "as it uses water as the principal medium for applying dyes and finishing agents and removing of impurities" and involves a lot of dye discharge into the wastewater. From the environmental point of view, the textile industry is characterized not only by its enormous water consumption but also by the variety and complexity of chemicals employed (Gemeay et al., 2003; Arslan-Alaton and Alaton, 2007). The manufacturing of textile products involves the use of different dyes and chemicals in many different industrial processes that cause the formation of wastewaters with complex and very variable characteristics that makes their treatment particularly difficult. The textile industry is also one of the most water-consuming industrial sectors (Delee et al., 1998; Vandevivere et al., 1998; O'Neill et al., 1999).

Figure 1-8: An image of industrial effluent coming from an industry

The disposal of industrial waste has become a major issue as it is polluting water and environment exposing people to chemical and other hazardous waste leading to spread of diseases. Certain chemicals being released untreated are highly toxic and exposure can lead to disease or death. Most of the industries in the province dispose off their highly toxic and untreated waste water coming from different units of the industry into water channels such as lakes, canals and rivers. This disturbs the overall balance of the environmental system. Articles about industrial waste effluents consisting of organic wastes such as pesticide residues, solvents and cleaning fluids, dissolved residue from fruit and vegetables, and lignin from pulp and paper to name a few. Effluents can also contain inorganic wastes such as brine salts and metals.

1.13. Legislative Compliance

A pollution charge regime was introduced in Pakistan as a measure to achieve industrial compliance with the National Environmental Quality Standards (NEQS). The modalities for the implementation of these pollution charges have gone through a unique consultative process between representatives of industry, government, environmental NGOs and academic researchers. The consensus of all stakeholders were on the point that it has to adopt a market based approach, i.e., a pollution charge or tax combined with fiscal incentives to industries, rather than a use of coer criminal procedures for ensuring compliance with NEQS. Appreciable progress has been made towards operationalizing the process. This was implemented in January 1999. Although originally promulgated by the government in 1983, there had never been a concerted effort to implement the NEQS until the Pakistan Environmental Protection Council (PEPC) was reactivated in 1993 by Mr. Asif Ali Zardari, then Minister for Environment.

Table 1-6: National Environmental Quality Standards for Municipal and Liquid Industrial Effluents (mg/L, Unless Otherwise Defined)

Parameter	Existing standard	Revised standards		
		Inti land water	Into sewage treatment	Into sea
Temperature or Temperature increase*	40°C	=< 3°C	=< 3°C	=< 3°C
pH value	6-10 pH	6 - 9	6 - 9	6 - 9
5-days Biochemical Oxygen Demand (BOD1) at 20oC	80 mg/l	80	250	80
Chemical Oxygen Demand (COD)	150 mg/l	150	400	400
Total suspended solids	150 mg/l	200	400	200
Total dissolved solids	3500 mg/l.	3500	3500	3500
Grease and oil	10 mg/l.	10	10	10
Phenolic compounds	0.1 mg/l.	0.1	0.3	0.3
Chloride	1000 mg/l.	1000	1000	SC
Fluoride	20 mg/l.	10	10	10
Cyanide	2 mg/l	1.0	1.0	1.0
An-ionic detergents (as MBAS)	20 mg/l.	20	20	20
Sulphate	600 mg/l.	600	1000	SC
Sulphide	1.0 mg/l.	1.0	1.0	1.0
Ammonia	40 mg/l	40	40	40
Pesticides, herbicides, fungicides and insecticides	0.15 mg/l.	0.15	0.15	0.15
Cadmium	0.1 mg/l	0.1	0.1	0.1
Chromium	1.0 mg/l	1.0	1.0	1.0
Copper	1.0 mg/l	1.0	1.0	1.0
Lead	0.01 mg/l	0.01	0.01	0.01
Mercury	0.01 mg/l.	0.01	0.01	0.01
Selenium	0.5 mg/l.	0.5	0.5	0.5
Nickel	1.0 mg/l.	1.0	1.0	1.0
Silver	1.0 mg/l.	1.0	1.0	1.0
Total toxic metals	2.0 mg/l.	2.0	2.0	2.0

Zinc	5.0 mg/l.	5.0	5.0	5.0
Arsenic	1.0 mg/l.	1.0	1.0	1.0
Barium	1.5 mg/l.	1.5	1.5	1.5
Iron	2.0 mg/l.	8.0	8.0	8.0
Manganese	1.5 mg/l	1.5	1.5	1.5
Boron	6.0 mg/l.	6.0	6.0	6.0
Chlorine	1.0 mg/l.	1.0	1.0	1.0

1.14. Global Warming/ Climate Change

Climate change is a significant and lasting change in the statistical distribution of weather patterns over periods ranging from decades to millions of years. It is change in average weather conditions, or in the distribution of weather around the average conditions (i.e., more or fewer extreme weather events). Climate change is caused by factors that include oceanic processes (such as oceanic circulation), variations in solar radiation received by Earth, plate tectonics and volcanic eruptions, and human-induced alterations of the natural world; these latter effects are currently causing global warming, and "climate change" is often used to describe human-specific impacts. News on the rising average temperature of Earth's atmosphere and oceans since the late 19th century and its projected continuation resulting in climate change.

1.15. Objectives of the Study

Today, media coverage of the environment may be classified as risk reporting or science journalism, or as part of a more general field called environmental communication. Newspapers cover generally these two aspects i.e. they inform about a coming environmental risk and secondly they educate on scientific discoveries and innovations. In country like Pakistan where

most of environmental issues go unnoticed and seriousness on environmental issues is negligible. The mainstream media seems not to be interested in reporting the issues of environment with proper research and follow up.

Lahore faces many environmental challenges but out of them eight categories has been selected based on their importance and appearance in the newspapers.

The other aspect of the study is to examine journalists who are reporting on the environment. Environment is a part time job for Pakistani Journalists and a subject of less priority for the editors. They have a challenging task before them. Environmental journalists can have an influence on society, and consequently make significant impacts on the future. Therefore, they need to have necessary environmental studies background which is seen to be lacking. The objective of this study is to investigate that whether and to what extent print media has successfully managed to report on the environmental issues with seriousness and proper follow ups.

1.16.   Research Questions

R.Q.1 Is the media coverage on environmental issues scientific or general in nature?

R.Q.2 Has media coverage on environmental issues increased in year 2010 compared to 2005?

R.Q.3 Is Pakistani media biased towards environmental issues?

R.Q.4 Does the environmental reporters consider environmental beat important?

2. Literature Review

Academic scholarship has grown in environmental communication studies in the form of books, journal articles, and in discussions in communication trade magazines over the last thirty years. The amount of literature concerning environmental journalism is vast, in the form of quantitative and qualitative research.

Some suggest the first Earth Day in 1970 was critical year that demanded increased attention from the press and the public about the environment (Bowman, 1978; Brooks, 1990; Burke, 1995, Cantrill & Oravec, 1996; De Mott & Tom, 1990). Shabecoff (1993) wrote in his book, "A Fierce Green Fire" that American Congress enacted a series of environmental laws in the 1970s that added fuel to the fire of the environment as an important political news story.

In the study "The Literature of Environmental Communication," Pleasant, Good, Shanahan, and Cohen (2002) collected citations of all papers matching specified keywords covering environmental communication topics in the social science journal literature from relevant indices from 1945 to 2001. They found that environmental communication research really began to take off in 1985 when the number of articles doubled from the previous year. They concluded that, with the substantial amount of academic literature on environmental communication scattered in different journals of communication, science, and risk, there should be a specialized journal offering a discussion forum on only environmental communication (Pleasant et al.).

Arguing that journalists are more loyal to their traditional news values, Sachsman (1999) continued that by hanging on to their own ways of looking at things, the media steered clear of the influence of those involved in environmental affairs. They set their own environmental agendas instead of depending on the value judgments of their sources. Because environmental

journalism, like science journalism, is so complex and can be highly technical, scholarship criticizes coverage that utilizes the same traditional news values found in other news (Greenberg, Sachsman, Sandman, & Salomone, 1989).

Allan (2002) found many of the deficiencies indicative of Western news coverage of post-Chernobyl coverage and concluded that reporting which reduces environmental risks to isolated events or incidents, to "personalities" made to stand for larger economic, political, and cultural factors, fails to make the necessary connections at a social structural level.

Environmental journalism is often belittled because of tendencies to be event-oriented, and failure to explain larger issues (Allen, Adam, and Carter, 2000; Anderson, 1997).

Lundberg (1984) found coverage of tropical rain deforestation in magazines comprehensively covered causes, effects, and background information, but addressed solutions and documentation least. Another complaint has been that journalists tend to be crisis-oriented on the environmental beat (Hertsgaard, 1989).

 Goodfield (1981) found that many scientists believe that too many people in the media always will present the public with simplistic stories rather than struggle to explain complicated truths.

Journalists often want just a general understanding because of the constraints they work under, and don't interpret underlying issues (Nelkin, 1995). For example, Sachsman (1976) found that journalists often rely heavily on press releases, resulting in coverage that is actually done by a public relations practitioner. Taking the easy way out of a complex subject does not have positive consequences for anyone involved the media, the environment, or the public.

In criticizing journalism for its simplicity, Shabecoff (1993) found that the mass media have probably been more effective than the slow-off-the-mark schools in educating the American

public about the nation's ecological problems – although not necessarily about potential solutions.

In addition to lacking long term coverage, Rubin and Sachs (1973) found that the environmental beat is prone to "Afghanistanism" which means that it permits perceptive coverage of problems in other parts of the country but produces myopia in dealing with similar problems at home and is characterized by the presentation of bold editorial solutions for the problems of countries halfway around the globe but only silence for problems at home.

Environmental journalism is also criticized for always obtaining information from and using traditional, dominant sources like government officials (Lacy and Coulson, 2000; Rubin and Sachs, 1973; Sachsman, 1976; Smith, 1993). In their comparative source study on source use on the environmental beat, Lacy and Coulson studies that traditional bureaucratic types of sources criticized by some scholars continue their dominance in shaping the news about an important public issue (p. 22). Sources with expertise, but not affiliated with government, such as sources at universities were used only occasionally (p. 23).

Finally, Simon (1980) in Science found that bad news about population growth, natural resources, and the environment that is based on flimsy evidence or no evidence at all is published widely in the face of contradictory evidence (p. 1432). Simon found the reasons to be: 1) There is a funding incentive. 2) Bad news sells. 3) There are a host of psychological explanations. 4.) Such warnings can mobilize institutions and individuals to make things better.

2.1. Challenges to Environmental Journalists

Many of the same challenges that apply to journalists in general are the ones that challenge environmental journalists as well. However, some challenges are very specific to environmental journalists.

Sellers and Jones (1973) listed many of the difficulties the mass media faced in covering the environment. News traditions including event reporting, objective reporting, and writing about response rather than initiative challenged journalists.

Advertiser pressure, management policy, unavailability of information, provincialism, reluctance to trust conservationist sources, and space, time and finances all created special challenges for environmental journalists.

As Friedman (1991b) said, the amount of attention in the media given to the environment has significantly increased, but the environmental beat in the 1990s is not very different from what it was in the era of 1970s. While quantity may be up and environmental topics different and more varied, the quality of environmental coverage presents many of the same problems it did 20 years ago. There are other similarities as well. No one knows now just as no one knew then how many environmental reporters there are working in the mass media or just what topics fall under the rubric of environmental reporting. Where does one draw the line between science and environmental reporting, or between political and environmental reporting?

To understand and write about the environment is a tall order. Friedman (1999) studied that tracking a long-term controversy such as dioxin is difficult enough for scientists who spend years studying the issue. For journalists, keeping abreast of all the scientific data and arguments is an

almost impossible task because they must keep track of a wide range of other scientific and environmental news and not just one issue.

The sheer science on the environmental journalist's beat presents another major challenge to journalists (Anderson, 1997; Archibald, 1999; Detjen, 1997; Goodfield, 1981).

Overall, there is wide agreement that environmental journalist's beat is innately complex (Anderson, 1997; Bowman, 1978; Fisher, 1974; Friedman, 1979; Gee, 2000; Harrabin, 2000; Miller, 2003; Willis and Okunade, 1997; Wilson, 2000). As Sandman, Sachsman, Greenberg, and Gochfield (1987) all studied that most fundamental problem characteristic of environmental news reporting is that environmental risk information is neither easy to obtain nor easy to understand.

Today, coverage of the environment is not only reporting current practices, issues, and trends, but what kind of repercussions they will have, in the social and political realm (Goodfield, 1981; Hamilton, 1991; Nelkin, 1995). The difficulties in reporting on the environment involve uncertainties associated with research and innovation and with their long-term, real-life impacts (Gee, 2000). Knowing what new developments mean to society and how they are going to affect the lives of individuals is important to the public at large.

Furthermore, Smith (2000) discussed challenges to media covering the environment. He explains that it is difficult to tell stories about highly complex science and policy debates which unfold slowly in meetings and journals. Plus it is tricky ensure that coverage of the deep underlying issues of environment and sustainability don't get bounced out of the way by late-breaking news items.

According to Goodfield (1981), one of the common constraints of the media covering science is that science journalism cannot work the same way as basic journalism, in the style of the

inverted pyramid. In telling a story about science, the reporter must start by building a series of bridges between the readers understanding and the essential background information. One builds bridge after bridge until finally an understandable conclusion is reached, but if any one of these bridges is cut out, the whole story collapses. Translation is yet another challenge to environmental journalists, from risk statistics to scientific processes (Anderson, 1997; Fisher, 1974; Krimsky and Plough, 1988). This is compounded with limited time and space for journalists to explain (Archibald, 1999; Bowman, 1978; Harrabin, 2000; Miller, 2003; Rubin and Sachs, 1973; Sandman et al., 1987). To show this, Sachsman, Simon, and Valenti (2002) reported that New England journalists interviewed said the biggest barrier to reporting environmental stories was everyday, practical journalistic process concerns such as time constraints and the size of the news hole.

A challenge journalists face personally is that they don't have an education or background in environmental issues or science (Anderson, 1997; Detjen, Fico, Li and Kim, 2000; Friedman, 1991). Nelkin (1995) found that journalists avoid substantive questions because they are unable to evaluate what they are told. In addition, many environmental journalists work in newsrooms in which higher-level constraints influence their work (Detjen et al, 2000).

Farrow (2000) studied that in the US environment is not a prime beat and environmental journalists do not stay around very long. In addition to this resources to pay for environmental journalists and their work is limited (American Opinion Research, 1993; Archibald, 1999; Detjen et al., 2000; Harrabin, 2000; Nelkin, 1995). According to Sachsman, Simon, and Valenti (2002), out of the 55 reporters interviewed who cover the environment at New England newspapers and television stations, only two spent 100 percent of their time on environmental stories. More than

40 percent of the journalists interviewed reported their title as reporter, general reporter, or staff writer.

Editors are another major challenge for environmental journalists. They may not have interest in environmental journalism, be educated about it, or believe it is important (American Opinion Research, 1993; Izakon, 2001; Miller, 2003; Sandman et al., 1987).

Editors choose to describe science so that each description makes sense to their readers, fits with that audience's general beliefs about science, and therefore enhance the publication's marketability (LaFollette, 1990). Journalists may feel the need to find the new all the time, which is another challenge since environmental issues are chronic, long lasting issues (Anderson, 1997). Editors usually evaluate news stories based on basis of color and excitement (Nelkin, 1995). All these reasons exemplify the challenge that environmental journalists face covering their beat.

In writing about the organizational requirements of the news media, Willis and Okunade (1997) listed advertising, consumers, and marketable content. Anderson (1991) found, environmental news stories rarely make headline news and much depends on the extent to which other social issues command greater political attention. Environmental reporters compete for space against whatever this week's diplomatic crisis is (Detjen, 1997; Hertsgaard, 1989).

According to Izakon (2001), journalists face a hostile environment when covering the environment because people assume a journalist is a tree hugger, leftist political activist.

Smith (1991) wrote that the solutions to environmental problems will increasingly revolve around tradeoffs between social and political goals and economic impacts. To adequately probe the economics of environmental solutions or the issues that today's environmental dangers raise for economic development and inform the public puts new demands on reporters to examine the

assumptions and information paradigm underlying current economic analysis and economics itself. For that they will need to look beyond conventional thinking to alternative visions, analysis and new ideas about the links between economics and the environment, technology, economic development and regulatory mechanisms.

3. Methodology

3.1. Research Problem

This study is designed to analyze the reporting of the environmental issues and to investigate how effectively the print media has reported on the scientific aspect of the environmental problems pertaining to Lahore.

In Pakistan, no such study has been conducted on the environmental reporting by the Pakistani print media and to analyze what are their approaches towards environmental problems. Are they really interested in reporting on environment? Second aspect of the study is to investigate the reporter's role in the reporting on environmental issues. They have a huge responsibility before them as the subject of environment is tricky and needs a scientific background.

3.2.Research Design

Thomas. R & L Brubaker (2002) suggest that the word Methodology is used to mean the steps, researcher follows in answering the research questions, including the collected information, classification and interpretation of the results.

Content analysis as well as interviews was adopted to explore and examine the print media's environmental reporting keeping in mind the nature as well as requirement of the study.

Content analysis was done of two newspapers of Pakistan for two years. These newspapers are the daily Dawn which is the largest widely circulated English newspaper and the daily Jang which is the largest widely circulated Urdu newspaper. Coverage of eight issues was analyzed.

3.3. Content Analysis

Content of the two newspapers, daily Jang Lahore and daily Dawn Lahore was analyzed for this study for two years. (From 1st January 2005 to 31st December 2005) and (1st January 2010 to 31st December 2010).

The reason behind their selection is that the Jang is the largest widely circulated newspaper of Urdu in Pakistan while the Dawn is the largest widely circulated English daily newspaper. Both of the newspapers have good reputation because they cover almost all of the important issues of the country along with the important issues of the world. These newspapers are served by sizeable number of qualified, senior and professional journalists.

The reason for the time period is that these environmental issues of the study remained dominant and visible in the newspapers and stories on environment started to appear in 2005 and by 2010 they became a regular feature. So by comparing these clear pictures of the situation will emerge. The following selected eight issues ware analyzed for two years 2005 and 2010.

1- Air pollution

2- Noise pollution

3- Water Quality

4- Sanitation

5- Solid Waste Management

6- Industrial effluents

7- Legislative compliance

8- Global Warming/ Climate Change

3.4. Variables of the Content Analysis

3.4.1. Length

News stories published about the issues of the study were counted and their length was measured as number of centimeters. Here, this is important to mention that the pictures accompanied by the news stories were also measured and space given to them was included in the measurement of the length of the news stories about the issues of the study.

3.4.2. Frequency

Frequency referred to the number of times a report is published on the selected themes.

3.4.3. Placement

The placement is also another very important factor in determining the importance of a news item. The placement was divided into four categories. These are as under:

1- Front Page
2- Back Page
3- City Page
4- Editorial Page

3.4.4. Frame

Framing is an important factor. It means how a news story was framed. The frames of the news stories were measured as being scientific or general in nature.

3.4.5. Content Analysis Categories and Rules

For the purpose of this research following rules were made. This format is typically used for carrying out content analysis.

Table 3-1: Content Analysis Categories and Rules

Variable	Categories	Rules
1- Topics / Issues	Air pollution	Where the report discussed introduction of chemicals, particulate matter, or biological materials that cause harm or discomfort to humans or other living organisms, or cause damage to the natural environment or built environment, into the atmosphere.
	Noise Pollution	An article on excessive, displeasing human, animal, or machine-created environmental noise that disrupts the activity or balance of human or animal life.
	Water Quality	Where the article concentrates on water contamination by various sources and its effects on animal and plant life; their costs to the economic system; and the methods of control.
	Sanitation	Where hygienic means of promoting health through prevention of human contact with the hazards of wastes are being concentrated. Hazards can be physical, microbiological, biological or chemical agents of disease. Wastes that can cause health problems are human and animal feces, solid wastes, domestic wastewater (sewage, sullage, greywater), industrial wastes and agricultural wastes.
	Solid Waste Disposal and Management	Solid waste Management referring to the collection, transport, processing or disposal, managing and monitoring of waste materials. This relates to materials produced by human activity, and the process is generally undertaken to reduce their effect on health, the environment or aesthetics.
	Industrial effluents	Articles about industrial waste effluents consisting of organic wastes such as pesticide residues, solvents and cleaning fluids, dissolved residue from fruit and vegetables, and lignin from pulp and paper to name a few. Effluents can also contain inorganic wastes such as brine salts and metals.

	Legislative compliance	Article related to the legal compliances and deviations by the industries/ factories from the Government authorities.
	Global Warming/ Climate Change	News on the rising average temperature of Earth's atmosphere and oceans since the late 19th century and its projected continuation resulting in climate change.
2- Frequency		Frequency means number of times news stories published on selected pages.
3- Length		Length of the news stories means measurement of length in centimeters per column.
4- Placement	Front Page	News published on the front page will fall here.
	Back Page	News published on the back page will fall here.
	City Page	News published on the city page will fall here.
	Editorial Page	News published on the editorial page will fall here.
5- Frame	Scientific	News items that have given a scientific reasoning, scientific data or justification for the issues of study.
	General	News items which are have not probed the issue scientifically and have just simply reported on the issues of study.

3.5. Interview with Environmental Reporters

Boyce and Neale (2006) define in depth interview as "a qualitative research technique that involves conducting intensive interviews with a small number of respondents to explore their perspectives on a particular idea, program or situation.

The researcher conducted in- depth interviews, to elicit information in order to achieve a holistic understanding of the interviewee's point of view or situation to explore interesting areas for further investigation. The interviews involved open- ended questions and probing where ever necessary to obtain data deemed by the researcher.

For the purpose of this research interviews have been conducted with environmental reporters of Dawn and Jang as the content analysis of these two news papers is being conducted in this research. Interviews were also conducted with other reporters and writers who have written on environmental issues in different other newspapers and magazines.

4. Results and Discussion

In the earlier sections it was described that content analysis of English newspaper Dawn and Urdu newspaper Jang was done for two years i.e. 2005 and 2010. The time period of study was from January 2005 to December 2005 and January to December 2010. As the placement of the news items are a crucial factor that determines the importance of any news item therefore this was measured in four categories. These categories include were front page, back page, city and editorial page of the two newspapers. They were chosen because they are widely read pages in a newspaper and are also therefore the most important pages. City page holds most news about the challenges faced by environment. The result of the content analysis is described in the coming lines.

4.1. Frequency of the News Stories published on the Issues

During the study period 2005 Daily Dawn and Jang collectively published 182 news stories in total on the selected issues while in 2010 the number of stories increased to 322. In both the years the reporting on water quality was the largest among all the selected categories. The number of stories in 2005 on water quality was 98 which increased to 152 in year 2010. In year 2005 second largest coverage went to the issue of solid waste management (20 stories) followed by sanitation (20 stories) legislative compliance (15 stories), air pollution (12 stories), industrial effluents (9 stories), noise pollution (9 stories) while no story was published on Global warming/ Climate Change.

In the year 2010, the breakup of stories were as water quality (152 stories), solid waste management (56 stories), sanitation (35 stories), legislative compliance (23 stories), air pollution

(20 stories), industrial effluents (19 stories), noise pollution (15 stories)   and 2 news stories were published in Global Warming/ Climate Change in the whole year.

By comparing the frequency of environmental stories published in the two leading news papers of the country it is being indicated that water quality has remained the most important issue. The media's identification and reporting of the environmental problems and issues did not change significantly during the span of five years though the number of stories doubled during the same time. Though the trend of reporting did not change much but several important differences in percentage were found for individual subcategories.
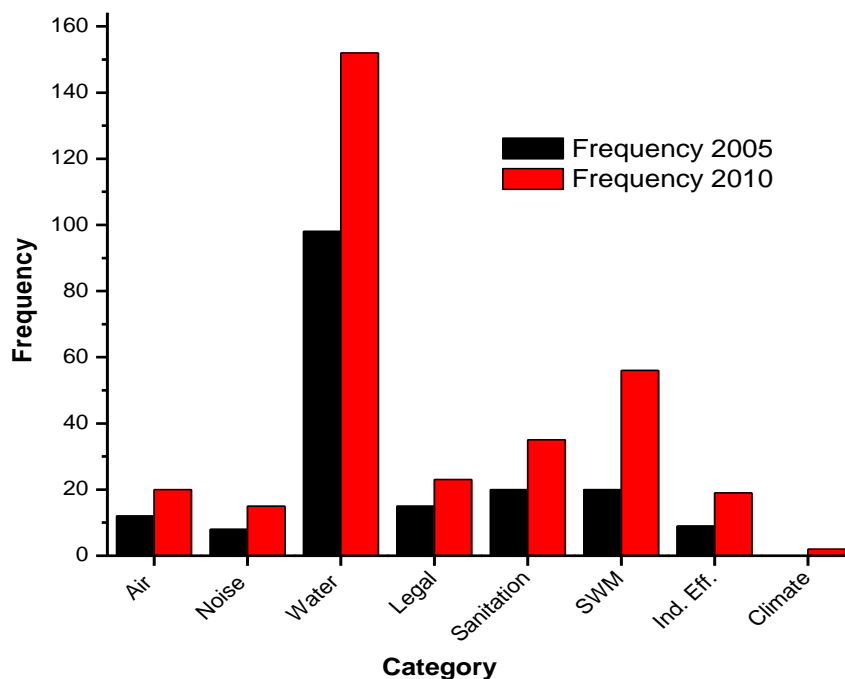

Figure 4-1: Comparison of frequency of new stories published in 2005 and 2010

As figure 4-1 illustrates water quality and availability related stories were ranked first in all of the chosen categories. This is due to the growing concern that about 70 percent of Lahore's water supply is contaminated. This problem is growing at a large rate due to rapid increase in

population, city being an industrial hub and centre of business activities. All these factors have combined to increase the demand for fresh water. In addition to this rapid urbanization is changing patterns of consumption. This has caused a severe misuse of water resources. Discharging of untreated sewage and chemical wastes directly into rivers, lakes and drains has become a traditional habit in the country. Water bodies can no longer cope with the increasing pollution load. Water contains Coliform Bacteria, which is responsible for gastroenteritis diseases. An analysis conducted by the University of Engineering and Technology in June 2010 revealed that out of 392 tube-wells, high concentration of arsenic was found in groundwater from 168, while in 82 others the level of this poisonous chemical was between 10 ppb and 50 ppb. Almost all of the news related to water quality was linked to health implications on the people.

These problems were same during the year 2005 and 2010. The situation did not improve during the five years time. All the news stories published were based on the official statistics and government statements. No follow up report or story was published.

Solid Waste Management was ranked at the second spot. The state of solid waste management appeared to be bleak as concluded during the research. Solid domestic waste in Lahore was found to be disposed off on low-lying land. Furthermore, this dumping are is then burnt to reduce its volume and increase the life time of the dump site. But since the solid waste has different type of material it does not burn completely which produces a large amount of smoke. This area creates nuisance environmentally, health wise and aesthetically. Such area can be recognized from miles away, produces foul odor and acts as a breeding place for flies and rats. This unchecked process results in the loss of valuable recyclable materials. The main inferences drawn from the news items on Solid Waste Management were that there is no waste collection system in the majority of the city, waste is typically dumped on the roads and streets, there is no

method of segregation of solid waste, no landfill site exists in the city and citizens are not educated on the method of disposing solid waste and its resultant relation with the health impacts.

Third issue which got sizeable amount of coverage was linked to sanitation. Sanitation news were about blocked drains, overflowing gutters and broken down sewerage system. Drains are posing serious health impacts. There are 12 big drains, 70 secondary drains and 100 roadside drains in the city. Toxic gases emitted from these cause several diseases such as skin allergies, tuberculosis while continuous exposure may cause lung cancer and eye infections. These gases include carbon monoxide, sulfur dioxide and nitrogen dioxide. Toxic and untreated effluents reaching river Ravi and the Hudiara drain is also another big nuisance causing health impacts.

Legislative Compliance is the fourth category which received attention from the two newspapers. This news was about the legal notices issued by the Environment Protection Department (EPD) and other Government agencies to the industries in and around Lahore, housing societies in violating environmental laws and standards. These news items show a very strange trend because the report is repeated after a couple of days as if the news paper had no other story to print or they are simply not interested to get a new story. They are happy to give space to the same story again and again.

The role of Environment Protection Department (EPD) was also studied during the study as it is the main Government machinery to regulate environmental laws in the province. The Environment Protection Department Punjab has failed to protect the environment and has been just a paper-pusher. The maximum power given to the Environmental Protection Department by

the 1997 Act is to refer the case to the Environment tribunal. The tribunal itself does not have any power to seal an environmentally hazardous industrial unit or establishment. The best it can do is to fine the offenders, the maximum limit of which is Rs.1 million. A million rupees arguably is not a threatening amount for any industrial giant and proves a weak measure against any environmental violation. They are happy to pay the fine and keep violating.

The figures reveal that out of the total of 2,100 cases filed with the Environmental Tribunal Punjab only 475 have been decided. The 475 decisions, too, have been toothless, as they have neither been able to stop the environment harming practices nor have they inflicted substantial punishment on the offenders which might have proved as a deterrent. Since its establishment, the total amount received in fines by the department is Rs2, 250,000. This amount, too, has been fined under just three cases where two were fined Rs1 million each and one was fined Rs.225, 000.

4.2. Placement of the News Stories

Placement is an important parameter which gauges the importance of a news story. It is well understood fact that a news story which is published on the front page of a newspapers has a more impact on the people than the one published on the inner portions of the newspaper. The placement was divided into four categories keeping in view the coverage given to environmental news stories and the research pattern of this study. These four categories were:

1- Front page

2- Back page

3-City Page

4-Editorial Page

Below are the results of the top four frequently published environmental problems of Lahore. They include Water Quality, Solid Waste Management, Sanitation and Legislative Compliance.
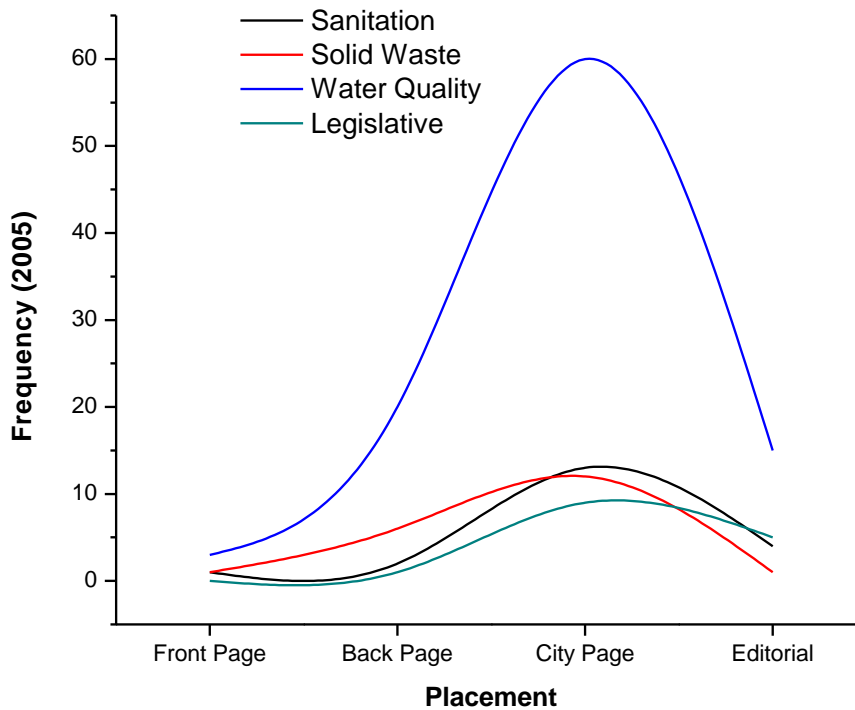
Figure 4-2: Placement of news stories in year 2005

As shown in the figure 4-2 the newspapers collectively published 60 news stories about the issue of water quality in 2005 on the city page, 20 on the back page, and 15 on the editorial section while 3 stories were published on the front page.

The newspapers published 12 news stories about the issue of Solid Waste Management in 2005 on City page, 6 on the back page, and one each on front and editorial pages.

On the topic of sanitation the coverage remained 13 on city page, 4 on the editorial, 2 on back page while 1 on the main front page on the newspapers.

On legislative compliance 9 news stories were given space on the city page, 5 on editorial, 1 on the back page and 0 news items on the front page.
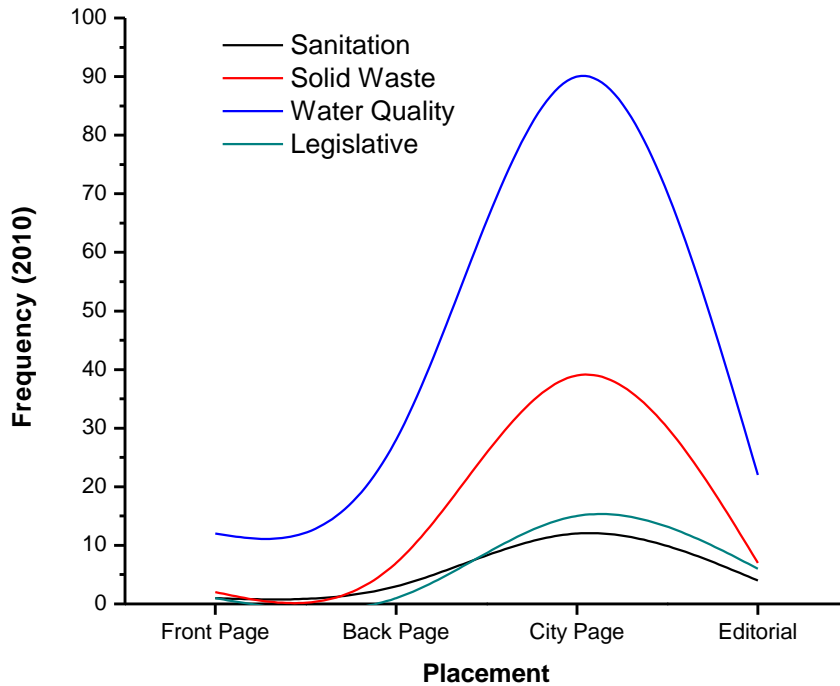
Figure 4-3: Placement of news stories in year 2010

The two newspapers published 90 news stories about the issue of water quality in 2010 on the city page, 28 on the back page, and 22 on the editorial section while 12 stories were published on the front page. The newspapers published 12 news stories about the issue of Solid Waste Management in 2010 on City page, 6 on the back page, 1 on front page, and 7 on editorial pages. On the topic of sanitation the coverage remained 12 on city page, 4 on the editorial, 3 on back page while 1 on the main front page on the newspapers.

On legislative compliance 15 news stories were given space on the city page, 6 on editorial, 1 each on front and back page.

As depicted by the figures 12 and a3 most of the environmental news stories appeared on the city pages of the newspapers and the highest coverage is given to the issue of water quality. This is because water problems are very serious and concern the health of the citizens of Lahore. It is one issue which is easily understandable to the common man. It effects life of every person.

4.3. Length of the News Stories

The length of the news stories published on the environmental problems were measured in centimeters per column. The normal width of a column in the Pakistani newspapers is four centimeters. This is important to mention that the pictures accompanied with any news item were also measured in this category. The length of the remaining parts of the news stories which are published on the inner pages were also included.

The newspapers in 2010 gave coverage of 14372 centimeters column to the number environmental issue of water quality, 4864 centimeters column to the issue of solid waste management. Sanitation was ranked third with a coverage of 2451 centimeters, issue of the legislative compliance got coverage of 1315 centimeters column and ranked at fourth spot. The newspaper gave fifth position to the issue of air pollution which received length of 1223 centimeters column while the issue of the industrial effluents received coverage of 1201 centimeters. Noise pollution got coverage of 1165 centimeters and Global warming/ Climate change with the total coverage of 98 centimeters. It is striking to note that the sequence of the coverage of the issues remained same as it was in the frequency measurement.
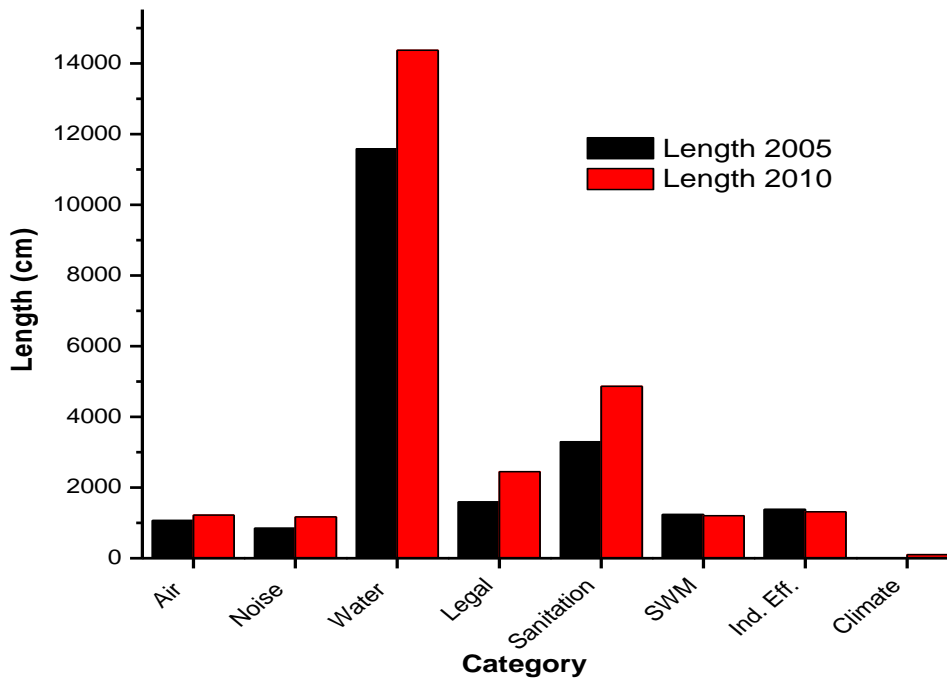
Figure 4-4: Comparison of length of the news stories for the year 2005 and 2010

As shown in figure 14 in the year 2005 11586 centimeters were given to the issue of water quality, 3296 centimeters on solid waste management, sanitation got 1589 centimeters, legislative compliance 1377 centimeters, 1065 centimeters to air pollution. This was followed by industrial effluents with 1236 centimeters, noise pollution 845 centimeters while no story was published on Global Warming/ Climate Change.

4.4. Framing of the News Stories

The frame of the news stories were measured as being scientific or general in nature. It was studied that there is a great difference in the framing patterns of the two news papers. This is because there is a considerable difference in Urdu and English print media's agenda due to the

fact that Daily Dawn is the widely circulated English newspaper of Pakistan being published from Karachi, Lahore and Islamabad simultaneously. Personal interviews with the environmental reporters reveals that the reason behind this is due to Dawn's readership by the educated, bureaucrats, and people at the policy making level. This is why the Dawn gives considerable attention the scientific probing, follow up and quality of the news items that appears in the newspaper.

Out of total 504 news stories published by the two newspapers 88 were scientific in nature i.e. they had technical aspect supported by facts and figures from authenticated sources (Figure 4-5). Water quality news had the maximum scientific input because on the issue of water quality a lot of readymade material is available. Journalists tend to use that available material.
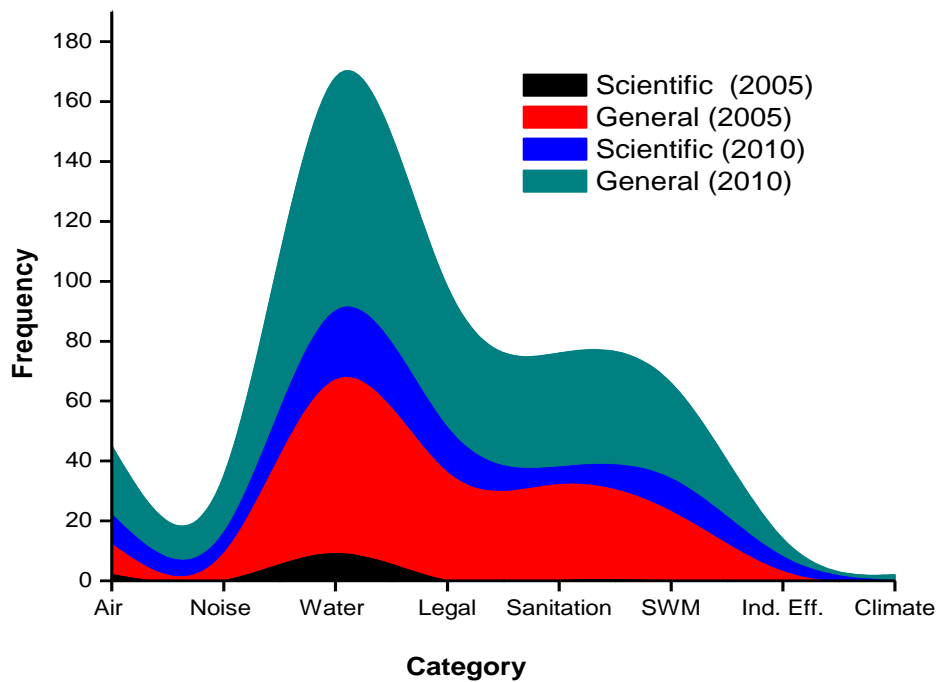
Figure 4-5: Comparison of the framing of the news stories for the year 2005 and 2010

4.5. Interviews with Environmental Reporters

For the purpose of the study interviews were conducted with environmental reporters, scientists and other prominent people who have written on environmental issues. Their affiliations were with Daily Dawn and Daily Jang, Daily News, Daily Times, Hum Shehri Magazine, Punjab Urban Resource Centre (PURC), Nia Zamana Magazine, Geo Tv Lahore, Daily Express and Strengthening Participatory Organization (SPO). Some interviews were also conducted with the scientists, teachers of National University of Sciences and Technology (NUST) and Forman Christian College Lahore who are teaching environmental sciences in the respective universities. The researcher had much difficulty in interviewing the personnel's belonging to news paper agencies as they were not willing to answer as they don't want themselves to be recognized as environmental reporters. Second difficulty was that during the course of the research work the environmental reporters were changed after every month or so. New comers or interns are given the task to report on the environment and after much struggle researcher managed to interview both the reporters. They were asked questions about their qualification and relevant experience in reporting. It was also investigated that what are their problems and why environmental news and stories not very frequently seen in newspapers. Why the print media is biased towards environmental issues.

The main findings of these interviews were:

- News reporters of Daily Dawn and Daily Jang were neither of the environmental nor of scientific background. They have done Masters in non scientific subjects i.e. journalism and sociology.

- Dawn and Jang have environmental beats but their reporters are not working full time on environment. They are given day to day assignments in which they have to cover other subjects as well.

- The reporter of Daily Dawn has been working as a journalist for the last ten years while the one in Daily Jang was recently hired.

- Before reporting on the environment one was reporting on health and other on sports beat.

- They were not happy reporting on the environment and wanted to "move away" from this as they consider it as a part time assignment and find it a boring one. They said that they are not taken seriously in the news room as well as by the fellow journalists. They are teased are made fun of.

- The reporter of Daily Dawn wanted to report on arts and culture as he has interest in that.

- The respondents agreed on the fact that environmental issues are complex and are multi-faceted. These issues involve many fields such as science, business, economics, culture, health, and politics. They have no boundaries. So a good environmental reporting is the one who has a flexible mind in order to understand all of these fields and manage to link them successfully.

- They said that the challenge for the print media is to present the different angles and make environmental issues relate to the daily lives of the general public.

- They said that environment news has been unfairly casted as a niche area and the stereotypes of nature friendly crazy people are associated with the people who are reporting on it.

- They were of the view that environmental news stories move slowly. As compared to politics and business the impacts and events of environment do not occur at a fast pace except natural calamities.

- They do not take it as a potential successful career. They felt that although environment is a technical beat the media agencies lack trained journalists in this field.

- The interviewees said that most media organizations in the country do not have an environmental section or dedicated environmental reporters.

- They believed that although coverage of environmental issues in Pakistan has increased in the past few years. But the coverage is mostly reactive in nature which means it is in response of any incident. This limits the frequency of the news stories.

- The environmental news does not gain people's attention until they are negative and controversial in nature i.e. the natural disasters that have afflicted the country for the recent times.

- Environmental reporting overlaps with so many other reporting assignments which present newsrooms with a new challenge. The interviewed reporters think that it is the responsibility of the editors to make sure all reporters who cover environmental topics even part time have adequate training to cover environmental topics accurately, with proper context and scientific grounding

- They suggested that news organization needs to have at least one person who specializes in the beat. This journalist should be unafraid to take on and navigate the most complicated of environmental stories. This team member can serve as a valuable resource for the entire staff.

- The interviewed personnel's said that to cover environment beat is just like that you are reporting on religion and the next you cover business and economics. Later that week, you do a story about public policy and government regulations and politics. Journalists who report on environment issues struggle with all of these topics in one story.

- The reporters were of the view that there are some factors which are not and cannot be controlled by them and they greatly shape the representation of an environmental news story. These factors may be external (such as political economic challenges) as well as internal influences (media routines, deployment of journalistic norms).

- They said that editors are also a hindrance for them because they want to create the interest to sell newspapers to readers which creates challenge for journalists covering the environment.

- The reporters said that people are generally quite optimistic about environmental problems and their solution. But in all other ways, they are no different from other polluters. They know that protecting the environment is important but continue to drive cars, waste water, and, generally, act in an unsustainable manner.

- The interviewed reporters said that Lahore has many environmental problems and according to them the most pressing are water quality and availability, sanitation issues followed by the air pollution caused by the massive construction activity within the city.

- Nevertheless all of the interviewed journalists felt that there has been an increase in the number of articles on environment both due to a higher awareness and interest of their readers (this is especially true for the younger generation) and the visible deterioration of the state of nature.

4.6. Interviews with Environmental Researchers

Below are the major findings of the interviews conducted with environmental researchers.

- Scientists expressed frustrations with inadequate environmental reporting.

- They felt that media practitioners distort reality, facts and figures and narrate distorted stories.

- They said that journalists are only attracted or interested to risk controversies. Their interest is not in intellectual arguments but rather in completing the given assignment/task.

- They argued that notion of balanced coverage may make perfect sense when covering a political convention, but in the culture of science it is a different arena. Balanced coverage of environmental issues does not mean giving equal weight to both sides of an argument. It means apportioning weight according to the balance of evidence.

- The respondents said that claims of scientists are also distorted by the media. This is due to the nature of working of media agencies. They want to get the extreme views which depict a situation of extreme risk. Journalists overemphasize the most extreme situation or outcome which is reported in scientific articles or interviews and ignore the range of other possibilities given.

- While talking about the number of programs and articles they said that programs and articles are fewer and fewer and more superficial. The problem is that stories are reported as if there is no connection between them. The people in media are not aware about the basic principles of ecology, ecosystem and the environmental balance.

- Respondents said that print media should have a regular series of articles on environment. They should dedicate 20-25 lines in newspaper everyday so that a regular reader is informed about environmental problems and their solutions.

- Language should be simple so that a lay man can understand the terminology.

- The newspaper should highlight the scientific aspect of the problem in simplistic language and also give the solutions. They should also tell the government's role in combating with the environmental problems.

- The regular feature section should be issue centric rather than area centric because in our country the issues related to a specific area become a political question and a blame game starts.

- Reporting on the environmental issues should be holistic in nature. Media personnel's, editors and news agencies should be aware of the whole cycle of environmental problems e.g. textile industries waste water contains toxic substances that harm the water bodies and contaminate the water channel but it is only the dyeing section in which this type of waste water is formed. Knitting section of the industry would not be having this kind of waste problem. So to blame the whole industry would be unfair.

- They said that covering environment in its geopolitical, social and scientific contexts require expert knowledge but the saddening fact is the subject is seldom dealt with in depth, and critical analysis and expert insights are rarely provided. And where newspapers sometimes try to write on environmental problems with seriousness they lack reliable environmental data.

- Talking about the media's role in creating environmental awareness they said that media should start consistent or permanent oriented awareness campaigns. Educational institutes

should take part in these voluntarily. More documentaries, movies, talk shows, survey reports, analytical and comparative studies in TV and radio should be broadcasted.

- Specific columns and permanent space in daily broadsheets to highlight the environmental problems, comparative, analytical, and result oriented features, news, and articles should be published.

- Universities should play positive role to highlight specific issues every week, they should take an ongoing initiative till they get results (attention of media, NGO's and government regarding that issues). They could arrange walk, seminar collectively with other departments like Communication studies, or inter-universities.

- On question regarding the industries response to environmental awareness they said that many multinational companies are required by the laws of their parent jurisdiction to maintain rigorous environmental standards i.e. in the manufacturing and export industry more and more companies are required to show environmental compliance before international companies can book export orders. They said that local companies by and large, do not care for the environment. They also criticized EPA and said that the Environment Protection Department and the Environment Protection Tribunals were setup to do something about this but their performance speaks for themselves.

- They said that environmental news reporting require background investigation, translation of technical information, and consideration of larger issues like future consequences in which environmental researchers, students can help them.

- They were of the view that environmental coverage is low in newspapers because environment is competing with all the other issues covered in the newspaper whereby the most severe selection criterion is the news worthiness of an issue. The interest of the reader as far as news on environment is concerned is supposed to be still fairly low.

- They suggested that media agencies should only hire a person having a degree in environmental and mass communication studies in order to work as environmental reporter. Because until and unless they are not educated in the basics of environment they cannot effectively report on it.

4.7. Qualitative Analysis of the Results

After discussing the quantitative coverage of environmental issues in the year 2005 and 2010, now qualitative analysis is discussed here.

4.7.1. Water Quality

The qualitative analysis of the results shows that although the environmental news has managed to find some space in the newspapers but their quality is not writing worth off. Lahore city is facing diverse environmental problems which need immediate attention. Lahore faces startling situation where 180 (69%) of total monitored sources were supplying unsafe water. It contained bacteriological contamination (34%), Total dissolved Solids TDS (37%) and arsenic (7%). According to Environment Department of Lahore 293 tube wells are supplying water with arsenic impurity. The main causes of water pollution are increased urbanization, extensive use of

chemicals in agriculture and increased industrial activity. In addition to that most of the supply lines are eroded and mixing of sewage water is aggravating the situation. Absence of proper planning and documentation makes water management poor urban areas. Rural situation is adverse and is never reported either. The reports generally quote figures taken from official sources that do not depict the real and complete picture. Furthermore, the reports lacked technical and scientific input or statistics. The reports also lacked the global statistics on the scarcity of water, global usage and its impacts.

Water quality and availability problems in Pakistan are raised due to lack of capacity, competing interests, coordination and information sharing and decentralization issues. It's not all about water; it is also about political will, governance and globalization.

Pakistan recognizes importance of water and ratified to the internationally agreed goals (Millennium Development Goals - MDGs) and has also promulgated Clean Drinking Water for All Programme in 2008.

4.7.2. Solid Waste Management

Solid waste management coverage can be summarized in just few words "private investment" and "change in organizational structure". Most of the news have centered on these two. While the solid waste management faces problems which are multi faceted such as provision of proper waste collection system, waste segregation, proper waste disposal and raising awareness about waste issues at different levels including Government, NGO's, the private sector and the public. But it is disheartening to see a lack of understanding on part of the decision makers who are switching systems and procedures over a quick span of time. This shows a lack in their vision and the motivation to handle the problem. Majority of the initiatives being taken to manage solid

waste has been given blindly to international companies and parties of Singapore, Turkey and England. Cleaning of major roads is being planned to be handed over to an international company while sanitary workers will be sent to poor areas. Biodegradable bags have been introduced which have the capacity to degrade after 90 days, they are made by using degradable material.

As one goes through the news items one cannot ignore the inequality which is being generated by the solid waste disposal and management. There is separate solid waste handling procedure for the elite while the rest of the majority population has no access to better and hygienic surroundings. They are condemned to waste dumps and unsanitary landfill sites. And increasingly they are the ones who are blamed for creating the solid waste mess as they are not educated on environmental issues. Thus, the only focus remains to educate them and help them adopt clean practices. A modern waste disposal complex is also being planned at "Lakhoder" which is village near the Wagha border. City's waste will be disposed here that will have a scientific laboratory, hydro energy, electricity, cement, minerals will be saved. Can any such facility operate in DHA or cantonment? Private waste disposal companies are registering themselves under the Kyoto's Clean Development Mechanism (CDM) and are earning Certified Emission Reductions (CER's). These CER's are generating huge profits for the companies.

Few other reports are about the fund scams where the Lahore Waste Management Company (LWMC) wasted enormous amount of funds in buying and setting up of offices.

On the other side of the story are the sanitary workers who are protesting against privatization of the SWM. They are continuously protesting to seek regular service against and services of all work charged employee regularization. They are raising their voice against poor health facilities.

Not much attention has been paid to their concerns by most newspapers; no exclusive report has published raising their problems.

The common practice of solid waste disposal in Lahore and in other cities of Pakistan is disposing it off within or outside municipal limits into low lying areas like ponds etc without any treatment except recyclable separation by scavengers. The land is hired or leased on long term basis for disposal. Moreover, no mitigating measures are taken from any municipality before disposing.

The Government of Pakistan has enacted the Pakistan Environment Protection Act PEPA in 1997 which calls for the formation of federal and provincial EPA's (Environment Protection agencies). One function of EPA outline in PEPA is to assist local council and local authorities to make schemes for the proper disposal of waste so as to ensure compliance with standards established by it.

Presently, legal rules and regulations dealing with solid waste management in Pakistan are inadequate and outdated (PEPA, 1997). Not much attention is being paid to hospital waste management although there are guidelines for Hospital Waste Management since 1998, giving detailed information and covering all aspects of safe hospital waste (Ministry of Health, 2002).

But these rules are never implemented. Medical waste disposal has been left unattended. Hospital wastes are simply mixed with the municipal waste in collecting bins at roadsides and disposed of with the municipal waste. Some waste is simply buried without any appropriate measure.

Presently the legal rules and regulations dealing with solid waste management in Pakistan are as follows.

4.7.3. Current Laws being implemented

- Section 11 of the Environment protection Act prohibits discharge of waste in an amount or concentration that violates the National Environmental Quality Standards.

- Draft of Hazardous substances rules 1999

- Provisions in the Local Government Ordinance 2001

- Islamabad Capital Territory Bye- Laws, 1968 by Capital Development Authority Islamabad

- "Section 132 of the Cantonment Act 1924 deals with deposits and disposal of rubbish.

4.7.4. Laws to be implemented

The rules and guidelines that are yet to be implemented are:

- Basic recycling rules
- Waste management rules
- E- Waste management rules
- Development of Environmental performance indicators (EPI)
- Eco labeling guidelines and its promotion
- Assessment of life cycle assessment approaches
- Guidelines for environmentally sound collection and disposal

Table 4-1: Solid Waste Management laws to be enacted

Items to be described	Explanatory substance
Industrial waste	Definition of industrial waste Industrial waste collection, transportation and treatment system controlled by local government Responsibility of industry which generates waste such as collection, transportation and treatment Standardization of treatment facility Responsibility of private industrial solid waste management company
Service area	Solid waste management service should cover whole city area
Responsibility	Responsibility of citizen Role and responsibility of businessman and enterprise Role and responsibility of government
Subsidy	Financial assistance from federal and provincial government to local government for constructing solid waste management facility, such as sanitary landfill site, hospital incinerator, night soil treatment facility and transfer station.
Definition of solid waste management. Collection, transportation, treatment and disposal	To clear the definition
Hospital waste	Definition of infectious hospital waste Collection, transportation and disposal system of infectious hospital waste system
Constructive standardization of solid waste management facility	To clear the standards of solid waste management facility
Punishment	Punishment for illegality of solid waste management law
Reduction, recycling strategy	Source reduction, reuse, recycling, material recycling
Solid waste management planning	Every municipality should make solid waste management planning for 15 years.

4.8. Sanitation

The word "sanitation" is a broad category which involves personal and household hygiene, clean environment including water, greywater disposal and treatment, safe excreta disposal and storm water handling. Water issues have been in focus to the detriment of appreciating good sanitation. Cairncross (1989) and others have reached the conclusion that water quantity is more important to good health than water quality for many diseases. Enough water to clean the hands and body, wash clothes, clean the house, etc. is more important than improved drinking water quality at the margin.

Sanitation conditions are very poor in Pakistan. The coverage level for sewage collection is estimated at 50 percent nationally (with only 20 percent coverage in rural areas), and only 10 percent of sewerage was being effectively treated. Treatment plants existed only in a few cities, and few of them were fully functional. Forty-two percent of the populations were living with unimproved toilet facilities in 2006 out of which 11 percent had access to facilities that were either shared and/or unimproved. Approximately 50.1 percent of households had access to improved toilets, of which 55.8 percent had a sewer connected to a flush toilet, and 29.1 percent had a flush toilet connected to a septic tank (Water and Sanitation Program Report, 2006).

Sanitation is viewed as less important, people are also uninterested, and is less of a public concern and attracts little public investment in poor urban areas up to now as the rresidents do not perceive that they pay for sanitation. The Millennium Development Goals deal more with water than sanitation issues, but sanitation now is picking up with the new emphasis. Today what is required is separate planning for sanitation and water that can lead to installation of piped supply long before proper disposal and wastewater treatment.

As Pakistan is predominantly agriculture based society and majority of the population lives in villages so lots of attention is required to put on the sanitation problems in the villages. Agriculture is their life not just the occupation. Hence it dictates their life styles. Early morning, they get up and go to their fields for seeing the crop. There they defecate near the fields. Open air defecation is thus a routine practice. Moreover, they hate sentimentally to defecate in the house or near the living rooms and they eat their lunch near their fields. This creates a high scope for feco-oral transmission of diseases.

As discussed in the introduction section sanitation and sewage problem is called as the silent crises but the media ignored this aspect completely. The reporters and the editors seemed to have no clue of what the problem is and how it can be resolved. Apparent interventions such as creating health awareness, promoting the idea of 3 safes: safe water, safe food and safe environment to prevent feco- oral transmission, sanitary barrier, sanitary latrines, sanitary land filling, soakage pits, encourage hand washing practice, community latrines, abolishing public defecation, urination and spitting were never discussed.

Sanitation news has been hijacked by WASA authorities. The reports are about WASA authorities preparing for the monsoon season called 'Monsoon action plan' to cope with the difficulties of the tradition rainy season. It has standard operating procedures (SOPs) and the action plan is made 15 days earlier to the arrival of the monsoon season. But it is noted that news reports appearing after the rainy season later inform that WASA failed to cope as main roads and a number of public areas looked like pools and ponds. Drainage seems to be a nightmare for the WASA and CDG officials. Apparently, they have absolutely no clue on how to tackle these monsoon showers. Union Council 109 and 117 remained in the limelight for contaminated

drinking water, poor drainage and sanitation system. This news also repeated after every few days. One cannot understand the logic behind that.

4.9. Legislative Compliance

Environmental Protection Agency and affiliated body Environment Protection Department (EPD) got their share of attention in the newspapers too. In both of the studied years i.e. 2005 and 2010 the majority news were about their planning to celebrate the World Environment Day and vows to protect the environment. Same old promises are repeated each year with no proper consistent planning and implementation. One report in 2010 that benefits of EPD are not reaching a large majority of society despite the presence of fully functional department and 800 newly hired staff. Another, news that grabs ones interest is about the internal politics of Parks and Horticulture Authority (PHA) which has led to the destruction of most of the gardens of the city. The Director General (DG) PHA who heads an additional charge of DG LDA (Lahore Development Authority) is called to be having a "Solo flight" and is also accused of favoritism. This news ends by saying that the view of the DG could not be gathered. An investigation by the reporter would have served the cause and a potential story would not have been wasted.

The role of Environment Protection Agency is also to be studied. The agency was established under the Pakistan Environmental Protection Act (PEPA), 1997. The performance of EPA has also been questioned. The researcher tried to extract information through personal interviews with the EPA officials. They did not want to be named and remain anonymous. Director General EPA who heads the body is not qualified adequately to handle the environmental problems of the country. He is a mechanical engineer and not an environmental professional. EPA lack equipped laboratories in order to analyze the air, water and waste water samples. Environment Impact

Assessment (EIA) reports and procedures are ceremonial with no practical steps seen. No mitigation steps are ever implemented.

Table 4-2: National Environmental Quality Standards for Waste Waster

Parameter	Existing standard	Revised standards		
		Inti land water =< 3°C	Into sewage treatment =< 3°C	Into sea =< 3°C
Temperature or Temperature increase*	40°C	Inti land water =< 3°C	Into sewage treatment =< 3°C	Into sea =< 3°C
pH value	6-10 pH	6 - 9	6 - 9	6 - 9
5-days Biochemical Oxygen Demand (BOD1) at 20oC	80 mg/l	80	250	80
Chemical Oxygen Demand (COD)	150 mg/l	150	400	400
Total suspended solids	150 mg/l	200	400	200
Total dissolved solids	3500 mg/l.	3500	3500	3500
Grease and oil	10 mg/l.	10	10	10
Phenolic compounds (as phenol)	0.1 mg/l.	0.1	0.3	0.3
Chloride (as Cl)	1000 mg/l.	1000	1000	SC
Fluoride (as F)	20 mg/l.	10	10	10
Sulphate (SO4)	600 mg/l.	600	1000	SC
Sulphide (S)	1.0 mg/l.	1.0	1.0	1.0
Ammonia (NH3)	40 mg/l	40	40	40
Pesticides, herbicides, fungicides and insecticides	0.15 mg/l.	0.15	0.15	0.15
Cadmium	0.1 mg/l	0.1	0.1	0.1
Chromium	1.0 mg/l	1.0	1.0	1.0
Copper	1.0 mg/l	1.0	1.0	1.0
Lead	0.01 mg/l	0.01	0.01	0.01
Mercury	0.01 mg/l.	0.01	0.01	0.01
Selenium	0.5 mg/l.	0.5	0.5	0.5
Nickel	1.0 mg/l.	1.0	1.0	1.0
Silver	1.0 mg/l.	1.0	1.0	1.0
Total toxic metals	2.0 mg/l.	2.0	2.0	2.0
Zinc	5.0 mg/l.	5.0	5.0	5.0
Arsenic	1.0 mg/l.	1.0	1.0	1.0

Barium	1.5 mg/l.	1.5	1.5	1.5
Iron	2.0 mg/l.	8.0	8.0	8.0
Manganese	1.5 mg/l	1.5	1.5	1.5
Boron	6.0 mg/l.	6.0	6.0	6.0
Chlorine	1.0 mg/l.	1.0	1.0	1.0

Table 4-3: National Environmental Quality Standards for Industrial Gaseous Emissions

Parameter	Source of emission	Standards
Smoke	Smoke opacity not to exceed	40% or 2 Ringlemann Scale or equivalent smoke number
Particulate Matter	(a) Boilers and furnaces:	300
	(I) Oil fired.	500
	(ii) Coal fired.	300
	(iii) Cement Kilns.	
	(b) Grinding, crushing, clinker coolers and related processes, metallurgical processes, convertors, blast furnaces and cupolas.	500
Hydrogen Chloride	Any	400
Chlorine	Any	150
Hydrogen Fluoride	Any	150
Hydrogen Sulphide	Any	10
Sulphur Oxides	Sulfuric Acid / Sulfuric Acid Plants. Others Plants.	5000 1700
Carbon Monoxide	Any	800
Lead	Any	50
Cadmium	Any	10
Mercury	Any	20
Arsenic	Any	20
Copper	Any	50
Antimony	Any	20
Zinc	Any	200
Oxides of Nitrogen	(i) Nitric Acid manufacturing unit. (ii) Gas fired (iii) Oil fired (iv) Coal fired	3000 400 600 1200

The qualitative analysis of these newspapers for the year 2005 and 2010 reveal that the news reports lacked any technical and scientific aspect. The reporters did not have any clue of the environmental regulations and they have just reported simply without going into any details or follow up's as highlighted by the researcher in the various sections. The news media agencies, reporters and other media practitioners need to understand that environment is not just about clean air, clean land and clean water. It is about present and future. As the media has outreach and opinion making power it has to lead and find a more effective way to involve all stakeholders to achieve sustainable development. Extreme positions, confrontational advocacy and reporting only for profit making are not likely to bring the stakeholders to a mutually beneficial outcome. Through reliable and responsible knowledge sharing and a strong sense of common purpose, the media can help safeguard our future in an enjoyable and enduring manner.

5. Conclusions and Recommendations

Issues surrounding the environment take a long time to develop, and coverage might improve if it follows in being persistent and long-lasting. Print media has three roles to play in the environmental debate: to educate, to expose, and to encourage debate. It serves as a vital role in communication processes between science, policy, and the public; thus, representations of the environment shape many perceptions of environment problems and considerations for environmental governance. Overall, the press should be dedicated to the goal of better communication, understanding, and cooperation.

Following are recommendations drawn out from the research:

- Environmental journalists need to be taught ways to explain science including definition, examples, and analogy.

- Journalists should strive to remain objective.

- Journalists covering the environment have to ask the critical questions, and to analyze issues critically.

- Journalists covering the environment should maintain coverage on a persistent basis with follow-up stories.

- Reporters need to provide complete information and avoid making assumptions about the background and level of knowledge of the audience. They cannot assume that readers encountered those earlier stories or, if they did, that they attended to them or can recall them.

- Environmental journalists need to maintain a historical perspective, need to explore history and expose it fully to public light.

- The environmental journalist should maintain the ethic by doing justice to all situations, digging hard enough and deep enough to bring out the truth. Journalistic ethics are ignored, bypassed, or just forgotten in the rush to report.

- Premature publication of scientific data needs to be avoided, and scientific limitations need to be mentioned.

- The journalists can improve their reporting skills through a guide sheet with the following tips: (a) Ask, "Who is my audience?" (b) Be accurate; (c) Be understandable. (d) Be objective by distinguishing between facts and beliefs on both sides of an issue and mention regulations and laws along with their impact on the arguments heard; (e) Provide substantial completeness through the presentation of both sides with their support and evidence, analysis of these claims in consideration of your audience, and cover the justice and science of a given risk.

- Journalists have a responsibility to seek the information from a multiplicity of sources and to report it accurately and in a context that includes not only the facts of science but of economics and politics as well.

- Without surrendering balance and fairness in reporting, newsmen should give more attention to nongovernment, non industry news sources.

- Broaden and significantly alter existing sourcing patterns. Journalists need to become more educated about the scientific aspects of stories and quote scientific experts even if what those experts say does not fit neatly into a two-sided dialogue.

- Journalists need to place the issue in the context of the political, social, and economic debates so citizens can understand the power they have to make decisions about the

issues. Comprehensive media reports can provide information to encourage discourse that can lead to change.

- Environmental beat should be covered without the influence of ideology, more environmental reporting should be less crisis-oriented, there should be an environmental editor, and journalists should find a way to personify issues.

- The task of the news media is to make complex environmental issues comprehensible to a mass audience. They should place issues in context and avoid coverage of mere symptoms. The story should be told in terms of people and the way it fits with their daily environment.

- Media should designate a staff member as an environmental reporter.

- Editors should seriously consider creating a special environmental news page.

- Translation of complex scientific information and thorough explanations of the background on an issue also might help improve environmental journalism.

- The media should act as an early warning system to identify hazards before they reach rather being reactive in their reporting.

- Print Media must inform the public of environmental practices being considered by government or business before they have been adopted and should be particularly alert to instances where laws are being violated.

- Editors and reporters should make a greater effort to provide specific information the public can use, such as the names of companies with lengthy records of violating anti-pollution laws, the performance of public officials in enforcing those laws, the way to obtain government and academic reports about the environment.

- To summarize the journalists covering the environment need more training and to improve environmental reporting; journalists need to be trained in environmental studies first and in journalism skills second. They should attend workshops and seminars whenever possible.

- Regular production of environmental features for dissemination to English and vernacular print media should be done.

- Production of high quality environmental monthly magazine that will be self-financing for 3 years.

- Publication of environmental resource material for use by Government, NGO's and institutions.

- Education on environment or environmental should be started at school and continued to college level.

5.1. What can the Newspapers do?

Newspapers can fully take advantage of its readership and outreach and spreads the environmental message.

- First, the print media can be the source of information that is balanced, accurate and comprehensive about the environmental problems.

- The newspapers have to tell their readers that environment is not just about clean air, land and water.

- It can educate the public on environmental issues beyond just scary figures.

➢   Coverage should not be limited to highlighting environmental problems. There is a need to awaken the people so that they appreciate the environment and the many benefits it gives.

➢   The newspapers can highlight the problems of the city and what the citizens have to face every day in terms of bad quality of water and sewage problems or poor disposal of solid waste management.

➢   It can facilitate in encouraging people to take initiatives so as to contribute in environmental sustainability.

➢   Good environmental reporting can force governments to allocate more budget for environmental management of the city or to force the industries, housing societies to adopt more environmental sustainable practices.

➢   On another level the Pakistani Print Media has to also contribute in raising awareness on the global environmental issues as the impacts of environmental degradation are not only felt locally. The effects of climate change, depletion of the ozone layer, acid rain and trans-boundary air pollution have all increasingly been felt on a more global scale.

➢   The print media by reporting on environmental issues can provide a helpful role and give assistance to governments, private sector and civil society in order to protect and manage the environment.

Appendix 1

Questionnaire for Environmental Reporters

1. Name and news paper associated with?

2. Does your newspaper have an environmental beat?

3. Are you working as full time environmental reporter?

4. What is your educational background?

5. For how long you have been working as an environmental reporter?

6. Were you working on some other beat before this?

7. How has been your experience reporting on the environment?

8. Are stories difficult to find?

9. Are environmental reports given their due space in the newsroom?

10. Do you see an increase in the number of environmental reports compared to five years back?

11. What according to you are the urban environmental problems of Lahore?

12. Do you think environment and environmental issues taken seriously?

13. Do you think people are more conscious of the environment now as compared to they were in the past? What has helped to achieve this?

14. Do the print media have played its role in creating awareness?

Bibliography

Allan, S. (2002). Media, risk, and science. Buckingham: Oxford University Press.

Altschull, J. H. (1984). Agents of power: The role of the news media in human affairs. New York: Longman.

Anderson, A. (1997). Media, culture and the environment. New Brunswick, New Jersey: Rutgers University Press.

Bartels, L. M. (1996). Politicians and the press: who leads, who follows? APSA 1996, San Francisco In Walgrave S. & Aelst P.V. (2004). 'The mass media's political agenda setting power', Paper presented to APSA political communication conference (September 1st 2004) retrieved from www.**tigger.uic.edu**/depts/pols/PolComConf/Walgrave.pdf (10 June 2011).

Benton, M. & Frazier, P.J. (1976). The agenda setting function of the mass media at three levels of "information holding". Communication Research, 3, 261-274.

Biswas, K.F., Ghauri, B.M., Husain, L. (2008). Gaseous and aerosol pollutants during fog and clear episodes in South Asian urban atmosphere. Atmospheric Environment, 242, 7775–85.

Bowes, J.E., & Stamm, K.R. (1979). Science writing techniques and methods. The Journal of Environmental Education, 10(3), 25-28.

Boykoff, M. T. (2009). We Speak for the Trees: Media Reporting on the Environment. Annual Review of Environment and Resources, 34, 431–57

Burke, E. (1995). Ecocrisis in Nepal: The role of environmental media. Mass Comm Review, 22(1/2), 46-63.

Burton, P. (1966). Corporate Public Relations, New York: Reinhold Publishing Corporation.

Chen, J., Wang, Q., Hua, Z. and Du, G. (2007). Research and application of biotechnology in textile industry in china. Journal of Enzyme and Microbial Technology, (40): 1651-1655.

Clausing, J. (1971). The ecological message of the outdoor magazines. Journal of Environmental Education, 2(4), 10-12.

Clay, S. (1979). The press and NEPA: The case of the Missing Agenda. Journalism Quarterly, 577-585.

Christine, R. A. A. (1995). Longitudinal Study of Agenda Settings for the Issue of Environmental Pollution. Journalism & Mass Communication Quarterly, 72, 300-312.

Darley, J. (2000). Making the environment news on the today program. In J. Smith (Ed.) The daily globe: Environmental change, the public and the media (pp. 151-167). London: Earthscan Publications Ltd.

Davies, R. (2008). Civil society activism and waste management in Ireland: the Carranstown anti-incineration campaign. Land Use Policy, 25, 161–172.

Detjen, J. (1997). Environmental writing. In D. Blum & M. Knudson (Eds.), A field guide for science writers (pp. 173-179). New York: Oxford University Press.

Dockery, D. W., Pope, C. A., Xu, X. P., Spengler, J. D., Ware, J. H., Fay, M. E. (1993). An association between air-pollution and mortality in 6 United-States cities. New English Journal of Medicine, 329, 1753–9.

Driedger, S. M. (2007). Risk and the media: a comparison of print and televised news stories of a Canadian drinking water risk event. Risk Analysis, 27, 775–786.

Druckman, J. N. (2001). On the limits of framing effects: Who Can Frame? Journal of Politics, 63(4), 1041.Environmental Education, 10(1), 2-11.

Fisher, C.N. (1974). Students should be prepared to cover environmental beat. Journalism Educator, 29(2), 42-43.

Friedman, S.M. (1979). Using real world experience to teach science and environmental writing. The Journal of Environmental Education, 10(3), 37-42.

Friedman, S.M. (1999). The never-ending story of dioxin. In S.M. Friedman, S. Dunwoody, & C.L. Rogers (Eds.), Communicating uncertainty: Media coverage of new and controversial science (pp. 113-134). Mahwah, New Jersey: Lawrence Erlbaum Associates, Publishers.

Frome, M. (1998). Green ink: An introduction to environmental journalism. Salt Lake City: University of Utah Press.

Ghauri, B., Lodhi, A., & Mansha, M. (2007). Development of baseline (air quality) data in Pakistan. Environmental Monitoring and Assessment, 127, 237–52.

Hameed, S., Ishaq, M. M., Ghauri, B.M., Siddiqui, Z.R., & Javed R, K. (2000). On the widespread winter fog in Northeastern Pakistan and India. Geophysical Research Letters, 27, 1891–1894.

Hansen, A. (1991). The media and the social construction of the environment. Media, Culture & Society, 13(4), 443-458.

Hashmi, I., Farooq, S., & Qaiser S. (2009). Chlorination and water quality monitoring within a public drinking water supply in Rawalpindi Cantt (Westridge and Tench) area, Pakistan. Environmental Monitoring Assessment, 158, 393–403.

Haydar, S., Arshad, M., & Aziz, J. A. (2009). Evaluation of Drinking Water Quality in Urban Areas of Pakistan: A Case Study of Southern Lahore .Pakistan Journal of Engineering and applied sciences, 5, 16-23.

Howenstine, E. (1987). Environmental reporting: Shift from 1970 to 1982. Journalism Quarterly, 64, 842-846.

International Media Support. (2009). Between radicalisation and democratisation in an unfolding conflict: Media in Pakistan, Retrieved from http//www. i-m-s.dk/publication

Iyengar, S. (1979). Television news and issue salience: A reexamination of the agenda setting hypothesis. American Politics Quarterly, 7, 395-416.

Jim, D. Fred, F. Xigen, L. Yeonshin, K. (2000).Changing work environment of environmental reporters. Newspaper Research Journal, 2 (1).

John E. Marston. (1963). The Nature of Public Relations, New York: McGraw-Hill Book Company, Inc.

Kadir, M. M., Janjua, N. Z., Kristensen, S., Fatmi, Z., & Sathiakumar, N. (2008). Status of children's blood lead levels in Pakistan: implications for research and policy. Public Health, 122, 708–715.

Kahlown, M. A., Tahir, M. A., Rasheed, H., & Bhatti, K. P. (2006). Water Quality Status, National Water Quality Monitoring Programme, Fourth Technical Report. Pakistan Council of Research in water Resources, Retrieved from http//www.pcrwr.gov.pk/research.

Kahneman, D. (2003). Maps of bounded rationality: psychology for behavioral economics. American Economic Review, 93, 1449–1475.

Kapdan, I. K. and Oztekin, R. (2006). The effect of hydraulic residence time and initial COD concentration on color and COD removal performance of the anaerobic-aerobic SBR system. Journal of Hazadous materials, (136): 896-901.

Keating, M. (1993). Covering the environment: A handbook on environmental journalism. Ottawa: National Round Table on the Environment and the Economy.

Kim, H. (1977). Small department can gain from science writing course. Journalism Educator, 32(3), 81-83.

Krimsky, S. & Plough, A. (1988). Environmental hazards: Communicating risks as a social process. Dover, Massachusetts: Auburn House Publishing Company.

Lacy, S. & Coulson, D.C. (2000). Comparative case study: Newspaper source use on the environmental beat. Newspaper Research Journal, 21(1), 13-25.

LaFollette, M. C. (1990). Making science our own: Public images of science 1910-1955. Chicago: The University of Chicago Press.

Logan, R.A. (1995). Environmental issues for the '90s: A handbook for journalists (1995) Washington D.C.: The Media Institute.

Manzoor, S., Shah, M. H., Shaheen, N., Khalique, A., & Jaffar, M. (2006). Characterization, Distribution and Comparison of Selected Met in Textile Effluents, Adjoining Soil and Groundwater. Journal of the chemical society of Pakistan, 28, 10-15.

Mazhar, F., & Jamal, T., (2009). Temporal population growth of Lahore, Journal of scientific research, 39, 53-58.

Mazur, A., & Lee, J. (1993). Sounding the global alarm: environmental issues in the US national news. Social Studies of Science, 23, 681–720.

McCombs, M. (2002). News Influence on our pictures of the World, in Media Effects edited by Bryant, J. and Zillman, D. UK, Lawerence Erlbaum Publishers.

McCombs, M. and Shaw, D. (1993). The evolution of Agenda Setting Research: Twenty- Five Years in the Marketplace of Ideas. Journal of Communication, 43(2), 58-67.

McGeachy, L. (1989). Trends in the magazine coverage of environmental issues, 1961-1986. Journal of Environmental Education, 20(2), 6-13.

Misra, V., & Pandey, S.D. (2005). Hazardous waste, impact on health and environment for development of better waste management strategies in future in India. Environment International, 31, 417–431.

Nelson, P. (1995). Ten practical tips for environmental reporting. Washington D.C.: International Center for Journalists.

Neuzil, M. & Kovarik, W. (1996). Mass media and environmental conflict: America's green crusades. London: Sage Publications.

Pauly, J. (1991). A beginner's guide to doing qualitative research in mass communication. Communication Monographs, 125, 1-29.

Pierce, J. C., Lee-Sammons, L., & Lovrich, N. P., Jr. (1988). U.S. and Japanese source reliance for environmental information. Journalism Quarterly, 65, 902-908.

Pleasant, A., Good J., Shanahan J., & Cohen, B. (2002). The literature of environmental communication. Public Understanding of Science, 11(2), 197-205.

Project for Excellence (PEJ) in Journalism. (2006), Retrieved from http// www.stateofthenewsmedia.com.

Rogers, C.L. (1999). The importance of understanding audiences. In S.M. Friedman, S. Dunwoody, & C.L. Rogers (Eds.), Communicating uncertainty: Media coverage of new and controversial science (pp. 179-200). Mahwah, New Jersey: Lawrence Erlbaum Associates, Publishers.

Rowan, K.E. (1990). Strategies for explaining complex science news. Journalism Educator, 45(2), 25-31.

Rubin, D. M., & Sachs, D.P. (1973). Mass media and the environment: Water resources, land use, and atomic energy in California. New York: Praeger Publishers.

Sachsman, D.B, Simon, J., & Valenti, J.M. (2002). The environment reporters of New England. Science Communication 23(4), 410-441.

Sachsman, D.B. (1999). Commentary: Should reporters use risk as a determinant of environmental coverage? Science Communication, 21(1), 114-121.

Schoenfeld, C.A. (1980). Newspersons and the environment today. Journalism Quarterly, 57(3), 456-462.

Schwartz, J. (1994). Air pollution and daily mortality: a review and meta analysis. Environmental Research, 64, 36-52.

Sellers, L. & Jones Jr., D.W. (1973). Environment and the mass media. The Journal of Environmental Education, 5(1), 51-57.

Shabecoff, P. (1993). A fierce green fire: The American environmental movement. New York: Hill and Wang.

Shoemaker, P. J., & Reese, S. D. (1996). Mediating the message: Theories of influences on mass media content. White Plains, NY, Longman.

Simon, J.L. (1980, June 27). Resources, population, environment: An oversupply of false bad news. Science, 208(4451), 1431-1437.

Singer, E. and Endreny, P.M. (1993). Reporting on risk: How the mass media portray accidents, diseases, disasters, and other hazards. New York: Russell Sage Foundation.

Slovic, P. (2000). Informing and educating the public about risk. In: Slovic, P. (Ed.), The Perception of Risk. Earthscan Publications Ltd, London

Smith, D. J. T., Harrison, R. M., Luhana, L., Pio, C. A., Castro, L. M., & Tariq, M. N. (1996). Concentrations of particulate airborne polycyclic aromatic hydrocarbons and metals collected in Lahore, Pakistan. Atmospheric Environment, 30, 4031–4040.

Smith, J. (2000). Introduction. In J. Smith (Ed.), The daily globe: Environmental change, the public and the media, pp. 3-14. London: Earthscan Publications Ltd.

Stempel, G. H., III. (1989a). Content analysis. In G. H. Stempel III, & B. H. Westley (Eds.), Research methods in mass communication (pp. 124-136). Englewood Cliffs, N. J.: Prentice Hall.

Stocking, H. & Leonard, J. P. (1990). The greening of the press. Columbia Journalism Review, 29, 37-44.

Strauss, A. & Corbin, J. (1990). Basics of qualitative research: Grounded theory procedures and techniques. London: Sage Publications.

Tanner, C. C., Sukias, J. P. S., Headley, T. R., Yates, C. R., & Stott, R. (2012). Constructed wetlands and denitrifying bioreactors for on-site and decentralized wastewater treatment: Comparison of five alternative configurations. Ecological Engineering, 42, 112-123.

United Nations Environment Programme (UNEP). (2006). Environmental Reporting for African journalists: A Handbook of Key Environmental Issues and Concepts, Retrieved from http//www.unep/training/downloads/PDFs/journ_hb.pdf

Valenti, J., &Wilkins, L. (1995). An Ethical risk communication protocol for science and mass communication. Public Understanding of Science, 4, 177-194.

Viklund, M. (2004). Energy policy options—from the perspective of public attitudes and risk perceptions. Energy Policy, 32, 1159–1171.

Waheed, S., Rahman, A., Khalid, N., & Ahmad, S. (2006). Assessment of air quality of two metropolitan cities in Pakistan: elemental analysis using INAA and AAS. Radiochim Acta, 94, 161–166.

Wilkins, L. (1997). Communitarian and environmental journalism. In J. Black (Ed.) Mixed news: The public/civic/communitarian debate (pp. 200-214). Mahwah, New Jersey: Lawrence Erlbaum Associates, Publishers.

Wilson, K.M. (2000). Communicating climate change through the media. In S. Allan, B. Adam & C. Carter (Eds.), Environmental risks and the media, pp. 201-217. London: Routledge.

www.dawn.com.pk retrieved on (2011, Oct 6)

www.jang-group.com.pk retrieved (2011, Oct 6)

Yagade, A., & Dozier, D. M. (1990). The media agenda-setting effect of concrete versus abstract issues. Journalism Quarterly, 67, 3-10.