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Chapter I

INTRODUCTION

1.1 The Background

Environment is defined as the sum total of anything that directly influences the animals’ and human beings’ chance to survive and reproduce (Maelzer, 1965). The subject of environment is interdisciplinary. Environment means the entire surroundings of somebody or something with which it continuously interacts and remains totally adapted for its existence and survival (Satpathy, 2005).

Since the day man began to devote his physical strength, mental power, ability and skills in the utilization of natural resources, it was the turning point of far reaching consequences. The man has been the explorer, exploiter and destroyer of these natural resources. In the name of development and advancement, he has disturbed the ecological balance between himself and the natural environment. The most important human action leading to environmental disturbances was domestication of plants and animals approximately 10,000 years ago. This practice lead to deforestation, overgrazing, intensive burning and land scaring which ultimately resulted in increased soil erosion, soil loss, declining water table, etc. This disturbance resulted in an imbalance of nature and the environment and the resource were destroyed and damaged.

When environment begins to influence resources and resource exploitation exerts its impact on environment. Business’s traditional response towards environmental issues remained antagonistic with little care about the costs of business activities towards the environment (Utting, 2000).

In the 1970s, civil society started to realize more clearly the negative environmental consequences of business activities. Every day man and industries create pollution in the form of smoke, noise, heat, gas and fumes. It is the society, which suffers from damaging effects of pollution in the form of poor health and associated reduction in productivity of people and quality of life, the strain on medical services, corrosion of buildings and damage to flora and fauna and degradation of land. If the wastes and residues are non-bio degradable then they pose major health hazards. Industrial effluents are not easily bio-
degradable and beyond the capacity of natural assimilation by the water bodies, with the result that these water bodies remain polluted affecting the health of the people in the region.

The issue of pollution has become much more significant since the emergence of industrial societies, which have the potential to generate newer forms of pollution and to spread these across large areas. Industrial revolution of the 18th and 19th century and the technological revolution of the 20th century resulted imbalance of the natural environmental. Technological advancements have helped man to attain greater control over nature but the greed of gaining more has resulted in over exploitation of natural resources. Pollution has come to the forefront and has become a major threat to the very existence of mankind (Ramjee, 2005). The problem of environmental degradation is widespread but there are regional variations in its intensity owing to the extent of various factors involved in the decay. The economies of most of the developing countries are based on agriculture. They require a considerable amount of chemicals for their agriculture, industrial and other needs. Most of the chemicals used by them are hazardous in nature and pose a serious threat to the environment as well as the human beings exposed to them. Developing countries with low levels of industrialization are gradually shifting their dependence from agriculture to industrial sector. Industrialization process has resulted in considerable environmental degradation of natural resources. This shift has given rise to concern towards increasing carbon intensity in both local and regional environments.

The relationship between business and the environment is now well documented (Fischer and Schot, 1993; McDonagh and Prothero, 1977). Interests on environmental degradation began in the 1960s in Western Europe and North America, prompted by incidents such as heavy smog caused by industrial activities in London. Environmental damage can’t be cut down to size until the pollution generated and the raw materials used per unit of output, decline much faster than economic output grows (Smart,1992). Economic growth is harmful for the environment unless production becomes cleaner and less resource consuming at the same time. From an environmental point of view, manufacturing turns resources into products that eventually enter the natural environment as wastes. Similarly, energy used in production finally ends up as waste heat. As a result, the more intensive the production process is, the more resources are depleted and waste generated. Industrial pollution, soil erosion, deforestation, rapid industrialization, urbanization and land degradation are all
worsening problems. One of the most serious threats is the enormous amount of waste that is released into the air, water and ground every year. Waste disposal is the biggest problem and the simple fact is that there is no away in the throw away. The current state and trend of environmental degradation from regulatory, consumer, and moral standpoints indicates a need for change in approach to manufacturing (Beamon, 1999).

The industrial sector is one of the most dynamic sectors of the economy and plays an important role in the economic development. The increasing concern of environmental degradation has led to environmental sensitivity among the nations of the developing as well as the developed world. The result of this awareness is the environmental protection and the environmental issues are now thoroughly politicized. Developing countries’ strong desire to achieve economic development also contributed to the low regard for environmental management. The increasing economic development and rapidly growing population has taken a strain on the environment, infrastructure, and the country’s natural resources. Current efforts for global environmental protection are mainly being concentrated around large and small scale development projects, but a large number of small scale operations have been left unnoticed in spite of their high resources intensity, inefficiency and high level of pollution load per every unit of production.

Small and medium enterprises (SMEs) are commonly recognized as one of the leading groups of economic activities globally, and pose massive impacts on social issues. Most of the SMEs are suppliers to large enterprises. The importance of SMEs in society can be recognized by looking at the recent institutional arrangement and policy development for assisting SMEs in all the countries. The SMEs active in the country are often undercapitalized and technologically weak operating outside the formal sector of the economy. Of the total export from India, a large portion is contributed by small and medium scale industries which also contribute 50 percent to the total industrial pollution.

Since the dawn of the industrial age, the goals of economic growth and environmental quality have often been at odds, but over the course of the past decade, a growing number of companies have pioneered new strategies for integrating the environment into their overall business strategy and for simultaneously improving their environmental and business performance. (Porter, 1991; Schmidheiny, 1992; Porter and vander Linde, 1995a, 1995b;
Hart and Ahujba, 1994). They are, to turn a phrase, becoming “leaner and greener” at the same time (Florida, 1996; Florida, Atlas and Cline, 1999).

In fact, environmental protectionism was considered a nuisance to business enterprises for the most part. Businesses tended to deny or avoid their environmental responsibilities and opposed those developments designed to control performance (Tilley, 1999). Hence, businesses generally remained in denial of their environmental responsibilities, despite the development of increasingly complex pollution control legislation in many parts of Western Europe, North America and Japan.

1.2 Environmental Crisis

The world is moving towards an environmental crisis. We sometimes do talk about it and then go about our routine business as if the environment and our lives were quite separate. The environmental problems in India are growing rapidly. The increasing economic development and a rapidly growing population that has taken the country from 300 million people in 1947 to over 1.1 billion people today is putting a strain on the environment, infrastructure, and the country’s natural resources. Industrial pollution, soil erosion, deforestation, rapid industrialization, urbanization, and land degradation are all worsening problems. Industrialization processes and overexploitation of the country's resources be it land or water has resulted in considerable environmental degradation of resources. Business organizations and societies’ commitment and dedication to the cause of protection, preservation and conservation of environment is very much essential.

Awareness regarding environmental issues is limited due to a number of factors. To the millions of poor surviving people, the problems of daily existence are more important than environmental degradation. Late Prime Minister Mrs. Indira Gandhi at the UN conference on Human Environment in Stockholm in 1972 broadened the term ‘Environment’ to include poverty, hunger, and sanitation. In her address to the conference she said, “How can we speak to those who live in villages and in the slums about keeping oceans, the rivers and the air clean when their own lives are contaminated? Is not poverty and need the greatest polluters?”
India’s economic development propelled by rapid industrialization and urbanization is causing serious environmental problems that have local, regional and global implications. Deforestation, soil erosion, water pollution and land degradation continue to worsen the problems and are hindering economic development in rural India, while the rapid industrialization and urbanization are causing serious environmental pollution problems. The inter-relationship between environmental degradation and most of India’s serious problems are often over-looked. It is necessary to stress on the relationship between destruction of environment on one hand and social problems on the other. The communication media can play a positive role in the awareness, protection and preservation of natural environment. They can play an active role in alerting people about environmental damages, corporate failure to meet its legal obligations and truthful analysis of new legislations.

The school education can significantly promote environmental awareness. Environmental education became an integral component of the National Policy on Education in 1986. It was declared that there is a need to create consciousness about the environment right from the childhood to all the ages and all sections of the society. Environmental consciousness should inform teaching in schools and colleges and should be integrated in the entire education process. Though environmental education has been integrated into the National Curriculum Frame Work, and as a result of directions issued by the Supreme Court of India, Environmental Science was made mandatory for undergraduates and Environmental Studies was introduced as a subject for students of Class 1 to 5, but environmental education problems are still far from over. These problems require early solution. It is necessary to emphasize that problem of environmental degradation can be handled only by intensive efforts of every person, organization and institution and by stringent enforcement of the laws. We have to educate, spread awareness, involve and motivate each & every person in the country to conserve the air, soil, water and all other natural resources.

1.2.1 Environmental Management

Environmental issues have become an inseparable part of modern businesses. Environmental concerns grew in the 1960s because of the increase in the levels of pollution. The accelerated industrial growth resulted in the quality evolution in the 1980s and the supply chain revolution in the 1990s. Over these years, the environment suffered at the
expense of economic progress (D’Souza and Peretiatko, 2002). There was a gradual realization of an inseparable link between socio-economic issues and the environment. The 1990s saw the development of environmental management systems (EMSs) designed to provide a framework for organizations to incorporate environmental objectives into their decision-making (Boiral and Sala, 1998). This led to the emergence of belief that improving the environmental performance of corporations is a way of abating environmental damage.

The new approach suggests that the government and its regulations are now no longer the sole guardian of environmental management. This responsibility has extended to business organizations as they are a part of the society and are held responsible and accountable for the decisions made within their organization that may have environmental effects.

1.3 Sustainable Development

Sustainable development is a process of achieving human development in an inclusive, connected, equitable, prudent, and secure manner. Inclusiveness implies human development over time and space. Connectivity entails an embrace of ecological, social and economic interdependence. Equity suggests intergenerational, intragenerational and interspecies fairness. Prudence connotes duties of care and prevention, technologically scientifically and politically. Security demands safety from chronic threats and protection from harmful disruption (Gladwin et al., 1995).

Exhibit 1.1 Three Pillars of Sustainability Model

*Source EPA United States environmental protection agency
Sustainability refers to the notion of ensuring that economic growth and environmental protection work together for long term benefits rather than operating in competition with each other. United Nations World Commission on Environment and Development (Bruntland Commission, 1987) describes sustainable development as “Development, which meets the needs of the present without compromising the ability of the future generations to meet their own needs”. According to Latin America and Caribbean Commission on Development and Environment, 1990, “Sustainable development requires that we change the trajectory of unsustainable development we have been following throughout the hemisphere, putting our nations on a new path of development”. The last 30 years have seen growing international recognition that the challenges associated with environmental degradation and sustainable development have important implications for, and connections with, education and schooling (IUCN, 1970; UNCED, 1992).

Sustainable Development has become the dominant way of talking about and planning for an improved relationship between societies and the natural environment and, unlike Green Politics, it has been taken up by businesses, local authorities, national governments and international bodies like UN (United Nations) and ordinary members of society (Sutton, 2007).

Turning the fusion of economic and environmental ends known as, “sustainable development” from a slogan into a global reality is the crucial task of the 1990’s (Brown and Gabaldon, 1993). Sustainable development requires that business organizations, individuals, society and other stakeholders operate on different, realistic time scales. But in order to just achieve short-term gains, long-term environmental protection perspectives should not be compromised. To ensure that longer term, intergenerational considerations are observed, longer planning horizons need to be adopted, while business policy needs to be proactive rather than reactive (Satpathy, 2005). Energy consumption, substitution of polluting fuels by eco-friendly energy sources, reduction of packaging and other wastes, green cover, effective water harvesting and use, eco-friendly agriculture, reuse of wastes of manufacturing, protection of endangered species etc are some of the dimensions of sustainable development (Khandwalla, 2008).

Sustainable development demands and requires the balancing of three different but interrelated variables:
Economics and commercial imperatives to produce and maintain an economic system that delivers wealth and efficiently meet customer demands; Environmental concerns, so as to ensure that the current state of the earth’s biosphere is at least maintained; and, Social justice factors or the protection of individual and community needs, on the assumption that the other two issues cannot be advanced if there is no motivation or incentive within the broader community to do so.

So for any business to be sustainable, it must aim for the pursuit of economic prosperity, ecological/environmental quality and social equity simultaneously.

**Exhibit 1.2 Path to Environmental Sustainability**

(*source Twelfth Five Year Plan 2012-17, Planning Commission, GOI)

1.4 Polluting the Environment

Pollution can be defined as the release of potentially harmful contaminants into the environment. Today, pollution is a very serious and obvious environmental problem that has
to be addressed. One of the most serious threats is the enormous amount of waste that is discharged into the air, water and ground every year. The issue of pollution has become much more significant since the emergence of industrial societies, which have the potential to generate more and new types of pollution and to spread these across large areas of the planet earth. Environmental activists have argued that the human pollution of the natural environment is one of the major problems of modern life and one of the most urgent environmental issues that needs to be tackled.

1.4.1 Air & Noise Pollution

Air pollution in its broadest sense refers to suspended particulate matter (dust, fumes, mist and smoke), gaseous pollutants and odours. Air, the most essential need of all the living beings is a natural combination of nitrogen (78%), oxygen (21%), argon (9%), carbon dioxide (0.03%) while rest is made up of small percentages of rare gases like xenon, helium, and hydrogen and water vapours.

Air pollution is one of the major reasons for the environmental pollution. Air pollution is said to exist if the level of harmful gases, solids, or liquids present in the atmosphere is high enough to affect humans, other organisms, monuments, buildings, and plants etc. Primary air pollutants are harmful chemicals that are released directly from a source into the atmosphere. They include particulate matter (solid particles as well as liquid suspensions) like lead, cadmium, asbestos, oxides of carbon, nitrogen and sulphur, and hydrocarbons like methane and benzene.

Secondary air pollutants are also the harmful chemicals that are produced in the atmosphere from the chemical reactions of primary pollutants. They include, Ozone, a form of oxygen that pollutes the troposphere, the closest layer of the atmosphere to the earth’s surface. Sulphur trioxide is formed as a result of the reaction of sulphur dioxide with oxygen, which in turn combines with water to form sulphuric acid. Outdoor air pollution is a result of burning of fossils fuel, mining activities which result in dust and fire. Indoor air pollution is also a cause of worry, pesticides, mosquito repellents, cleaning agents, cigarette smoke, gases from stoves, make the air polluted. Air pollutants cause a wide range of problems. They can depress the immune system; at low levels they irritate & cause inflammation of
the respiratory tract, skin allergies, colds, influenza, nausea, upset stomach etc. Air pollution on a large scale leads to acid rain, ozone layer depletion and global warming.

Noise has been defined as unwanted sound that irritates and results in stress. High intensity noise has become one of the most disturbing problems of modern life. The Noise Pollution (Regulation and Control) Rules, 2000 differentiates between sound and noise. When the sound reaches to an unbearable level it becomes noise. Most of the noise pollution originates from human activities. Maximum noise originates from transport sector (aircrafts, buses, trucks, railways, cars, three wheelers, motorcycles, and scooters), industrial machinery, generators, factory equipments, drills and special occasions resulting in high volume sounds from loudspeakers, contribute a lot to increasing the noise pollution. Noise pollution affects human beings and results in physiological as well as psychological damage. Loud noise can also have other ill effects like heart palpitation, muscle contraction, migraine headaches, nausea and dizziness. Noise can cause serious damages to wildlife while animals are adversely affected due to loud noise. According to the rules, the state government shall categorize industrial, commercial, and residential or silence zones and implement noise standards. Use of loudspeakers, amplifiers and beats of drum are prohibited except with the permission of the authorities.

1.4.2 Water & Soil Pollution

The quality of water is of vital importance for the sustenance of mankind as it is directly linked to the welfare of human beings as well as for all forms of living organisms. Most countries have economic problems of providing fresh water. Water pollution is the presence of deleterious substances in water that make it unsuitable. Pollution in water can be either due to the presence of either industrial or domestic waste. Domestic water pollution is mainly due to the presence of harmful pathogens along with chemicals while industrial water pollution is due to the presence of toxic chemicals. Water pollutants come from point sources and also from nonpoint sources. Sewage treatment plants and factories that discharge pollutants into water bodies through pipes, sewers and ditches are the point sources. When water pollutants mix into the water body from several points over a large area, then it is the case of nonpoint sources; it is very difficult to control such type of pollution. Non point sources include surface run-off, mining waste, municipal waste, acid rain, and soil erosion.
Ground water is one of the natural sources of water. Groundwater exploitation is a serious matter of concern today and legislations and policy measures taken till date; by the state governments (water is a state subject) have not had the desired effect on the situation. Excessive extraction of ground water leads to the natural pollution of the same. About two third of the world's population depends on ground water for their daily needs. Ground water pollution is due to the pollutants from septic tanks, landfills, hazardous waste dumps, underground tanks containing petrol, oil, chemicals, etc. Ground water pollution lasts longer because it neither gets flushed nor does it decompose away. The country's ground water resources are dwindling, at a much faster pace than they are being recharged, naturally or otherwise. Against a backdrop of fast depleting groundwater reserves - in some villages, wells have now to be dug at over 200 meters to reach water.

Ground water is defined as the water located beneath the ground surface in soil pore spaces and in the fractures of geological formations. Ground water is made use of for agricultural, municipal and industrial use by constructing and operating extraction wells. Groundwater can be a long-term 'reservoir' of the natural water cycle, as opposed to short-term water reservoirs like the atmosphere and fresh surface water. Groundwater is naturally replenished by surface water from precipitation, streams, and rivers when this recharge reaches the water table. It is estimated that the volume of groundwater is fifty times that of surface freshwater. Groundwater makes up about twenty percent of the world's fresh water supply, which is about 0.61 percent of the world's entire water supply.

Groundwater is a highly useful and abundant resource, but in arid or semi-arid regions it is in a pre-development state. The most evident problem that may result from this is a lowering of the water table beyond the reach of existing wells. Wells must consequently be deepened to reach the groundwater; in some places in India the water table has dropped hundreds of feet due to well pumping. Sometimes the water movement from the recharge zone to the place where it is withdrawn may take centuries. When the usage of water is greater than the recharge, it is referred to as mining water. Under those circumstances it is not a renewable resource.

Soil pollution refers to any chemical or physical change in soil conditions that may adversely affect the growth of plant and other organisms living in it or on that soil. Agricultural chemicals, especially fertilizers and pesticides, dumped waste like garbage,
untreated sewage, nuclear waste and mining waste pollute the soil, as the dangerous substance from the dumps leak into it. Soil and water pollution are closely connected to each other.

Acid rain and excessive use of chemical fertilizers result in the soil’s inability to hold nutrients, this leads to rapidly seeping of the toxic chemicals deep into the groundwater, or to run off into rivers.

1.5 Environmental Laws in India

Environmental protection is a fundamental duty of every citizen of this country under Article 51-A (g) of our Constitution which reads as follows:

“It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures.”

India has an elaborate legal framework with over two hundred laws relating to environmental protection. Key national laws for the prevention and control of industrial and urban pollution include the following:

The Air (Prevention and Control of Pollution) Rules, 1982
The Environment Protection Act, 1986
The Environment (Protection) Rules, 1986
Hazardous Wastes (Management and Handling) Rules, 1989
Manufacture, Storage and Import of Hazardous Chemical Rules, 1989
The Forest Conservation Act, 1980
The Forest (Conservation) Rules, 1981
The Wildlife Protection Act, 1972
The Wild Life (Transactions and Taxidermy) Rules, 1973
The Wild Life (Stock Declaration) Central Rules, 1973
1.6 Environmental Consequences of Industrialization

Maintenance of purity and safety of the environment is the most challenging task in the face of increasing industrialization, urbanization, and mechanization of daily life. In the interest of the present and future generation, necessary steps should be undertaken for sustainable use of land, its minerals and water resources, plants and animals to preserve the purity of air, water and ensure reproduction of natural wealth and improve the quality of environment. Man and industries create pollution everyday in the form of smoke, noise, heat, gas and fumes. Industries cause land pollution by dumping the solid wastes in open areas which get leached into the soil and pollute the soil as well as the ground water. This problem can be solved to some extent by adopting pollution control measures through installation of relevant devices. Though the cost of pollution control devices is high but taken the social cost of pollution, is more significant and should be taken care of. It is the society which suffers from damaging effect of pollution in the form of poor health and associated reduction in productivity of people and quality of life, the strain on medical services, corrosion of buildings and damage to flora and fauna and degradation of land. These costs are not only inevitable but much higher than for installing pollution control technology. The pollution control laws are to be implemented strictly by the concerned authorities. With very poor environmental controls being exercised by the authorities, many air and water polluting industries are set up near urban areas. The nature and quality of wastes differ from industry to industry depending upon the nature of raw materials, processes used and the final product produced. The water discharged from most of the industrial houses is contaminated; i.e. it is not fit for any other further use, be it for irrigation or other uses. Most industries discharge waste water into rivers and other water courses directly or indirectly without adequate treatment. Industrial effluents are not easily biodegradable and beyond the capacity of natural assimilation by the water bodies, with the result that these
water bodies remain polluted affecting the health of the people in the region. The awareness for disposal of hazardous waste is yet to pick up the pace against the industrialists and civic authorities.

**Exhibit 1.3 Major environmental impacts in the manufacturing industry**

(*Source Twelfth Five Year Plan 2012-17, Planning Commission, GOI)

It is presumed that the industry would remain at variance with the environment and little effort is made in harmonizing the two. If the industries adopt the measures and regulations then all the menaces of the pollution can be controlled to some extent. The concept of prevention of pollution should be right from the time of introduction of process technologies and selection of raw materials. Recycling of effluents is acknowledged world over in attaining better results in pollution control. If the wastes and residues are non-biodegradable then they pose major health hazards once these affect the life support system and enter the food chain. However, wastes and residues can be reused to a substantial degree. Recycling technology is now used in attaining tangible results in pollution control. The cost of recovery of raw materials, intermediate products and final product outweigh the cost of effluent treatment. Use of biotechnology has revolutionized effluent treatment all over the world. Plants, animals, aquatic animals and birds all are interconnected and depend on each other directly or indirectly and make biological community, where survival of one is dependent on the survival of others. Optimum use of micro organism splits up organic
matter in the effluent. This has become the crux of the biological treatment process as adopted in industries. The discharge of pollutants in the form of gases, liquids or solids should be strictly controlled. Limits for discharge of pollutants or gases from the industries have been imposed by the pollution control boards for majority of industries but implementation of law is the main problem/curse and should be looked into carefully.

Water used by industries is discharged to the land or water bodies. It can contaminate, alter or deteriorate the quality of fresh water. The industrial effluent discharge should be of such quality that it does not cause pollution. Thus, all industries should have an effluent treatment plant and control system judiciously operated and designed to render effluent quality that meets the tolerance limit for the industrial effluents set by the pollution control boards.

1.7 Small and Medium Enterprises (SMEs)

Small and medium size enterprises (SMEs) have a dominant role in economic development as well as industrial development of a country. Economic and social sectors of a country are very much dependent on SMEs. There contribution towards large-scale employment creation, investment, development of indigenous skill and technology, encouragement of entrepreneurship and innovativeness, increasing exports, and creating an industrial base at different scales is worthwhile. SMEs worldwide have been benefited from the combined interactions of forces of product mix, locational factors and market advantages (Ahmed, 2006).

Structural and operational changes at the global level have intensified the competition internationally, where multinationals are playing the pivotal role (UNIDO, 2000). Under this changed situation, the SMEs are continued to enjoy their importance through increased exports and employment (UNIDO, 2000; Wattanapruttipaisan, 2002). The increase in market competition, and entry of multinational players in otherwise protected market have made the operational conditions complicated for SMEs. Despite of these hardships faced by the SMEs, the recent empirical results emerged from the country reports indicate that the growth of this sector has occurred at the expense of their larger counterparts (ISED, 2005). The recent revival of SMEs in the world economy, especially those hailing from the developed countries, has promoted the growth of SMEs in the developing and least
developed countries (LDCs). Emphasis has always been given to the promotion and development of SMEs because they are the major employment providing sector in LDCs. As the SMEs in LDCs use outdated technologies for producing products and services, they have been facing tough competition from the imported products. The situation may further be worsened in the days to come because SMEs have to compete with international competitors due to free trade and phasing out of tariff barriers (UNIDO, 2000). Therefore, the changes that have been taking place in the international economic scenario have definitely brought challenges for the SMEs. However, at the same time, globalization has also opened up new business and market opportunities for SMEs (Wattanapruttipaisan, 2002).

1.7.1 Developmental Roles of Small and Medium Enterprises (SMEs)

India was the first among the developing countries to formulate policies to support SME sector before it became more generic phenomenon (Mohan, 2001). In India, the small scale industries are engaged in manufacturing of labour intensive goods. The basic focus on SME sector in India has been on the employment creation. The basic institutional structure has focused on the creation of employment alongside the promotion of small scale enterprises through positive technical and marketing support. This has led to the growth of various facilitating organizations at the central and the state levels throughout the country. Keeping these points in view, the small-scale industries are to be protected from the competition with the large scale both through reservations, fiscal benefits and concessions.

The economic developments over the years have resulted in the increase in the number of SMEs in India. Presently, there are 11.8 million small-scale units, of which more than 10 million are unregistered, producing almost 8000 different items out of which 506 are exclusively reserved for this sector. This sector employs 28.2 million people, and accounted for almost 34 percent of country’s exports in 2004-05. The sector has registered an annual growth rate of 6.7 percent of GDP, and has a share of 39.4 percent of the total industrial production. The dominance of this sector has been found in the areas of sports goods, readymade garments, woolen garments and knitwear, plastic products, processed food, light engineering goods, pottery, ceramics, glass and leather products.

Despite of globalization and liberalization of the world economy, the decade of nineties showed a gradual rise in the number of SMEs in India. The employment has also kept pace
with the rise in the absolute number of industrial units. The export earnings have increased during the same period showing the importance of this sector. The employment has risen by 72 percent during the same period and in the export earnings have increased by 79 percent between 1990-91 and 2002-03. According to Central Statistical Organization (CSO), the growth rates of the SMEs contribution to the GDP has increased steadily from 7.3 percent growth in 1994-95 to 8.5 percent in 2003-04. It has been observed across the world that, regional cooperation in support of the development and integration of SMEs yields in increasing social and economic returns within and across the nations. A competitive and innovative SME sector holds out substantial assurance for the region, particularly in terms of:

- Higher income growth,
- Optimal utilization of domestic resources,
- More gainful integration through global and regional trade and investment, and
- Greater equity in access, distribution and development.

The share of SMEs in an economy is an indicator of the economy’s flexibility of industrial base. The ability of these industries to respond to the new customer requirements, bringing in workforce changes, and adopting new technologies, make them more flexible in adjusting with the changing environment (ISED, 2005). Small enterprises in the developing countries are meant to serve the local demand. However, the newly emerged situation has brought in changes favorable to demands and investment structures. As a result, SMEs are not only the key ingredients to the global production networks across nations but are also actively involved in a country’s innovation system. SME sector has been playing a vital role in employment generation and export earnings. In developed countries, SMEs have been playing a vital role in strengthening country’s competitiveness.

1.8 Scope of the study

The present study aims at studying the environmental issue and challenges in SMEs in India. In this study the following topics have been focused upon:

- Environmental laws pertaining to India
- Problems faced by SMEs in incorporating the environmental laws
- Environmental pollution
  - Air;
This research aims to focus on environmental issues and challenges in SMEs. This is expected to ensure the productivity and welfare of the society contributing to sustainable development. The research amalgamates operations with supply chain and environmental management in order to balance a variety of corporate objectives such as resource conservation, pollution prevention and competitiveness, etc. The functional perspective brings together different functional fields like, Total Quality Management (TQM), Total Quality Environmental Management (TQEM), Re-engineering, Waste management, Reverse logistics, etc.

This research will be effective in developing optimal strategies that balance environmental and economic costs. Further, it shall contribute to long-term betterment of industry and society as a whole.

1.9 Research Objectives

The manufacturing sector in SMEs has been characterized by high consumption of natural resources in one form or the other. It is also a potent source of waste generation, ecosystem disruption and depletion of natural resources. Specifically, the study aims

- To identify environmental issues and challenges and the extent of implementation at various levels.
- To identify the extent of implementation of environmental protection practices at various levels of operation in select SMEs.
- To explore the differences, if any, with regard to implementation of environmental protection procedures and techniques across select SMEs.
- To develop a conceptual model covering different aspects as regards different environmental issues and challenges concerning selected SMEs and their impact and benefits so derived.
- To ascertain the validity of the conceptual model interlinking various environmental concerns with environmental performance and benefits derived.
To ascertain the benefits derived as a result of implementation of environmental protection procedures and techniques with regard to resource conservation, competitiveness and economic performance.

1.10 Research Strategy

In this research work, following research techniques are employed

- **Questionnaire-based survey**: Questionnaire-based survey is an established approach and technique to obtain respondents’ opinion on a range of issues related to a research problem. In the present research work this is used to gain an insight into the environmental issues and challenges in select Indian SMEs.

- **Hypothesis testing and Model validation**: The hypotheses relating to dimensions of environmental concerns with organizational variables and hypothesis based on impact of different dimensions on environmental concerns were tested. For this purpose Analysis of Variance (ANOVA) and Structural equation modeling (SEM) have been used. SEM is used to quantify relationship between interdependent variables related to environmental issues, environmental challenges, environmental management practices, pollution prevention, resource conservation, competitiveness and economic performance.

1.11 Organization of Research

The study is divided in five chapters.

*Chapter I Introduction* contains an introduction to the research. Talks about environmental crisis, environmental management, sustainable development, pollution and its types, environmental consequences of industrialization, small and medium enterprises, and the roles played by them in development. The scope of the study, objectives of the research and later on research strategy has also been explained.

*Chapter II Small and Medium Enterprises: An Overview* deals with the introduction, definition, small and medium enterprises in Indian context, status of the select industries, leather and tannery, Pottery/Ceramic, Glass, Lock, hardware and allied is discussed.
Chapter III Literature Review deals with the literature on the relevant aspects of this research. Contributions made by different researchers on broad environmental concerns and also on specific issues are highlighted. After literature review, gaps have been identified. These gaps then have helped in the crystallization of the problem statement for this research work.

Chapter IV Research Methodology talks about the problem statement, scope of the study, research objectives, formulation of the hypothesis, research design, development of the conceptual model, questionnaire development and its administration. This chapter also provides the research strategy, tools used in analysis and the limitations of the study.

Chapter V Data Analysis reports the findings of the questionnaire-based survey. The developed questionnaire was administered in four sectors of Indian SMEs, namely Lock, hardware and allied, Pottery/Ceramic, Leather & Tannery and Glass. The observations and the results of the survey have been reported in this chapter.

Chapter VI Conclusions and Recommendations presents key findings. Finally, suggestions and directions for future research have been presented in this chapter.

To sum up, we can say that Industrialization which has led to transition from the agrarian economy to the developed and modernized one, demands for more of the scarce natural resources. As a result, the natural environment suffers at the cost of economic development. Pollution of the environment results in various forms at different stages of the product life cycle. Small and Medium Enterprises which are the backbone of any economy, are the potent source of pollution. They are considered a threat to the environment as they discharge a lot of waste into the environment. This study aims to identify the environmental issues and environmental challenges in Indian SMEs. In the next chapter we present an introduction to the SMEs.
CHAPTER II
SMALL AND MEDIUM ENTERPRISES

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Chapter II

SMALL AND MEDIUM ENTERPRISES

2.1 Introduction

Economic as well as social sectors of a country are very much dependent on Small and Medium enterprises (SMEs). The role played by SMEs is crucial for the development and growth of any economy. The importance of this sector is well-recognized all over the world owing to its significant contribution in fulfilling various socio-economic objectives, such as employment generation, contribution to national output and exports, fostering new entrepreneurship and to provide depth to the industrial base of the economy. It can also help achieve a more equitable distribution of the benefits of economic growth and thereby help alleviate some of the problems associated with uneven income distribution. Once considered to be remnants of traditional sectors, SMEs, and their development, have now become the focus of initiatives aimed at creating growth and employment in developing countries.

2.2 Small and Medium Enterprises: Defined

Across the world, the SMEs are defined on the basis of two criteria: volume of turnover and number of persons employed in a particular organization. According to the standard EU definition, “If the total number of employees happens to be fewer than 50 for an organization, it falls within the category of ‘small’, and those with strength less than 250 but more than 50 identified as ‘medium’ scale industries”. In the US, there is no standard definition of small business enterprises; the definition is largely industry specific. The central government in India by the Industries (Development & Regulation) Act 1951 defines in the case of the enterprises engaged in the manufacture or production of goods as a micro enterprise, where the investment in plant and machinery does not exceed Rupees 25 lakhs; a small enterprise, where the investment in plant and machinery is more than Rupees 25 lakhs but does not exceed Rupees 5 crore; or a medium enterprise, where the investment in plant and machinery is more than Rupees 5 crore but does not exceed Rupees 10 crore; in the case of the enterprises engaged in providing or rendering of services, as a micro enterprise, where the investment in equipment does not exceed Rupees 10 lakh; a small enterprise, where the investment in equipment is more than Rupees 10 lakh but does not
exceed Rupees 2 crore; or a medium enterprise, where the investment in equipment is more than Rupees 2 crore but does not exceed Rupees 5 crore.

The Ministry of Small Scale Industries and Agro and Rural Industries was first created on 14th October 1999 and, on 6th September 2001, further bifurcated into two separate ministries, namely, the Ministry of Small Scale Industries and the Ministry of Agro and Rural Industries. Subsequent to enactment of “Micro, Small and Medium Enterprises Development Act, 2006” by the Parliament, the President under Notification dated 9th May, 2007 has amended the Government of India (Allocation of Business) Rules, 1961. Pursuant to this amendment, Ministry of Agro and Rural Industries and Ministry of Small Scale Industries were merged into a single Ministry, namely, “Ministry of Micro, Small and Medium Enterprises.”

2.3 Small and Medium Enterprises: The Indian Context

Way back in 1973, British economist E. F. Schumacher in his award winning book, ‘Small Is Beautiful: Economics As If People Mattered’ advanced the argument that it is the small and appropriate technologies that empower people more. The Economic Survey India, 2011-12 has stated “MSME is a dynamic and vibrant sector that nurtures entrepreneurial talent besides meeting social objectives including that of providing employment to millions of people across the country.”

In India, the quest for industrial development started after independence in 1947. The evolution of the Indian Industrial Policy was a result of the Industrial Policy Resolution of 1948. The resolution not only defined the broad contours of the policy, but also set down the role of the State in industrial development both as an entrepreneur and as an authority. Successive policy resolutions also reiterated this basic tilt in favour of the public sector. With the advent of planned economy from 1951 and the subsequent industrial policy followed by the Government of India, both planners and the government earmarked a special role for small and medium scale industries in the Indian economy. The Industrial Policy Resolution of 1956 gave the public sector strategic role in the economy. It categorised industries which would be the exclusive responsibility of the state or would progressively come under state control and others. Earmarking the pre-eminent position of the public sector, it envisaged private sector co-existing with the state and thus attempted to give the policy framework flexibility. Due protection was accorded to both sectors, and particularly to small scale industries from 1951 to 1991, till the nation adopted a policy of
liberalization and globalization. Certain products were reserved for small-scale units for a long time, though this list of products is decreasing due to the change in industrial policies and climate.

SMEs always represented the model of socio-economic policies of the Government of India which emphasized judicious use of foreign exchange for import of capital goods and inputs; labour intensive mode of production; employment generation; non-concentration of diffusion of economic power in the hands of a few (as in the case of big houses); and finally effective contribution to foreign exchange earnings of the nation with low import-intensive operations. SMEs in India fulfilled the expectations of the government which made it possible for them to achieve the objectives of high contribution to domestic production, low investment requirements, operational flexibility, capacities to develop appropriate indigenous technology, competitiveness in domestic and foreign markets, import substitution and significant export earnings. On the other hand, SMEs have the limitations of low capital base, concentration of power and functions within a small group of persons, lack of professionalism, very low or no R&D and low exposure to international environment.

India’s economic development propelled by rapid industrial growth and urbanization is causing severe environmental problems that have local, regional and global significance. Deforestation, soil erosion, water pollution and land degradation continue to worsen and are hindering economic development in rural India, the rapid industrialization and urbanization in India’s booming metropolises are straining the limits of municipal services and causing serious environmental problems.

The growth and development of Indian economy since independence has led to a number of environmental issues. The country’s natural environment is losing its natural balance. The environmental issues in India are rapid growth of population which adversely affects the natural resources, industrialization, massive intensification of agriculture, pesticides and fertilizers, uncontrolled rate of urbanization, vehicular and industrial emissions and the destruction of forests. According to Visvanathan et al. (2005), environmentally sustainable industrial development is an essential pre-condition in today’s globalized world. Integrating economic growth, social issues and environmental concerns ensures that all the stakeholders are beneficiaries in the overall development process of the concerned society.
The onset of globalization has resulted in economic integration across the world. Regional economies are playing a pro-active role in the integration process through their linkages with the global economic structures and processes. Factors like information technology boom, trade liberalization and creation of trans-national trading blocs have created huge opportunities for the SMEs across the world (UNIDO, 2000). The intensified global competition has forced the multinationals to decentralize their activities, and greater prominence for regional activities has become the order. This has led to the growth in the new initiatives to promote enterprises at the local and regional levels through the SMEs (UNIDO, 2000).

Patrica & Rajshekhar (2007) have mentioned about the strategic challenges faced by SMEs. These challenges can be broadly classified into three categories; firstly Country Specific, secondly Industry Specific and finally Firm Specific. According to them, country and industry specific challenges are considered external factors. The cause of these challenges is the external environment in which the firm is operating and the firm has less control over these challenges. Firm specific challenges are considered as internal factors because these are arising within the firm and the firm has more control on these factors.
2.4 Status of Selected SMEs

2.4.1 Leather and Tannery Industry

The Indian Leather Industry occupies a unique position in the Indian economy in terms of its contribution to employment and export potential. In spite of a strong raw material base, India’s share in the global leather trade is a meager one. As leather industry in India was reserved for small scale sector for a very long time, the level of investment in the leather sector is very low resulting in smaller production base and poor productivity. Obsolete technologies, lack of standardization and poor marketing infrastructure have been other factors associated with the sector not growing to its potential. Given the significance of this industry to the overall health of the Indian economy, its employment potential and historical backlog of technology up-gradation, it has been emphasized by experts that in order to assist and improve its competitiveness in the global market, it is essential for the leather industry to have access to timely and adequate capital in order to up-grade its technology level, and modernize and increase capacity/production.
Leather sector is one of the fast growing industries in India. Leather tanning is considered as highly polluting industry. Most of the tanning units in the country are small-scale units, which cannot afford to spend on pollution control equipment such as Effluent Treatment Plants. In order to reduce burden on the smaller units, a concept of Common Pollution Control facilities such as Common Effluent Treatment Plants (CETP), Treatment Storage and/or Disposal Facility (TSDF) facility have come into practice.

Leather industry and tanning activity in particular all over the world is linked to environmental concerns. In view of the fact that environmental issues are slowly gaining ground and expensive measures would need to be put in place for industries to cope with the stringent norms, an allocation of Rs. 200 crores has been made in the 11th Five Year Plan to meet environmental concerns which would include, inter-alia, establishment, expansion and up-gradation of CETPs, developing secure landfills and other techniques for hazardous waste management using the best available technology.

The sub-scheme of leather parks under ILDP is being proposed during 11th Plan for addressing the infrastructure constraints being faced by the leather industry in the country. The scheme would be assisting the industry in addressing the infrastructure needs of the entire sector in a holistic manner. This would enable the industry in improving its global competitiveness, apart from meeting the regulatory and trade related compliances. The scheme will cover the entire value chain of leather industry i.e. tannery, finished leather products, footwear components etc.

Tanning is the process by which raw animal hides are converted into leather. During this process, the leather is made resistant to biological decay by stabilizing the collagen structure of the hide, using natural or synthetic chemicals (UNEP, 1991).

The pollution load from the tanning activity has been estimated to be 50% more in weight than the weight of the hides processed (Gjerđåker, 1998). Pollution comes from several of the sub-processes, and is both organic and chemical.

The water pollution generated by the wet-processes of soaking, liming and tanning has been subject to most attention. Since hides are organic material, large amounts of organic compounds are released when hides are processed. In addition, around 175 different chemicals are in use for the tanning process in total.
In addition to water pollution, there is also air pollution from the release of dust from the buffing of the leather and from finishing. Solvents from dyes that can be toxic are released. To an increasing extent, solid waste is also a problem because it requires special storage and a lot of space.

According to the CLRI, there are close to 1600 tanneries in India (Chandramouli, 1998). In this study the CLRI counts around 170 tanneries in the Kanpur area. For this study, more than twice this number were found only in one of the tanning clusters in Kanpur. Thus, one can expect that the number of 1600 might represent only half of the total number of tanneries in India, so 3000 tanneries are probably closer to the true figure. The vast majority of the Indian tanneries (80%) are small-scale, only 20% are medium or large scale (Thyagarajan et al., 1994, Varadarjan and Krishnamoorthy, 1993). In the 1990s, Uttar Pradesh (UP) accounted for around 15% of the gross output of the production of Indian leather and leather products (CSO 1990/91-1997/98).

As the last potential explanation to be discussed here of why firms act differently in response to environmental regulations, the attitude of the firms to environmental issues is an important element. Henriques and Sadorsky (1996) found that firms that consider environmental issues to be important are more likely to implement actions that will reduce the environmental impact of their activities. When it comes to the tanning industry, this view has been supported by Odegard (1999) in his study of Brazil. He states that, “The extent to which the tanners comply with the environmental regulations depends heavily on the attitudes of the company directors.” These variations in attitude are related to the economic situation of the tanneries, their size, their markets and the environmental practice of the region where they are located.

To improve the link between demanding customers and firms’ environmental performance, the idea of eco-labeling has been introduced. Eco-labeling schemes are developed to make it possible for the consumer to identify what products are less harmful to the environment than other competing goods within the same product category. “Eco-products” can be identified on the basis of what they are made of or the way in which they were made (Staffin 1996).

### 2.4.2 Pottery/ Ceramic

Ceramics, also known by the name of fire clay; is an inorganic, non-metallic solid component, which is produced by the art or technique of heat and subsequent cooling.
Ceramics is a diverse sector industry and contains several categories of products, including pottery, sanitary-ware, refractories, cement, advanced ceramics and ceramic tiles.

One of the environmental problems associated with ceramics/pottery manufacturing is the emission of acid compounds into the air, arising because of the presence of impurities in the raw materials and/or fuels. González et al. (2002) report that gas emissions into the atmosphere are one of the main environmental impacts in ceramics manufacture. Such emissions may contain particulate matter and gas pollutants of an acid nature, in the form of fluorine, chlorine, sulphur and nitrogen compounds.

The ceramics industry in India came into existence about a century ago and has matured over time to form an industrial base. From traditional pottery making, it now produces sophisticated insulators, electronic and electrical items as well as sanitary-ware, refractories, cement, advanced ceramics and ceramic tiles. Over the years, with the advancement, the industry has been modernising through new innovations in product profile, quality and design to emerge as a modern, world-class industry, ready to take on global competition. The Indian ceramic industry can be broadly divided into two major groups, white-ware pottery and red clay pottery (including terracotta).

Khurja is the single most important pottery cluster in India composed of labour intensive small and medium scale units. TERI report (2001) estimates that the Khurja cluster alone accounts for 25% of the manufacturing units and over 40% of the production. The industry is also energy intensive. The firing of the clay in kilns and dryers account for most of the energy consumption. Fuel used to power the kilns includes gas, electricity, diesel oil, kerosene, coal, wood and cow dung. Of these, wood and cow dung are used in smaller and rural kilns, while coal is probably the most common fuel used by the largest number of units. Electricity is rarely used because of high costs and erratic supplies due to shortages in the country. The fuel of choice is diesel oil or kerosene in the newer oil fired kilns. Gas is not common again due to supply constraints in India. But it is very likely that the availability of gas and its use will increase slowly as more natural gas pipelines are being built. Environmental problems arising from the ceramics industry in India include air pollution from combustion, coal ash disposal, effluents from the clays and possible impact on deforestation where wood is predominant.

Ceramic wares are produced both for the domestic market and for export. But over all export markets are unlikely to be more than 10-15% of total production. There is an
increased import of ceramics in the higher price range and the smaller units face competition from large scale manufacturers also.

The Indian Ceramic Industry ranks at 8th position in the world and produces around 2.5% of global output. The industry provides employment to 550,000 people, of whom 50,000 are directly employed. Gujarat accounts for around 70% of total ceramic production.

According to EXIM bank report (2005), the ceramic products are produced both in organised as well as in unorganised sector. The share of organised sector in total production is around 55%. The organised sector is characterised by the existence of a few large players. Small and medium enterprises (SMEs) account for more than 50% of the total market in India, offering a wide range of articles including crockery, art ware, sanitary ware, ceramic tiles, refractory and stoneware pipes among others. Most of the players are grouped together in clusters.

During 2008, India was the 24th largest ceramic trading nation in the world and accounted for a share of around 0.9% in total ceramics trade. During the period from 2001 to 2008, India’s ceramics trade increased from US$ 143 million to US$ 738 million at a CAGR of 22.2%. The increase in trade was led by rise in imports, which increased from US$ 60.9 million in 2001 to US$ 523.8 million in 2008, at a CAGR of 30.9%. India’s ceramic exports, on the other hand, increased at a CAGR of 12.8% from US$ 82.3 million to US$ 214.5 million.

The ceramics industry is a highly energy intensive sector. Petroleum and raw material products together form the most critical components in the production processes in this sector.

As per the data from CSO, petroleum and clay products account for a share of 15.6% and 12.7%, respectively in the production of ceramic products. Other non-metallic minerals and mineral products, bauxite etc. account for a share of 11.3%, 5.3% and 4.9% respectively.

2.4.3 Glass

Glass in simple terms refers to hard, brittle, transparent material which is commonly used for making windows panes, bottles, container glass, mirror and eyewear. Technically glass is an inorganic product, it is a fusion which is solidified through the glass transition to a
rigid condition without crystallizing. Glass is a transparent or translucent material; it has no crystalline bonding structure but still behaves like a solid.

The exact date when glass was first discovered is still a mystery. Glass has been known to humankind for thousands of years. Glass was used around as a glaze for beads as far back as 4000 BC. Archaeologists have found that Egypt and Mesopotamia made glass articles as early as 2100 BC. One of the oldest methods to make glass products was ‘core forming’, believed to have been practised around 1500 BC.

Glass plays an important role in industry, science, and household domains. The physical and optical properties of glass make it suitable for applications such as flat glass, container glass, optics, laboratory equipment, thermal insulator, reinforcement fiber, utensils and decoratives. Glass is the most eco-friendly packaging media.

Technologists have made the interesting observation that the six elements most commonly used in making glass and ceramics are oxygen, silicon, aluminium, calcium, magnesium, and sodium. Glass happens to be among the eight most commonly occurring elements in the earth’s crust.

The process involved in glass melting is energy-intensive; energy represents overall 15 percent of manufacturing costs. While only about 2.2 mmBtu should be needed to melt a ton of glass, current glass furnaces use between 3.8 and 20 mmBtu. A reliable forecast of future availability and cost of fossil fuels could be of major value in planning and developing glass melting technology. As customer requirements for quality have increased continuously, melting technologies have balanced production quantity with quality, thus increasing energy usage.

Although energy usage for glass melting has been reduced considerably over the last several decades, actual energy consumed in melting glass is still greater than the calculated energy required. Of energy consumed, 70 percent is used to melt and refine glass. Of that 70 percent, 40 percent of the energy from combustion goes to melt raw materials, while 60 percent is lost through furnace walls and hot exhaust gases.

Energy consumption by the glass industry has been reduced to some extent by the development of refractories that resist higher temperature; greater insulation of furnaces; increased combustion efficiency and preheating of combustion air with recovery of waste heat. Further energy savings up to the theoretical limits may be more difficult to obtain, as
the industry is approaching practical limits in energy reduction but continues to make incremental efforts to save energy. Some modified energy saving technologies are available to reduce energy consumption but savings incurred do not justify the capital investment at the current cost of the energy. The combustion-based melting process inevitably pollutes the air with NOx, SOx and particulates; emissions of VOC, heavy metals, crystalline silica, fine particulate and greenhouse gas emissions are concerns as well.

Glass manufacturing is one of mankind’s oldest industries. Glass manufacturers generally consider current glass melting practice to be adequate—efficient and reliable. Yet the process, developed in the 1860s by the Siemens brothers, today lacks the capability to meet demands of 21st century glassmaking. The glass manufacturers must continue to seek
Exhibit 2.3 Dos and Don’ts for the Glass Sector

Dos

- Proper batching (suitable batch composition)
- Improvement of pot furnaces
- Use of static producers in port furnaces
- Improvement of pot arch
- Provision of insulation
- Waste heat utilization
- Facility of soft loan
- Multi-partnership for implementation
- Achieve compliances with statutory environmental standards
- Build up a rapport with expert
- Provide demonstration plants
- Need for awareness and training programmes
- Improvement of annealing lehrs and chambers
- Use collective bargaining power to force better coal quality
- Be selective in what is to be improved
- Carry out process audits
- Need for progress in a step-by-step manner
- Use of advanced instrumentation

Don’ts

- Do not assume that consultant can provide all the answers
- Do not underestimate the competence of local glassmarkers
- Do not try to go for comprehensive solutions at once
- Do not involve in a single problem
- Do not delay
- Do not involve in a single problem
- Do not involve in a single problem

(*Source: The Energy and Resources Institute and Swiss Agency for Development and Cooperation, 2008)
dramatic ways to improve combustion techniques, develop refractories compatible with advanced technologies, regulate quality of raw materials, and develop glass formation process controls.

2.4.4 Lock, hardware and allied industry

The lock industry of Aligarh is very old and traces its history to the era of Mughals. The Aligarh lock industry got a major boost in the times of British rule. It were British who streamlined the lock industry that was once much unorganized.

Locks and keys were known long before the birth of Christ. They are mentioned frequently in the Old Testament and in mythology. In the Book of Nehemiah, chapter 3, it is stated that probably in 445 B.C. when repairing the old gates of the City of Jerusalem they ‘set up the doors thereof, and the locks thereof, and the bars thereof.’

The manufacturing process in lock and hardware industry comprises of a large number of complex steps right from the metal procurement stage. Electroplating, buffing are the main cause of pollution.

Almost all products that are manufactured or contain metal are subject to some type of finishing operation. The metal finishing is carried out by a wide variety of processes and chemicals are used to clean, etch, and plate both metallic and non-metallic surfaces, so as to enhance their appearance and surface properties. Electroplating is one of the several techniques of metal finishing. It is a technique of deposition of a very fine layer of one metal on another through electrolytic process, so as to impart various properties and attributes, such as corrosion- and rusting protection, lustre, enhanced surface hardness, and colour.

Electroplating has a long history in India. Like many other industrial activities, it gained momentum after independence. Modern techniques in electroplating started in early sixties in India, but the first semi automatic plant was set up in 1976 in Mumbai. Since then, the industry has grown steadily without facing any recession. Currently there are more than 600 automatic plants in the country (Comprehensive Industry Document on Electroplating Industry (COINDS), 2007)

The industry is principally dominated by small specialty job shops that cater primarily to larger industries, most metal finishing operations are small, numerous, and highly capital
intensive, there is extreme competition to continually provide quality products and services to their customers at the lowest possible cost. The lack of technological know-how is a serious problem in the small enterprises. In addition, processes used in metal finishing operations are extremely chemical-dependent, making them one of the most heavily environmentally regulated industries.

The primary environmental problems associated with metal finishing and electroplating operations are related to disposal of contaminated water, recovery of metals from the rinse water, and the treatment of wastewater before it is discharged. New technologies have been shown to help meet or exceed requirements for environmental regulation compliance and waste reduction.

Small and Medium Enterprises play an important role in the development of a country. The large scale industries are dependent upon these industries as they sometime work and provide materials to them. They provide large scale employment for the workforces. The definition of SMEs differs from country to country. In India, they are defined on the basis of investment in plant and machinery. Leather and Tannery Industry is one of the important industry in India, though it is considered to be a highly polluting industry, its share in exports is significant. Ceramics/Pottery, Glass, Lock, hardware and allied industries are important industries in India; they are also polluting the environment in one way or the other.
CHAPTER III
LITERATURE REVIEW

3.1 Introduction
3.2 Environment and Environmental Pollution
3.3 Environmental Concerns in Business Organizations
3.4 Sustainable Development
3.5 Environmental issues/ Environmental management practices
3.6 Small and Medium Enterprises
3.7 Gaps in the Existing Literature
Chapter III

LITERATURE REVIEW

3.1 Introduction

This chapter primarily, describes and summaries, on the earlier work carried out and compiled in Reports/Articles/Dissertations/Books/ and Journals in the field of environmental concerns, Small and Medium Enterprises and other areas related to this research. Literature review carried out in this chapter contains following sections. In the first place, a review of studies under the broad theme environment and environmental pollution has been undertaken. This review peruses key studies on Industries in India, types of Industries especially Small and Medium Enterprises, and Industrial Pollution and SMEs. Based on literature survey an attempt has been made to identify the research gaps, which, then has become the basis for this research.

3.2 Environment and Environmental Pollution

Generally speaking, environment means area around something. The term environment has a very wide meaning in the sense that it takes into account all those factors which directly or indirectly have a relevance to the natural surroundings of the human beings. The Encyclopaedia Britannica defines environment as “The entire range of external influence acting on an organism, both physical and biological i.e. other organisms, and forces of nature, surrounding an individual”. Wiktionary, the free on-line dictionary defines environment as “The surroundings of, and influences on, a particular item of interest”. The term environment is often and commonly used as a short term for the bio-physical environment. Wikipedia online dictionary defines the bio-physical environment as “The biotic and abiotic surroundings of an organism, or population that includes particularly the factors that have an influence in their survival, development and evolution”.

Over the last decade, the degradation of the natural environment has become a major concern for scientists, governments, business leaders and the public at large. Environmental degradation is the collateral damage of modern economic growth based on fossil fuel consumption and industrial production. It has been observed that the natural environment of the planet earth has been altered by the activities of modern man; these changes usually
represent a sum total of local influences on the environmental processes and later on they are disseminated over large areas.

Swedish scientist and Nobel Prize winner Svante Arrhenius had predicted well back in 1896 that global warming and climate change would be a result of the human interference with the environment. His prediction has become true and climate change is now disrupting global environmental stability. The Inter-governmental Panel on Climate Change (IPCC, 2007) has concluded that there is now undeniable evidence that climate change is the result of human activities and that urgent action must be taken to avert environmental collapse.

World Bank (2009) studies show that in the developing countries the general state of the natural environment, including air quality, is deteriorating. Chopra et al. (1993) opined that the changing life styles, increasing pace of urbanization, industrialization and infrastructure development are the major elements that have resulted in environmental pollution and degradation. Anbumani (1999) studied in detail and reported that the achievement of sustained and equitable development remains the greatest challenge facing the human race. Although the desirability of development is universally recognized, recent years have witnessed environmental constraints that limit development and cause serious damage to the quality of life for future generations. Bawa and Singh (1987) reported that present age human activities exert enormous influence on the natural conditions of the entire planet. Changes in the flora and fauna of land areas are particularly pronounced. Henson (2006) and DEFRA (2009) stated that climate change is frequently argued to be the greatest environmental challenge facing the world today.

Pollution is a serious problem to the environment and is the contamination of the environment. Environmental pollution or simply pollution is the introduction of contaminants into the natural environment i.e. air, water and land from man-made waste that causes instability, disorder and harm to the ecosystem i.e. physical systems or living organisms. Pollution leads to depletion of the ozone layer, global warming and climate change.

Environmental pollution increasing day by day is one of the major problems for the developed, developing as well as underdeveloped countries. The problems of the environment are no longer being viewed exclusively from the angle of the pollution affecting the industrialized countries but seen rather as a worldwide hazard threatening the