CHAPTER - I

INTRODUCTION AND DESIGN OF THE STUDY
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Natural human activities have now acquired an artificiality due to development of technology, scientific advancement, growth in population and industrialisation disturbing the delicate balance of the biosphere. The most important of the components of the biosphere is atmospheric air without which nobody can survive. Introduction of large amounts of pollutants into the atmospheric air causes serious problems for the life on earth.

Air is a common heritage of mankind to be preserved, conserved and enjoyed by all nations and people. Therefore, it is the duty and legal obligation of all nations to maintain and preserve its purity, for human consumption.

This ‘atmospheric ocean’ is boundary free. Pollution of air may cause adverse effect hundreds of miles away in another area. The cause and effect phenomenon may also cross the national frontiers and may thus assume international dimensions. Therefore, air pollution is an international problem which cannot be tackled in isolation separately by each country. No doubt, air pollution requires national efforts to minimise it but without international cooperation the struggle for environmental protection cannot be won.

Internationally, in 1957 the World Health Organisation attracted the attention of the World community to the problem of atmospheric pollution. Regional European Office of W.H.O. organised Milan Conference to discuss the
hazards of air pollution. A similar conference was organised by the Expert Committee on Environmental Sanitation by W.H.O in 1958. A clean Air Conference was held in London in 1959. A major step for prevention of air pollution was taken in 1972 in the Stockholm Conference on Human Environment. Further, International Institute of Studies, Documentation and Information for Protection of the Environment held an International symposium at Milan in June 1979 which recommended co-ordination of efforts at the international level for the protection of environment across the national borders. In 1979, a major step towards strengthening of international co-operation was taken in Geneva on Long Range Trans boundary Air Pollution.¹

CONSTITUTIONAL IMPERATIVES FOR THE CONTROL OF ENVIRONMENTAL POLLUTION

The Constitution of India 1950 did not make any specific provisions to deal with environmental pollution. Indirectly, one could locate it in Article 47 which reads:

The state shall regard the raising of the level of nutrition and standard of living of its people and improvement of public health as among its primary duties....

For the improvement of public health, it is necessary that the state should be able to provide pollution free environment. It was in the year 1976

that it was thought necessary to make a direct provision for the 'Protection of Environment' in the constitution. This was done by the 42nd Amendment in 1976. Article 48-A was added:

The state shall endeavour to protect and improve the environment and to safeguard the forests and wild life of the country.

Side by side, the same amendment added a fundamental duty to be observed by every citizen in Article 51 A (g):

To protect and improve the natural environment including forests, lakes, rivers and wild life and to have compassion for living creatures.

Thus the constitution makes two-fold provisions. On the one hand, it gives directive to the state for the protection and improvement of environment and on the other, it casts a duty on every citizen to help in preservation of natural environment. The constitutional recipe for the control of environment is good. If the state and the citizens perform their respective constitutional duties, it is submitted that the problem can be controlled largely, if not wholly.
LEGAL CONTROL OF AIR POLLUTION IN INDIA

In India, to begin with air pollution was indirectly controlled by various enactments made by the Central Government\(^2\) and the State Governments.\(^3\) Therefore, there arose a need to introduce comprehensive legislation with the sole object to deal with air pollution. Thus, the Indian Government enacted the Air (Prevention and control of Pollution) Act, 1981.\(^4\) This Act was passed under Article 253 of the Indian constitution for implementing the decisions reached at the 1972 Stockholm Conference, in so far as they relate to the prevention and control of air pollution, to which India is a party.

LAW RELATING TO INDUSTRIAL POLLUTION

There are several enactments which deal with industrial pollution. The important Acts are given below:

1. Indian Penal Code
2. The Indian Fisheries Act 1857
3. The Indian Ports Act, 1908

\(^2\) Examples of Central Government enactments which indirectly cover air pollution are as under:

i. The Boilers' Act, 1923
ii. The Factories Act 1998
iii. The Industries (Development and Regulation) Act, 1951, and

\(^3\) Examples of State legislations relating to air pollution are

i. Calcutta Municipal Act 1951
ii. Delhi Municipal Corporation Act, 1957

\(^4\) Act No.4 of 1981.
4. The Factories Act, 1948  
5. The Merchant of Shipping Act, 1958  
6. The Motor Vehicles Act, 1988  
8. The Air (Prevention and Control of Pollution) Act, 1981.  

The various provisions and salient features of the Acts are furnished in a statement in the following pages 6 & 7.

**STUDIES ON AIR POLLUTION: A REVIEW**

The accumulation of pollutants in the atmosphere and its negative effect has been attracting the researchers of different disciplines all over the world to study the environmental issues. As a result, environmental science has developed into a multi-discipline one and many dedicated specialists, such as environmentalists, engineers, botanists, zoologists, economists and geographers have been applying their expertise to develop this science. Various studies conducted in the field of environment show that physical and cultural environments are important for studying relationship between man and ecological problems. It is tried in the following pages to review the studies in environmental issues and science.

Meteorologists are concerned with atmospheric pollution and its environmental impact. To choose the best environmental area for the location of the air pollution industries, Vital Murty (1983) considered the variables of atmospheric pollution potential. This pollution potential was calculated for
# ACTS RELATING TO INDUSTRIAL POLLUTION AND THEIR FEATURES

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the Act</th>
<th>Related Sections</th>
<th>Offences/Activities Prohibited</th>
<th>Aim/Objectives</th>
<th>Maximum penalty provided</th>
<th>Controlling Authority</th>
<th>Where to file the case</th>
<th>Minimum Punishment/Penalty</th>
<th>Who can file the suit/case</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Indian Penal Code</td>
<td>Chapter XIV &amp; secs. 323, 325, 304-A, 425-43</td>
<td>Public nuisance mischief, rash and negligent acts.</td>
<td>To check air, water, land and noise pollution</td>
<td>2 years imprisonment, w/s 430 imprisonment upto 5 years</td>
<td>CJM/I class Magistrate</td>
<td>1 Class Magistrate</td>
<td>Not prescribed</td>
<td>Any person/police officer/Magistrate on his own</td>
</tr>
<tr>
<td>2.</td>
<td>The Indian Fisheries Act, 1897</td>
<td>Whole Act consisting of seven sections</td>
<td>To put any poison, lime or noxious materials into any water (sec. 5)</td>
<td>To check water Pollution</td>
<td>2 months imprisonment or fine or both.</td>
<td>Dept. of Fisheries/Police Authority</td>
<td>1 Class Magistrate</td>
<td>Removal of nuisance</td>
<td>Police Officer/Other persons empowered by the State</td>
</tr>
<tr>
<td>3.</td>
<td>The Indian Ports Act, 1908</td>
<td>Sections 13, 21, 23, 27.</td>
<td>Throwing ballast or Rubbish etc. in water (section 21)</td>
<td>To Check water pollution</td>
<td>Imprisonment upto 2 months or fine upto Rs.500</td>
<td>Conservator of port</td>
<td>I or II class Magistrate</td>
<td>Not mentioned</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>The Factories Act, 1948</td>
<td>Whole Act Particularly Section 12 and Chapters III, IV &amp; X</td>
<td>Emission of air Pollutants in excess of prescribed standards; Improper handling of hazardous wastes</td>
<td>To control air, water, noise Pollution and proper handling storage etc., of hazardous wastes</td>
<td>Closure of factory/ imprisonment upto 37/ years Fine upto Rs.2 lakhs</td>
<td>Labour and Industry Department FODS</td>
<td>CJM/I class Magistrate</td>
<td>Order for removal of nuisance. Fine upto Rs.10,000</td>
<td>Chief-inspector/any Person with the consent of inspector/state (section 105)</td>
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<td>5.</td>
<td>The Merchant of Shipping Act, 1958.</td>
<td>Specially Chapter X-B, XI-A.</td>
<td>-</td>
<td>To check water Pollution by oil</td>
<td>Recovery of damages done by oil Pollution</td>
<td>Director General of port Authorities</td>
<td>High Court of the state.</td>
<td>-</td>
<td>The Central Government.</td>
</tr>
<tr>
<td>7.</td>
<td>The Water (Prevention and Control of Pollution) Act, 1974.</td>
<td>Whole act.</td>
<td>Discharge of poisonous, noxious or polluting matter into well, river, stream or land (section 24,25,26)</td>
<td>Prevention &amp; control of water pollution and maintain or restore wholesomeness of water and creation of Boards for the above purposes</td>
<td>Imprisonment for 6 years with fine (section 41(2)(i) for contravening section 32/33; 7 years with fine w/s 45 subsequent conviction for contravening sections 24, 25 &amp; 26</td>
<td>Pollution Control Board</td>
<td>Metropolitan Magistrate of class/CJM/ Magistrate</td>
<td>Under sec. 41(2) not less 1 year, under sec. 45 not less than 2 years</td>
<td>The Board or any officer authorised by it. (or) any person with the consent of board and if a sixty days notice is served.</td>
</tr>
<tr>
<td>Sl. No.</td>
<td>Name of the Act</td>
<td>Related Sections</td>
<td>Offences/Activities Prohibited</td>
<td>Aim/Objectives</td>
<td>Maximum penalty provided</td>
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<td>8.</td>
<td>Air (Prevention and Control of Pollution) Act, 1981</td>
<td>Whole Act</td>
<td>Industries not to allow emission of air pollutant in excess of prescribed standards (section 22) other related sections 20 &amp; 21</td>
<td>Prevention/ control abatement of air pollution</td>
<td>Six years/seven years and fine of Rs.5000 per day (section 37) for contravening sections 21, 22 &amp; 31-A.</td>
<td>The State Pollution Control Boards</td>
<td>Metropolitan Magistrate/ 1 class Magistrate/ CJM Section 23.</td>
<td>Under sec. 37, 1 year &amp; 6 months.</td>
<td>- do -(section 43)</td>
</tr>
<tr>
<td>9.</td>
<td>The Environment (Protection) Act, 1986</td>
<td>Whole Act</td>
<td>Allowing emission or discharge of environmental pollutants in excess of prescribed standards (section 7) violating the procedural safeguard in handling the hazardous substances (section 8)</td>
<td>Protection and improvement of the environment and for matters connected there with. Regulate the management and handling of hazardous substances and hazardous chemicals</td>
<td>Imprisonment for five years or fine upto one lakh rupees or both. For contravention for one year imprisonment may extent to 7 years (section 151).</td>
<td>The Central Govt.</td>
<td>Metropolitan Magistrate/ Magistrate/ 1 class/CJM</td>
<td>Not provided</td>
<td>The Central Govt. or any other authority/ officer authorised by Govt. or any other person with the consent of the Central Govt. after a notice of 60 days (section 19).</td>
</tr>
</tbody>
</table>

Source: Manickavasagam .V. - Environmental Protection: Some Legal Aspects, Chartered Secretary, May 1998.
inland and coastal cities. High value of pollution potential was found in the inland cities and it was very low in the coastal cities because of the stable atmosphere in the inland area and very well mixed air circulation in the coastal zone. Thus his study recommends the coastal area as the suitable place for air polluting industries.

H. Stafford (1985), when addressing the question whether the environmental regulations by the government organisation play any role in location of the polluting industries, found that entrepreneurs consider the raw-materials, labourers, market facilities and power supply the primary factors, while the environmental regulations are considered as secondary factor.

Air pollution increases the concentration of greenhouse gases in the atmosphere and it results in global warming. Global warming may cause melting of continental ice or thermal expansion of ocean water, thereby resulting in sea level rise and consequent environmental problems in the coastal zone. Most of the global warming studies state that the temperature increase is mainly due to the emission of carbon dioxide (CO$_2$) from the burning of fossil fuels (Hansen et al 1981), J. Charney 1979).

Wilson (1978) observed that there was a great spurt of CO$_2$ injection into the atmosphere between 1860 and 1890, because of vast forest cleaning in temperate belt. Cleaning of forest now going on in the tropics may further accelerate the release of CO$_2$ in the atmosphere (Gribbin 1983).
Rycroft (1990) argued about the depletion of Antarctic Ozone layer by atmospheric pollution and the subsequent causes of global temperature increase. The warming of the atmosphere can also be induced by the substantial increase in other green house gases such as carbon monoxide, nitrogen oxide, methane, ozone, ammonia, sulfur dioxide and chlorofluorocarbons (Edward Bryant 1987).

Eijchiro Fukai (1969) estimated about 0.9°C to 1.5°C temperature rise in the Japanese cities of Tokyo, Osaka and Kyoto in the period of 1885 - 1935.

STATEMENT OF THE PROBLEM

Pollution is caused by industries, automobiles, domestic wastages and fire wood smoke from kitchen. Among the industries which pollute the atmosphere, chemicals, fertilizer, refinersies, cement industries are note worthy. The extent of and causes for pollution, its effects on workers and community at large and control measures undertaken by the industries form the nucleus of this present research venture.

NEED FOR THE STUDY

Abundant evidence has established that air pollution damages vegetation, accelerates the deterioration of materials, soils property, affects climate, reduces visibility and solar radiation, aggravates public relations, adds to production costs, contributes to safety hazards, interferes with the comfortable enjoyment of life and property and is a definite factor in human and animal morbidity and mortality.
On the other hand there are three major motivating forces which support the battle against air pollution. The first is economic, the second is social, and the third is medical and all the three are interconnected.

Various legislations have been enacted to control the environmental pollution. Some of the enactments are: the Indian Penal Code, the Factories Act, Air (Prevention and Control of Pollution) Act and Environment (Protection) Act. But the irony is that inspite of all these measures the pollution problem continues to remain. There is an urgent need to identify the causes of the problems and to rectify the situation at the earliest from further deterioration of the environment.

OBJECTIVES OF THE STUDY

The ambitious objectives of the study are set forth below:

1. To underscore the significance of air pollution control in the changing industrial scenario.

2. To study the provisions of the Pollution Control Act in respect of air pollution control.

3. To examine the causes of Air Pollution in the study units

4. To study the pollution control measures undertaken by different industries.
5. To ascertain the effects of air pollution on the workers and the community at large.

6. To study the role of TNPCB in control of air pollution in industries in the State of Tamil Nadu.

7. To suggest suitable measures that are required to be taken to bring down industrial pollution (air) and for the conservation of natural resources through promoting suitable technologies.

HYPOTHESES

The following null hypotheses have been formulated for the study.

i. There is no association between 'the type of unit' and 'the air pollution control operation and maintenance staff', 'the employment of air pollution control consultant', 'the sources of the emission', 'the air pollution control measures provided in the unit', 'the air pollution control measures under operation', 'the complaints against the sample unit', 'the action taken by the TNPCB over the complaints', 'the green belt developed within the sample unit'.

ii. There is no association between 'the designation of the employee' and 'the usage of protective equipments by the employee', 'the adequacy of protective equipments given to employee', 'the employee suffering from disease', 'the prevalence of specific odour', 'the Gases and dust reaching
the ventilation of the sample unit’, ‘the smoky atmosphere over the
sample unit’, ‘the training given to the employees’.

iii. There is no association between ‘the experience of the employee’ and
‘employee suffering from disease’.

iv. There is no association between ‘the type of unit’ and the opinions of
public about pollution such as ‘the gases, dust and soot reaching house’,
‘the prevalence of specific odour’, ‘the illness among the people from
public’, ‘the gases and dust affecting animals’, ‘the dust and gases reach
the ventilation of the flat’, ‘the dust resting over the washed clothes in
the yard’, ‘the smoky atmosphere’.

**RESEARCH DESIGN AND METHODOLOGY**

Although there are a number of major industrial units in Tamil Nadu,
the units which cause air pollution belong to chemical, petroleum refining,
fertilizer and cement groups. Hence the following sample units are taken for
the study:

**Sugar**

1. Sakthi Sugars Limited - Bhavani - Erode District.
2. Maduranthakam Co-operative Sugar Mills limited - Padalam
   Kanchipuram District.
3. Madura Sugars - Pandiarajapuram, Madurai District.

Cement

7. India Cements Limited - Sankari - Salem District

Thermal Power Station


Distillery

10. Sakthi Sugars Ltd., Distillery Division - Sakthinagar - Erode District.

Fertilizer

Refinery


Petro Chemical


Pesticide


Pharmaceutical

17. TTK Pharma Limited - Pallavaram - Chennai.

Dye


SAMPLING DESIGN

A total of 190 employees, 190 members from public and 19 physicians for the 19 sample units were contacted for this study. Area sampling method has been adopted for choosing the sample industrial units. The location of Tamil Nadu state in the Union of India is shown in Fig.1.1. The location of sample units selected for this study in the state of Tamil Nadu is shown in Fig.1.2. Table - 1.1 shows the sampling distribution.
FIG. 1.2

LOCATION OF SAMPLE UNITS IN TAMIL NADU
TABLE - 1.1

SAMPLE DISTRIBUTION

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Category</th>
<th>Number of Samples</th>
<th>Units</th>
<th>Employees</th>
<th>Members from Public</th>
<th>Physicians</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Sugar</td>
<td></td>
<td>6</td>
<td>60</td>
<td>60</td>
<td>6</td>
</tr>
<tr>
<td>2.</td>
<td>Cement</td>
<td></td>
<td>2</td>
<td>20</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>Thermal</td>
<td></td>
<td>1</td>
<td>10</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>4.</td>
<td>Distillery</td>
<td></td>
<td>2</td>
<td>20</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>5.</td>
<td>Fertilizer</td>
<td></td>
<td>2</td>
<td>20</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>6.</td>
<td>Refinery</td>
<td></td>
<td>1</td>
<td>10</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>7.</td>
<td>Petro Chemical</td>
<td></td>
<td>1</td>
<td>10</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>8.</td>
<td>Pesticide</td>
<td></td>
<td>1</td>
<td>10</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>9.</td>
<td>Pharmaceutical</td>
<td></td>
<td>2</td>
<td>20</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>10.</td>
<td>Dye</td>
<td></td>
<td>1</td>
<td>10</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>19</td>
<td>190</td>
<td>190</td>
<td>19</td>
</tr>
</tbody>
</table>
COLLECTION OF DATA

Both primary and secondary data have been collected for the study. Primary data have been collected from the officials of the units, workers, physicians of the hospitals attached to the industries and the general public living around the polluting units.

Secondary data have been collected from the records of the study units, reports of the Tamil Nadu Pollution Control Board (TNPCB), books, journals and published documents.

TOOLS FOR COLLECTION OF DATA

Separate interview schedules were constructed to collect the required data from the industries, workers, physicians and general public.

The interview schedules administered to the sample units contain questions regarding its location, sources of emission, air pollution control measures provided, treatment of solid waste, compliance of Air Act, complaints regarding pollution.

The interview schedules administered to the workers contain questions regarding the personal protective equipments and other safeguarding facilities, the health problems faced by them and the treatment given to them by the organisations.
The interview schedule administered among the physicians contain queries relating to the types of cases attended by the physicians, the number and nature of cases and the treatment given to the employees.

The interview schedule administered to the general public consists of questions regarding the hazards they face from the polluting units, diseases contacted, resistance to the units and suggestions to get rid of the problem.

Copies of all the interview schedules are enclosed at the end.

FRAME WORK OF ANALYSIS

The study has been both descriptive and analytical. Simple percentage analysis, chi-square test and Pollution index analysis have been used in the study.

Chi-square technique has been used to test the hypotheses formulated for the study.

Pollution index analysis was carried out, after constructing a pollution index exclusively for this study. To ascertain the polluting nature of the sample units, weighted scores were assigned to various factors and on the basis of the scores secured sample units are identified into three categories viz., less polluting, moderately polluting and highly polluting.
STUDY AREA AND STUDY PERIOD

The area of the study is restricted to Tamil Nadu, a state in the Union of India.

Primary data were obtained from the respondents through interview schedules during the two years period 1996 and 1997.

The secondary data pertained to the financial years 95-96 and 96-97.

LIMITATIONS OF THE STUDY

Every research study suffers from errors and limitations. Some of these are inherent in the research design while some others become part of the study during various stages of operation. The present study is subject to the following constraints and limitations.

1. The researcher had to undergo a number of ordeals to obtain the information from the Tamil Nadu Pollution Control Board.

2. Though the study units granted permission to meet its employees and physicians, the executives were reluctant to part with certain information regarding air pollution.

3. The number of employees and the general public contacted for the study was 20 (10 employees and 10 public) per sample unit. Hence, the findings may not be cent percent correct in view of the sample size.
CHAPTER SCHEME

The present study entitled "Air Pollution Control in Industries in Tamil Nadu - A study on Legal Aspects" has been organised into seven chapters. The present chapter identifies and states the problem of the study in relation to Air Pollution Control. It also deals with the research design including objectives of the study, need for the study, methodology and tools employed, sampling design, frame work of analysis and organisation of the report.

Chapter II titled "Importance of Air Pollution Control" presents a vivid picture of the nature and impact of air pollution from industries in Tamil Nadu.

Chapter III captioned "Air (Prevention and Control of Pollution) Act, 1981 - An overview" discloses the various provisions and salient features relating to air pollution, its prevention and control.

Chapter IV titled "Compliance with the provisions of the Air Act by the study units" discloses the information regarding location of the sample unit, sources of emission, air pollution control measures provided in the unit, consent obtained from pollution control board, complaints regarding pollution and the green belt developed within the sample unit.

Chapter V captioned "Opinions of Employees, Public and Physicians regarding air pollution" discloses the awareness among people regarding air pollution and its effect on human health.
Chapter VI titled "The Role of Pollution Control Board (PCB) in Air Pollution Control" presents a clear picture of the various functions and activities of the Pollution Control Board to ensure pollution free environment.

Chapter VII brings the research report to a logical conclusion by highlighting the summary of the survey findings and by providing valuable suggestions.