

## **Chapter – 1**

# **Introduction, Research Methodology and Review of Literature**

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# INTRODUCTION, RESEARCH METHODOLOGY AND REVIEW OF LITERATURE

### 1.1 Introduction

Rapid and all-round economic development is the prime and important objective of each and every country in the world. Hence, the efforts are being made by many countries of the world to begin a variety of productive or economic activities included in the productive sectors like primary, secondary and tertiary. The world economic history reveals that the countries that have achieved rapid development of industry or secondary sector, they have been emerged out as economically developed countries. The role of development of tertiary or service sector in materializing the goal of rapid economic development also enables to offer superior standard of living to the citizens of country and also facilitates to emerge out as most economically developed countries and thereby economic supremacy in the world economy as a whole.

However, economic development and the environment are negatively correlated. The rapid economic development rapidly deteriorates the environment and vice-versa. Hence, the process of economic development should take due care of the environmental protection. The world economic history adequately shows that much attention was not paid towards control of environmental degradation, while materializing the goal of rapid and all-round economic development by the countries concerned-Environment was totally neglected in the process of economic development. This was resulted in environmental pollution to a greater extent and its very adverse effect on the flora and Fauna and human beings. The growing severity of environmental pollution and its evil consequences increased the need for serious think of environment and its various dimensions.

Hence, environment in general and Environmental Economics in particular have become part and parcel of living things, in general and human beings in particular after 1970's to protect environment and arrest environmental degradation, many laws, acts, rules have been enacted across the world; and attempts are being made to enforce them. This needs to examine the state of environment and arresting of its rapidly growing deterioration.

As industries are so much important in achieving rapid and all round economic development. They are also the major and important contributor in the deterioration of the environment. Hence, control over the industries, and their stick up to environmental pollution control is so much significant. Therefore, the study of industrial efforts in the protection of the environment, and their attempts to implement provisions in environmental laws, acts, rules, otherwise this can be promote the intensity of environmental pollution and damage to the Flora, Fauna and human resources. It is against this over all background, the present study intends to examine the environmental audit of industries as an attempt to protect the environment and its degradation.

Sangli district is one of the developed districts in Maharashtra. Industrial development of this district is significant one. Likewise, industrial development has a special place in Sangli- Miraj-Kupwad. Hence, the present study attempts to analyse empirically in Sangli district for the period from 2001-2002 to 2007-2008.

## **1.2 Concept of Environment Audit**

Environmental Auditing is a management tool designed to provide information on environmental performance to the right time. According to Rajaram," Environmental auditing is a series of activities undertaken on the initiative of an organisations management to evaluate its environmental performance "An environmental audit is a systematic means of providing environmental management

information to all levels of management for a variety of purposes. The term environmental audit is used to refer to a number of different information and assessment activities consisting of a technical review of compliance with pollution control and waste control legislation, a management review of management procedure, record keeping, compliance with legislation, company policies, programmes and other requirements and due diligence review. That consists of likely cost of implementing pollution control and site recommendation actions. An environmental audit represents management tool comprising a systematic, documented periodic and objective evaluation of the performance of the organisation, management system and process designed to protect the environment with the aim of facilitating management control practice, which may have an impact on the environment, assessing compliance with environmental policies. The regulation specifies that an audit should include the steps such as planning of the audit activities, review of the environmental protection policy of the company, assessment of the organisation, management and equipment, gathering of data and all relevant information, evaluation of the over all performance, identification of areas for improvement, internal reporting to the top management.

As per the notification of Ministry of Environment and forests, New Delhi dated 13<sup>th</sup> March 1992. It is obligatory to submit the environmental audit report by the industries to the State Pollution Control Board. Every person carrying an industry operation or process requiring consent, under section 25 of the water (prevention and control of pollution) Act 1974 (6 of 1974) or under section 29 of the Air (Prevention and Control of Pollution) Act. 1981 or both on authorization under the hazardous wastes. (Management and handing rules 1998 issued under the Environment (protection) Act. 1986 (29 of 1986) shall submit an Environmental Audit Reports for the financial year ending the 31<sup>st</sup> March in form V to the concerned State Pollution Control Board on or before the 15<sup>th</sup> day of every year beginning 1993.

### **1.3 Statement of the Problem**

Now-a days, the environment has become the part and parcel of the living things in general and human beings in particular. The efforts of the people to materialize the goal of rapid and over all economic development has caused a serious problem of environmental pollution and their by its evil consequences and damage to the environmental and human resources. Hence, control of environmental pollution has become more urgent and necessary. As industries have been contributing significantly to the environmental pollution and its bad effect, their efforts to arrest environmental pollution is necessary to study urgently. Environmental audit is a tool, which facilitates to access the endeavours of the industries to control environmental pollution. Hence, this study intends to examine the environmental pollution control efforts reflected in environmental audit forms as well as others.

Sangli district is one of the industrially developed districts in general in Maharashtra, and in particular in Western Maharashtra. In 2007, the total number of industries in Sangli district was 3038. Its composition consisted of 1% large scale industries (31) 0.6% medium scale industries (15) and 98.5% (2992) small scale industries of which the district has 6% red category and 13% orange and 81% (Green) category industries. This demands to study the efforts of industries in Sangli district to control the environmental pollution as reflected in their environmental audit. Likewise, Sangli- Miraj- Kupwad MIDC has also played a pivotal role in industrial development. It had in all 887 industries of various categories in 2007.

### **1.4 Significance of the Study**

The importance of the present study is described as below.

- 1 The present study will be an addition to research in Economics of Environment, which is an important and applied branch of main stream Economics.

- 2 The Concept of Environment audit is basically a new concept that has originated recently. This study will be of great use in understanding the meaning of environmental audit and its theoretical aspects to the students and researchers.
- 3 The study will highlight the efforts of the industries in controlling environmental pollution, its further need and direction.
- 4 This study will be a guide to the people about the extent of environmental pollution, through industrial activities and precautions to be taken by them to avoid its evil consequences.

### **1.5 Hypothesis of the Study**

The present study will attempt to test the following hypothesis.

The honest and rigorous efforts by the industries to enforce provisions in environmental audit will help in protecting the environment, particularly the human beings.

### **1.6 Objectives of the Study**

The important objectives of the present study are enlisted below.

1. To study the concept of environmental audit and its various aspects;
2. To examine endeavours of industries in Sangli district to control environmental pollution;
3. To assess awareness of industries about environmental audit and control of environmental pollution;
4. To study the impact of environmental audit on the environment particularly human beings;

5. To identify difficulties in the implementation of environmental audit and suggest measures on the same.

### **1.7 Data Base and Research Methodology**

The present study intends to study the attempts of industrial units in Sangli district to control environmental pollution. The study examines the attempts of industries so as to control the environmental pollution through their stick up in enforcing provisions in various environmental protection laws, acts, rules, etc. and environmental audit. This shows to what extent the industries have succeeded in eliminating environmental pollution. The study also highlights the impact of growing environmental pollution on the quality of environment especially human resources. An attempt is also made to assess the honesty and rigorousness in implementing provisions in environmental audit.

The present study depends on the secondary data. The secondary data about economic development of Sangli district, contributions of different productive sectors, in its growth, place of industries in development, types of industries, regularity in submitting environmental audit reports and so on has been collected from the publications like. Socio-Economic survey Reports of Maharashtra State Pollution Control Board, Sangli-Miraj- Kupwad Municipal Corporation and Ministry of Environment and Forest, Government of India, Government of Maharashtra, District Industrial Center.

In 2007, there were in all 3038 industries in Sangli district of which 6% (130) were red industries, 13% (389) orange industries and 83% (2479) Green industries consisting of large scale, medium scale and small scale industries. The present study emphasis on studying only red category industries (130) which are most polluting one. Hence, the study takes a non probabilistic sample of 30% of the red industries, which stood at 17. It was stratified as 2 (23) large scale, 2 (14) medium scale industries and 13 (132) small scale industries.

The collected secondary data has been classified and tabulated in the light of hypothesis, objectives and chapter scheme. The statistical tools like mean, standard deviation, compound growth rate, correlation and regression have been employed in processing of the data. At the same time the use of computer softwares like excel, SPSS was made as per the necessity and requirements.

This study makes use of parameters like district economic growth, composition of growth, composition of industries, environmental purity attempts to control pollution etc.

### **1.8 Chapter Scheme**

The chapter scheme of the present study is as follows.

- Chapter – 1 : Introduction, Research Methodology and Review of Literature
- Chapter – 2 : Environmental Audit in Theoretical Perspective
- Chapter – 3 : A Profile of Economic Growth and Industrial Development of Sangli District
- Chapter – 4 : Environment Audit : An Empirical Analysis of Industries in Sangli District
- Chapter – 5 : Conclusions and Suggestions

### **1.9 Review of Literature**

The important research studies relating to my research topic have been reviewed as follows.

'Vijay Pithadia' (2000)<sup>1</sup>, Reader in Management has explained the usefulness of environmental audit in environmental accounting. According to him, the concept of environmental accounting and auditing may be new for western accounting thinkers. He has analysed



environmental Management programme to develop perspective on the diversity in audit reporting techniques, formats and approaches to provide clear and appropriate disclosure of audit findings. In his research article, he makes the study of conducting audits of highly sensitive situations for outside counsel.

Thomas E. Simpson, Charles H. Grand (1993)<sup>2</sup> discuss the choice of internal auditor in the development of environmental standards. They focus on current state of standards, which are being developed to address environmental auditing, certification or environmental auditor and reporting and disclosure of environmental information.

Ron Black (1998)<sup>3</sup> is an internal auditor who has introduced a new leaf in environmental auditing namely "compliance". Compliance or environmental Management system, which has created five realities. Those are Broadness of audit, Integration of external audit to the real business organisation, spread involvement of personnel, emphasis on certification and merging roles of internal auditor and environmental auditor are merging into one. According to him, "compliance" is now only element in broadened environmental auditing landscape.

Bruce Mecuag (1998)<sup>4</sup> considers Environment audit as a bonafide, which may nearly so important as to asking how it is helping in organisation. In his article, he deals with Control-Self-Assessment (CSA), assurance strategies and missions of an audit programme. He discusses the provision of assurance to management, staff, the board and others on wide variety of end-results of business. Objectives in including compliance policies, reliable financial information and economy and efficiency as a mission of an audit department.

K. Elderly <sup>5</sup> discusses environmental audit as scientifically testable method to successful planning assessment and management of impact from development projects. According to him, guidelines

of an auditable Environment Impact Statement (EIS) of impact statement (EIS) are the mirrors of the structure of the research procedure undertaken for the project and also assist in the monitoring procedure and test the accuracy of impact predictions.

McKinney, Michael M. Steadman (1998)<sup>6</sup> have defined environmental audit as a self-initiated voluntary inspections of a companies facilities and records to evaluate and identify compliance with environmental regulations. They explain the scope of an environmental audit with compliance, operational to controls with regulations protecting to the air, water and soil. According to them, environmental audit might be dedicated to issues governed by review of compliance with several statutes. They also give emphasis on environmental protection Agency as a public disclosure requirements, self-requirement in the form of stable public access laws, Freedom of Information Act and privilege issues like environmental attorney, environmental engineers or external Common Personal Assistant (CPA) to conduct environmental audit voluntary.

Environmental Audit : Theory and Practices, article by Josephine Malbty (2004)<sup>7</sup> discusses the mandatory nature of environmental audit. In his article, he discusses the role of regulating standards, individual practitioners and environmental consultants. While he discussing the role of environmental consultant he discusses the background and their approaches to the audit of environmental consultants. The result of questionnaire survey of environmental consultants can assert to what kind of audit work they do and what their views are about the nature of the audit. Environmental consultant also examines the competing and incompatible views of environmental audit- audit as managerial aid and audit as an independent critique of environmental performance.

Lawrence B. Cachil (1998)<sup>8</sup> an internal auditor discusses environmental audit on the background of ISO 14000. According to him, traditional environmental compliance audit modified to better

address. Environmental Management system issues with expanding few value added Environment Management system. Audit activities like performing ISO-14000 Fitness tests, developing regulatory calendars and compliance of self assessment checklists etc.

Robert R. Richard (1998)<sup>9</sup> internal auditor makes the comparison between ISO-9000 and ISO-14000 in terms of elements. Standards system. Documentation, need and expectation of stockholders. He also describes auditors qualification in the guidelines, education and work experiences, auditors training and personal attributes and skill.

In one more attempt in "Environmental Management system and ISO – 14000 " article by M. H. Fulekar (1998)<sup>10</sup> discusses issues of environmental management system like environment audit on the background of ISO-14000. ISO–14000 provides guidelines for basic elements of environmental audit, audit procedure, general guidelines for environmental auditing, qualification criteria and registration work.

Russell J. P. (2007)<sup>11</sup> in 'For know and follow ISO–190011 gives auditing principles, those are (a) Ethical conduct (b) Faire presentation (c) Due professional care (d) Evidence based approach and (e) Independence are the five principles of ISO–190011.

Dr. Rajeev Sadhan in his research article, Environmental Management and ISO-14000 published by "Research Port" (2008)<sup>12</sup> describes environmental audit as a key part of environmental management. As a component of ISO-14000 series, he highlights Environmental audit, audit procedure auditors criteria, audit management & environmental review, site assessment, performance evaluation etc.

Mr. Rajendra Badtiwale (2008)<sup>13</sup> in his article "Environmental Management System" describes environment audit as the basis of determining an organization's environmental objectives and targets.

Moreover, Environment audit is a document to identify the actual and potential environmental impacts of an organization's operations.

R. M. Mehta and V. K. Sharma (1996)<sup>14</sup> in their article give emphasis on the need to adopt environmental audit as a self-assessment and monitoring tool with focus on environment and sustainable development. They also discuss pre audit activities, post-audit activities in a very practical manner and also highlight advantages.

The Journal of Industrial Pollution Control fully discusses the various tools and techniques of pollution control. Shradha Dubey and P. S. Dubey (2002)<sup>15</sup> consider environmental audit as a successful ecotechnological tool and also a snapshot of one segment of management responsibility. In his research paper, he summaries the over all picture of environmental care, right from management to energy saving after environmental auditing. He also examines the significance of technically sound "Green Belt Development" programme. He has also introduced "Environmental Performance Evaluation Matrix" to express the comparative changes in performance, which basically reflects how serious was the management in accepting and implementing the recommendation of yearly environment statement and audit report.

Mr. A. K. Awasti (2002)<sup>16</sup> discusses "Environmental issues in India" programme. His article attempts to address the variety of issues, which are likely to arise. He explains audit as a part a corporate governance. He has mentioned the utility of environment audit for both intra-generational and inter-generational equality, economy and efficiency in resources use and effectiveness of public policy. He also highlights origin and legal issues of environmental auditing in India and United States as well, need and objectives of environmental auditing and also makes the difference in accountants and auditors problems, modalities and information requirements.

E. E. Okafar, A. R. Hansen and A. D. Hassan (2008)<sup>17</sup> discuss environmental audit as a part of corporate responsibility. As a part of corporate responsibility, Environmental audit measure, how well organisation, management and equipments are performing with the aim of management to safeguard the environment. They also highlight the key objectives of environment audit and also give importance to establish a baseline against future audit as a requirements of successful audit.

B. Padma, S. Rao and Ram Babu (1999)<sup>18</sup> discuss environment audit process as an opportunity for cleaner production system and also gives suggestion of inclusion of environment audit in study. In their article, components of environmental audit are categorised as a process audit material audit, Energy audit, wastewater audit, environment motoring system audit, health and safety audit,. They adopt a very particle view to discuss the components of environment audit, procedure of audit and finally give recommendation about the structure and procedure of audit.

S.D. Badrinath and N. S. Raman (1993)<sup>19</sup> discuss environment audit as a effective pragmatic management tool. In this article, they empirically assert that environment audit practices help in industry to increase its productivity. They also highlight material audit, energy audit, Health and safety audit with certain methodology and authors give suggestions as a part of environmental audit.

"Environmental Audit in Thermal Power Plants" one more article by N. S. Raman and N. Narayan Rao (1994)<sup>20</sup> give details of the aspect of power audit relevant to thermal plants. Environmental audit elements in thermal power plant comprises electrical load management, power factor management, Transformer and distribution system, induction of motor pumps and fans, variable speed drivers, compressed air system, cooling towers, illuminiun system and boilers. Environment audit of a thermal power plant includes management of ash handling and effluent discharge, coal, petroleum product

conservation, water and waste audit and health and safety audit. They also take the review of initial attempts to establish the practices of environmental audit especially in thermal power plant.

Mr. S. K. Jain (1995)<sup>21</sup> adopts a very practical approach to explain procedure of ambient air Monitoring. According to him, a typical procedure is followed by internal auditor to ambient air monitoring. Air monitoring is a site inspection and review of the quality assurance system is used for total measurement system, which comprises of sample collection, sample analysis and data processing and checklist can be prepared for individual parameters. In performance audit on site the auditor usually measure a reference material value of composition, which involves i) Audit of flow rate, for sample collection. ii) Audit process using reference sample iii) Audit data processing, for SPM involves a) Audit of clean filter weighing, b) Audit of flow rate calibration, c) Audit of exposed filter weighing, and d) Audit data processing.

Pallab Choudhary (2002)<sup>22</sup> explains environment audit with reference to boil and roller bearing industries. Due to increasing complexity of the management. Bearing industries gone for formal process of auditing covering material and energy consumption, level of concentration of SPM, in the ambient air, noise pollution level and physical, chemical and bacteriological characteristics of raw and treated effluent.

Toefer, Klaus (2004)<sup>23</sup> Executive Director of United Nations Environmental Programme (UNEP) shares his views of environmental auditing with the concept of sustainable development. He gives importance to the environment audit as a supporting efforts to achieve sustainable development.

According to him, the connection between environmental threats and governance becomes vividly apparent. In this content United Nations Environmental Programmes (UNEP) greatest area of interest

is the growing importance of environmental auditing at national level and working group of environmental Auditing (WGEA) in particular. The work of environmental auditors provide an valuable sources of independent, legitimate and credible information that accesses the efficiency and effectiveness of environmental policy at the national level. Lastly, in few words he expresses his view on capacity building of environmental auditing. He recognizes that the collaboration between national agency for environmental protection and working group of environmental auditing. Through this collaboration, we plan to improve our environmental auditing methodology and training material. Effective capacity building in environmental auditing can provide countries the tool and knowledge. They need to make informed decisions, bring about positive changes and ultimately contribute to the sustainable development.

The foregoing review of research studies clearly and adequately reveals Environmental Audit is a new concept and a tool of environmental management. The studies reviewed above are basically theoretical and conceptual and rare in empirical evidences. More importantly, these studies have been mainly undertaken in Environmental Science and Commerce and Management totally lacking in Environmental Economics. Hence, the study of Environmental audit in the context of industry sector has special importance in Environmental Economics. It is also found that no attempts have been made to study financial implications of environmental audits for the industries, as well as its impact on the environment. Therefore, this study is of urgent necessity in Environmental Economics. As Sangli district has significantly developed industry sector, the present study takes into consideration industry sector of Sangli district during the latest period from 2001 -02 to 2007-08.

### **1.10 Concluding Remarks**

Environmental audit is a new concept and an important tool of environment protection being used in many countries of the world today. It is also being practiced in India in general, and Maharashtra in particular. It is an important element being studied in Environmental Economics. The present chapter adequately proves that not much studies have been undertaken in Environmental Economics. In this backdrop, the present study is a first attempt of that kind in Environmental Economics. Hence, it has a special importance and Audit Reports for the financial variety in nature.



## References

1. Vijay Pithadia (2004), Environmental Auditing and Accounting: Reader in Management, Shri Levva Patel MBA Mahila College : Amerli.
2. R. P. Thomason, Thomas E. Simpson, Charles H Le Grand (1993), Environmental Auditing - Cover Story, <http://Findarticles.Com/p/articles>.
3. Ron Black (June 1988), A new leaf in Environmental auditing-cover story. <http://Findarticles.Com/p/articles>.
4. Bruce Mecuaing (June 1988), Internal Auditor, article on CSA approaches, assurance strategies and definition of crowds. <http://Findarticles.Com/p/articles>.
5. Erdelyi K., Environmental Audit guidelines for an unstable Environmental impact statement. <http://Findarticles.Com/p/articles>.
6. McKinney, Michael M Steadman Mark, (August, 1998), EPA challenges, privilege issue in Environmental self audit. CPA Journal.
7. Josephine Malbty (1995), Environmental Audit Theory and Practices : Managerial Auditing Journal, Earland Group Publishing Limited, Earland Vol. 10, Issue 8 page No 15-26.
8. Lawrence B. Cahill, internal auditor (June 1998), article on compliance with ISO- 14000 standards. Cover Story - <http://Findarticles.Com/p/articles>.
9. Robert. R. Picard, Internal Auditor (June 1998), Environmental Management, what's auditing got to do with it? <http://Findarticles.Com/p/articles>.
10. Fulekar M. H. (1998), Environmental Management system and 150- 14000 - It's overview. Indian Journal of Environmental Protection. Varanashi, Vol. 19, No. 2 , pp. 101-104.

11. Russell, J. P. (Feb 2007), Know and Fallow ISO-19011's Auditing Principles, Journal of Quality Progress <http://Findarticles.Com/p/articles>.
12. Dr. Rajeev Sadan (Oct 2007), Environmental Management and ISO-14000 "Research Port", Vol. 2, Issue No. 1-2 Oct 07 March 2008. Social Science and Research Forum Mumbai.
13. Rajendra Badiwale (2008), Environmental Management system. "Sampada" Environmental Special, Maratha Chamber of Commerce, Industries and Agriculture, Pune. pp 25-27.
14. Mehta R. M. and Sharma V. K. (1996), Environmental Audit an Overview : Indian Journal of Environmental Protection. Environment Management Division. Faridabad, Vol. 17. No. 3 March 1997 pp. 212-214.
15. Shardha Dubey and P. S. Dubey (2002), Environmental Auditing - A successful Ecotechnological Tool, Journal of Industrial Pollution Control Vol. 18 (2) 2002, pp. 201-212.
16. Awasti, A. K. (2002), Environmental Issues in Audit.
17. E. E. Okafor, A. R. Hassan and A. D. Hassan (Feb. 2008), Environmental Issues and Corporate Responsibility : the Nigeria Experience, Journal of Human Ecology, Nigeria, pp. 101-107.
18. B. Padma, S. Rao and Ram Babu (Oct. 1999), Environment Audit Process – An Opportunity for Cleaner Production System, Indian Journal of Environmental Protection, pp. 758-761.
19. S. D. Badrinath and N. S. Raman (1993), Environmental Audit – A Management Tool, Indian Journal of Environmental Protection, Nagpur, pp. 991-894.
20. S. D. Badrinath, N. S. Raman and N. Narayan Rao (April 1994), Environment Audit in Thermal Power Plants, Indian Journal of Environmental Protection, National Environmental Engineering Research Institute, Nagpur, pp. 279-281.

21. Jain, S. K. (Nov. 1995), Environmental Auditing of Ambient Air Monitoring – A Procedure, Indian Journal of Environmental Protection, Ghaziabad, pp. 804-806.
22. Choudhary Pallab (April 2002), Environmental Audit : With Reference to a Bearing Industries, Indian Journal of Environmental Protection, Indian Institute of Technology, Kharagpur, pp. 400-404.
23. Toepfer, Klaus (April 2004), Environmental Auditing and Sustainable Development, International Journal of Government Auditing, United State, pp. 148-158.