



INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE AND MANAGEMENT

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ENVIRONMENTAL MANAGEMENT ACCOUNTING PRACTICES IN SELECT ISO 14001 COMPANIES IN INDIA

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ABSTRACT

Environmental Management Accounting (EMA) is one the management systems to improve environmental and economic performance of business firms. Various research studies in industrially developed countries support it empirically. This paper makes an attempt to study the extent of EMA system and practices prevalent in select Indian business firms with ISO 14001 certification and make suggestions to strengthen it further on the basis of results. The study reveals that for majority of firms Physical Environmental Management Accounting (PEMA) system aspect is well developed but lot of scope is left for Monetary Environmental Management Accounting (MEMA) system aspect usage. The findings are in line with previous studies. The intervention of Institute of Cost and Works and Accountants of India (ICWAI) for making wide application of MEMA and its integration with PEMA can go a long way in making EMA a very effective tool for making Indian business firms sustainable. The issue of guideline on EMA in Indian context can be the right step in this direction.

KEYWORDS

Environmental Accounting (EA), Environmental Management Accounting (EMA), ISO 14001 certified companies, Monetary Environmental Management Accounting (MEMA), Physical Environmental Management Accounting (PEMA).

INTRODUCTION AND CONTEXT OF THE STUDY

In the last few years, there has been a growing awareness of the need to discover the art of living in harmony with nature. It is also realized that the environment is not a permanent asset. Rapid industrialization, inspite of its positive effect on economic development has very seriously threatened the world's natural environmental balance. There is a growing pressure from environmentalists, government, society, customers, employees, and competitors on business firms to be environmentally accountable. Proper balancing of economic development and environment protection is gradually being recognized by all concerned.

Environmental accounting is considered one of the important management systems to enable improvement of economic and environmental performance of a business firm. Various research studies (Shield et al 1995, Joshi et al 2001, Stasiskine and Staniskis 2005, Jurgens 2006) show that adoption of environmental management accounting helps to improve the environmental and economic performance of the business firms. Countries like Germany, U K, Japan, USA, Canada have issued guidelines for preparation of environmental accounting. IFSC also issued guideline for the same taking the best practices prevalent in various countries. In India so far the guidelines for preparation of environmental accounting are not available. Study by Prasad (2009) in Indian context has thrown some light on availability of environmental information for decision making. In this background this study makes an attempt to explore the extent of environmental accounting system practiced by Indian inc.

The availability of this information can help to further strengthen the systems to meet the challenges of improving environmental and economic performance of business firms.

THEORETICAL BACKGROUND OF ENVIRONMENTAL MANAGEMENT ACCOUNTING (EMA)

The fact that environment costs are not fully recorded often leads to distorted calculations for improvement options. Environment protection projects aiming to prevent emissions and waste at the source (avoidance option) by better utilizing raw and auxiliary materials and requiring less (harmful) operating materials are not recognized and implemented. The economic and ecological advantages to be derived from such measures are not used. The people in charge are often not aware that producing waste and emissions is usually more expensive than disposing of them¹. There are also other reasons in interest in the Environmental Accounting like : If existing accounting systems does not provide financial data on the environmental performance of organizations that will help non-complying organizations/entities to pollute environment and spoil resource and yet appear more economic efficient than other which incur costs to protect the environment. Many of the environmental activities are of quantitative and accordingly of financial nature and have a major effect on organizations costs, assets and liabilities. Environmental risks may result in huge environmental liabilities and subsequently the organization/entity may be obliged to outlay large payments which may affect seriously the liquidity and the financial position of the organization².

Environmental Accounting (EA) being in developing stage , the language used for environmental accounting is not standardized. Even within a particular subset of EA, such as EMA, terminology differs among organizations and countries. For example, EMA has been variously called EA, EMA, Environmental Cost Accounting (ECA), Full Cost Accounting (FCA), Total Cost Assessment (TCA) etc. Thus, in discussing any type of environmental related accounting within an organization or elsewhere, it is important to clarify the definition and languages being used³."

Environmental Management Accounting has no single, universally accepted definition. According to IFAC's Statement Management Accounting Concepts, "EMA is the management of environmental and economic performance through the development and implementation of appropriate environment-related accounting systems and practices. While this may include reporting and auditing in some companies, environmental management accounting typically involves life-cycle costing, full-cost accounting, benefits assessment, and strategic planning for environmental management."⁴

A complementary definition is given by the United Nations Expert Working Group on EMA⁵, which more distinctively highlights both the physical and monetary sides of EMA. This definition was developed by international consensus of the group members, representing 30+ nations. According to the UN group EMA is broadly defined to be the identification, collection, analysis and use of two types of information for internal decision making :

- Physical information on the use, flows and destinies of energy, water and materials (including wastes) and
- Monetary information on environment-related costs, earnings and savings

At the Micro (organization) level, EA takes place in the context of both management accounting (assessment of an organization's expenditures on pollution control equipment; revenues from recycled materials; annual monetary savings from new energy-efficient equipment) and financial accounting (evaluation and reporting of the organization's current environment-related liabilities)⁶.

Application fields for the use of EMA data are assessment of annual environmental costs / expenditure, product pricing, budgeting, investment appraisal, calculating investment options, calculating costs, savings and benefits of environmental projects, design and implementation of environmental management

systems, environmental performance evaluation, indicators and Benchmarking Setting quantified performance targets, cleaner production, pollution prevention, supply chain management and design for environment projects, external disclosure of environmental expenditures, investments and liabilities, external environmental or sustainability reporting, and other reporting of environmental data to statistical agencies and local authorities⁷.

EMA was defined in the second and third meeting of the expert working group on “improving the role of Government in the promotion of EMA” of the United Nations Division for Sustainable Development to cover the issues in the two middle columns of the table namely – MEMA and PEMA. Figure 1 shows the framework of EMA developed by the said group⁸.

FIGURE 1: FIGURE SHOWING FRAMEWORK OF ENVIRONMENTAL MANAGEMENT ACCOUNTING

Accounting in Monetary Units		Accounting in Physical Units	
Conventional Accounting	Environmental Management Accounting		Other Assessment Tools
	MEMA Monetary EMA	PEMA Physical EMA	
DATA ON THE CORPORATE LEVEL			
Conventional bookkeeping	Transition of environmental part from bookkeeping and cost accounting	Material flow balances on the corporate level for mass, energy and water flows	Production planning systems, stock accounting systems
DATA ON THE PROCESS/COST CENTRE AND PRODUCT/COST CARRIER LEVELS			
Cost accounting	Activity based material flow cost accounting	Material flow balances on the process and product levels	Other environmental assessments, measures and evaluation tools
BUSINESS APPLICATION			
Internal use for statistics, indicators, calculating savings, budgeting and investment appraisal	Internal use for statistics, indicators, calculating savings, budgeting and investment appraisal of environmental costs	Internal use for environmental management systems and performance evaluation, benchmarking	Other internal use for cleaner production projects and eco design
External financial reporting	External disclosure of environmental expenditures, investments and liabilities	External reporting (EMA statement, corporate environmental report, sustainability report)	Other external reporting to statistical agencies, local governments, etc.
NATIONAL APPLICATION			
National income accounting by statistical agency	National accounting on investments and annual environmental costs of industry, externalities costing		

Source: United Nation Division for Sustainable Development, (2001) *Environmental Management Accounting Procedures and Principles*, United Nation Publication, New York. Internet <http://www.un.org/esa/sustdev/publications/proceduresandprinciples> (PDF)

Physical Environment Management Accounting (PEMA) is an information tool for internal management decisions. It includes materials and materials-driven costs like use of energy, water, generation of waste and emissions, personal hours⁹.

PEMA as an internal physical environmental accounting approach serves as:

- An analytical tool designed to detect ecological strengths and weakness;
- A decision-support technique concerned with highlighting relative environmental quality;
- A measurement tool for that is an integral part of other environmental measures such as eco-efficiency;
- A tool for direct and indirect control of environment consequences;
- An accountability tool providing a neutral and transparent base for internal and, indirectly, external communication; and
- A tool with a close and complementary fit to the set of tools being developed to help promote ecologically sustainable development.

This physical accounting information does not provide all of the data needed for effectively managing all potential environmental impacts, but is essential information that the accounting functions can provide¹⁰.

Monetary approach emerged due to the fact that the Physical Approach does not fulfill the requirements of the Environmental Accounting. Nevertheless, the physical approach is very important to get physical information about the resources which enables to prepare the environmental statistics and is considered the first step in the monetary approach. Despite the difficulties associated with the monetary approach, it gained a lot of interest as such data will enable to know the profit and loss associated with environmental operations and to get environmentally adjusted economic indicators¹¹. It deals with the environmentally induced impacts on a company expressed in monetary terms like costs or fines for breaking environment laws, investment in capital budgeting. It contributes to strategic and operational planning, provides the main basis for decisions about how to achieve desired goals, and act as a control and accountability device¹².

As per IFAC (2005)¹³ to achieve environment and economic performance cost-categories could be used, which induce environmental-related cost information. The environment cost categories include 1. materials costs of product outputs 2. materials costs of non-product outputs 3. Waste and emission control costs 4. prevention and other environmental management costs 5. research and development costs and 6. less tangible costs.

LITERATURE REVIEW

Shields, Beloff, Heller¹⁴ (1995) made a study with the purpose to compare environmental accounting approaches in oil and chemical companies whose activities have significant environmental impact. The study had the objectives, 1) To collect information about what companies in the chemical and refining industries are doing in accounting for environmental costs and how environmental accounting can provide decision makers with the information they need 2) To develop case studies from each participating company on how they are grappling with the issues of environmental management and cost accounting for environmental activities 3) To establish baseline environmental cost information as identified by all participating companies 4) To develop a framework for understanding the nature and uses of environmental accounting. The team developed a questionnaire to collect data. The questionnaire was divided into five parts: company Overview, attitude toward environmental Stewardship/ corporate culture, environmental cost accounting systems, environmental costs & non-financial

performance measures, and cost information for decision making. The participants felt that non-financial measures were superior to financial information for day-to-day management, but that financial information more effectively justified the need for intervention to top management.

White, *et al*¹⁵ (1995) made study on corporate environmental cost accounting practices and applied it for the capital budgeting decisions in U.S. manufacturing firms. For cost management, environmental cost inventory and cost allocation methods were key issues for companies. The survey suggested that much work remains before business practices provide managers with a comprehensive and transparent look at "true" costs of processes and products. While most firms quantify the more obvious and measurable environmental costs, substantially fewer have grappled with those that were less tangible, uncertain, and difficult to quantify. Upgrading the capital budgeting system through improved environmental accounting systems is best viewed in the broader context of strategic planning. Many social benefits can be gained from improved internal environmental accounting.

Stasiskiene and Staniskis¹⁶ (2005) made a research study entitled "integration of environmental management accounting into company's environmental performance improvement system: case study of Lithuanian Industries". Recognizing the crucial role of environment management accounting can play in providing core information to evaluate a company's sustainable management, in September 2004 EMA methodology developed by LOW, Institute of Environmental Management and Economics, Vienna, Austria was introduced to representative of industrial companies in Lithuania. The pilot testing was performed in 18 economically significant Lithuanian industrial companies. Experience of the companies related to cleaner product investment project development and implementation was very important driver for increased awareness of their environmental responsibility and also contributed for a great interest in modern economically and environmentally sustainable solution and positive corporate culture. For introduction of EMA methodology conceptual approach was used which included the steps of training material, company case studies and further dissemination of EMA. This was followed by seminars. Following this data were collected from eight industrial companies. The author reported that "after interviews with the companies which participated in testing the EMA methodology, it can be concluded that they will be very active in implementing the methodology because they rapidly catch-up advantage and got unique ideas about how to use the developed data. However effectiveness of the measures identified applying EMA and efficiency of their implementation largely depend on integration of these measures in the overall strategy of enterprises and everyday activities. It means adequate changes are needed in the management system of a company e. g. new policy, new methods and new procedures." He concluded that "there has been real progress in promoting environmental accounting system in Lithuania since 2003. Companies which participated in EMA methodology testing, have shown that environmental accounting system can provide accurate information for cost-benefit analysis in designing pollution abatement strategies. There are several factors essential to successfully implementing the environmental accounting system. Organizational and management commitment are among the most critical factors. Internal and external communications are also important since environmental accounting requires inputs from a wide variety of disciplines. Even with strong commitment, implementation remains challenging. Continuous effort is required to encourage businesses to implement the environmental accounting systems and basic principles of sustainable development."

Jurgens R.¹⁷ (2006) made study on assessing the practical relevancy of environmental cost accounting for industrial waste, waste accounting, process efficiency, and cleaner productions. An empirical study was conducted with 20 Swedish industrial companies and production sites. The main findings of the research reported were "as expected, the gap between concepts developed by academics and what companies are doing in practices is big. Most companies and production sites reviewed do not have any cost accounting in place for processes waste, and consider it as an environmental issue to be kept under control rather than a production-related cost indicating existing inefficiencies in the manufacturing process. A majority of companies do not appear to have a strong interest in an enhanced information basis for decision making. Material flow management is an appropriate concept to generate the desired information. EMIS provide a necessary and useful support for all steps of materials flow management."

Prasad¹⁸ (2009), studied corporate environmental sensitivity in selected Indian companies. The objective of this study has been 1) to demonstrate the present practice of environmental accounting and reporting among Indian companies, 2) to establish environmental sensitivity of Indian company's *vis-a-vis* less environmental sensitivity of companies. 3. To analyse to what extent environmental sensitivity influence adoption of environmental accounting and reporting among Indian companies and 4) to provide a platform for further research and to stimulate Indian companies to adopt environmental accounting and reporting. The study was undertaken with two hypotheses namely H1 firms in environmentally sensitive industries are more likely to introduce environmental accounting procedures than firms in less environmentally sensitive industries and 2. Firms in environmentally sensitive industries are more likely to externally disclose environmental information than firms in less environmentally sensitive industries. The Data was collected through a mailed questionnaire to the Chief of Accounting and Finance Departments of 130 Indian companies listed on BSE & NSE. The final sample included 59 firms identified as being involved in environmentally sensitive industries and 32 in less sensitive industries.. He concluded "in conclusion, the argument that 'environmentally sensitive' firms are more likely to develop environment accounting procedure is only supported for activities that are associated with significant environment related issues for the specific industries. Where issues are of general nature it appears that these firms are no more likely to develop such accounting processes. Hence the study provides no conclusive evidence that the environmental sensitivity of the firm's operations will necessarily result in increased likelihood of the development environment accounting procedures of general environmental issues. Such a result suggests that observations as to what motivates the external reporting process may not hold true for the development of internal management practices, indicating the need for further research as to what motivates firms to develop environmental accounting, auditing and reporting.

Various research in ISO 14001 shows advantage of ISO 14001 certification in improving firm's environmental performance (Morrow and Rondinelli (2002), Ammenberg and Sundin (2005). However Stasiskiene and Staniskis (2005) study showed that ISO 14001 is more a marketing strategy rather than commitment to improve environmental performance

RESEARCH PROBLEM

Most of the above EMA related studies are undertaken in developed countries. The existence of environmental management accounting is a first step to improve environmental as well as economic performance. Sustainability Reporting by leading Indian firms indicate their commitment for improvement of environmental performance. In light of these information it is likely that business firms have evolved their accounting system to provide information for environmental related decision making. Therefore, a need has been felt to study the environmental management accounting system - the existence of EMA in fragmented form or more integrated form either - among Indian companies and suggest improvement if any. The study is restricted to ISO 14001 companies. The rationale of choosing ISO 14001 Companies is that such companies have shown their commitment to improve its environmental performance. Being ISO 14001 certified, such companies have system in place for improving environmental performance on ongoing basis. The Environmental Management Accounting system, being designed for effective internal management of environmental and economic performances may be existing in organizations but may not be formally documented and/ or reported as it is not mandatory or felt necessary by organizations. EMA being a domain of accounting/ MIS/Costing /management accounting field may exist in ISO 14001 companies as a formal system- in fragmented way or more integrated way either. It is also likely that the accounting system is not so far evolved in the organization for environment-related information. However being ISO 14001 certified companies the necessary database is available with the companies and is also used by the management in operational and strategic decision making to improve environmental and economic performances.

Accordingly this study is entitled as "Study of Environmental Management Accounting Practices in select ISO 14001 Companies in India".

OBJECTIVE OF THE STUDY

The study seeks to get answer to the question "Is there existence of environmental accounting system to some extent in the organization?"

HYPOTHESIS OF THE STUDY

The theoretical framework and literature review, helped to form the hypothesis for the study. Based on the available literature the following descriptive hypothesis was formulated:

H1. There is existence of Environment Management Accounting system in business units to some extent

DATA COLLECTION

The data about Environmental Management Accounting practices is collected from 32 ISO 14001 certified units/ sites of different companies by way of structured Questionnaire with closed ended questions. The questionnaire is based on guideline / best practices on EMA issued by IFAC and other literature. It was reviewed by two experts in the field and pilot tested in four units. After necessary changes as suggested, the final questionnaire has been circulated to 50 units having ISO certification as convenient sampling. After follow up 32 filled in questionnaire were received back. The responses were sought from the Environment manager as well as Accounts/ Costing Manager as the system can be applied by both or only by Environment manager/ Technical manager as a part of ISO 14001 EMS. The total actual score is taken after considering the response of both the respondents. The common response was adjusted to consider only once. Therefore, the total score here considers response of two stakeholders. If response of both respondents is same it considered as once only and if only one respondent gives positive reply that is considered. The reason for this is as the EMA may exist more on PEMA basis in production/ technical side without proper integration with Accounts/ costing manager or it may exist in account/ costing department with MEMA –cost information, without knowledge of / integration with Environment manager/ technical staff. The list of sample units is given in Annexure 1.

TABULATION OF DATA

TABLE 1: TABLE SHOWING VARIOUS DETAILS RELATED TO EMA SYSTEM AND PRACTICES

Particulars	Actual Score	Maximum Scores	Percentage of Maximum score
Adopted EA , formally or informally	30	32	94%
Purpose/s of Environmental Accounting as Environmental Reporting and internal decision making	148	256	58%
Environment related Internal Decision Making made	198	288	69%
Uses EMA data in various Place	73	160	46%
Scope of EA like Reporting or implementation of environment policy	47	64	73%
Different types of techniques use for EA like PEMA, MEMA, and environment Budget	48	96	50%
Training for EMA	25	32	78%
Total	570	928	61%

Source: Primary data collection

TABLE 2: TABLE SHOWING DETAILS OF PEMA SYSTEM AND PRACTICES OF SAMPLE UNITS

System and Practices of PEMA	Actual Score	Maximum Scores	Percentage of Maximum score
Use Materials, Energy, Water Flows for internal decision making	90	96	94%
materials flow Accounting done for Raw, Auxiliary, operating materials	106	128	83%
Site level used for getting PEMA data	32	32	100%
Use PEMA Indicators	28	32	88%
Use techniques for PEMA	31	32	97%
Total	287	320	90%

Source: Primary data collection

TABLE3: TABLE SHOWING DETAILS OF MEMA SYSTEM AND PRACTICES OF SAMPLE UNITS

System and practices of MEMA	Actual Score	Maximum Scores	Percentage of Maximum score
Environment Related cost-categories used	25	192	13%
Site level MEMA data availability	13	32	41%
Methods/ techniques like LCA, TCA, FCA, used for MEMA	11	32	34%
Incineration Plant	6	32	19%
Integration of PEMA & MEMA data for decision making	11	32	34%
Total	66	320	21%

Source: Primary data collection

TABLE 4: TABLE SHOWING SUMMARY OF USE OF EMA INFORMATION FOR STRATEGIC DECISION MAKING

Type of Strategic Decision	Actual Score	Maximum Score	Percentage of Maximum score
Use of environment aspects in supply chain management	30	32	94%
Rise in sales after adoption ISO 14001	31	32	97%
Gain in exports after ISO 14001 certification	23	32	72%
Reduce Purchases of non-renewable materials	31	32	97%
Reduction in energy Uses	30	32	94%
Reduced use of traditional Energy	27	32	84%
Other actions to reduce environment Impact	23	32	72%
Achievements for Environment & Economic Performance	8	32	25%
TOTAL	203	256	79%

Source: Primary data collection

TABLE 5: TABLE SHOWING SUMMARY OF EMA SYSTEM AND PRACTICES

Particulars	Total Responses	Max. Score	Total Companies	Average	Percentage
EMA	570	928	32	17.82/29	61%
PEMA	287	320	32	8.97/10	90%
MEMA	66	320	32	2.06/10	21 %
EMA information for Strategic Decision Making	203	256	32	6.34/08	79 %
Total	1126	1824	32	35.19/57	62%

Source: Primary data collection

HYPOTHESIS TESTING

H1 There is existence of Environment Management Accounting to some extent in ISO 14001 Certified Companies.

TABLE 6: STATISTICAL DATA OF ENVIRONMENT MANAGEMENT ACCOUNTING SYSTEM AND PRACTICES

Environment Management Accounting system and practices (EMA)	Chi-Square Value	Degree of Freedom	Significant Level (0.05)	Result
Value	2.75	3	7.81	Accept H1(2.75<7.81)

DISCUSSION

As shown in Table 6 Summary of Statistical Data the observed value of Chi-Square test is less than table value the hypothesis is accepted. There exists a EMA system which is helpful in operational and strategic decision making. The PEMA is most used technique, while MEMA is not widely applied. This speaks of wide potential to further strengthen EMA systems in Indian companies. Application of MEMA and integration of PEMA and MEMA can bring more effectiveness in improving environmental and economic performance of the organizations.

LIMITATIONS OF THE STUDY

This study is limited to small sample size and therefore findings of the study cannot be generalized.

SUGGESTIONS FOR IMPROVEMENT OF ENVIRONMENTAL ACCOUNTING PRACTICES

The study provided insight about the present practices of EMA by Indian companies having ISO 14001 Certification. Based on the insight, the following suggestions are made:

1. Use of MEMA for integrating environmental and economic performance is strongly recommended.
2. The national accounting body like Institute of Cost and Works Accountants of India should issue the guideline on use of environmental accounting in line with international guideline on EMA and extend training for successful implementation of EMA.
3. Better communication among technical people and accounting people /costing and MIS people is suggested to get full potential of EMA realized.

AREAS OF FURTHER RESEARCH

Based on this study the following area for further research is suggested:

1. Case study of implementation of environmental management accounting.
2. Study on the same line with large sample size.

CONCLUSIONS

The study has been undertaken to know the extent of EMA system and practices applied by select ISO 14001 certified firms to improve environmental and economic performances. The study revealed interesting outcome that majority of firms apply physical information for taking environmental related decisions. However, the extent of monetary information for the same is comparatively very less. This findings are in line with previous studies. The intervention of Institute of Cost and Works and Accountants of India for making wide application of MEMA and its integration with PEMA can go a long way in making EMA an effective tool for making Indian business firms sustainable. The issue of guideline on EMA in Indian context can be the right step in this direction.

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