Environment Accounting System
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ENVIRONMENT ACCOUNTING SYSTEM

3.1 A BRIEF HISTORY OF ENVIRONMENTAL ACCOUNTING

3.1.1 EARLY ACCOUNTING PROJECTS

The first environmental accounts were constructed in several European countries working independently of each other. Norway was one of the first. Influenced by the publication of Limits to Growth (Meadows et al. 1972) and a burgeoning environmental movement, Norwegian officials were concerned that their natural resources, on which their economy is relatively dependent compared with other European countries, would run out. They, therefore developed accounts to track use of their forests, fisheries, energy, and land. In the 1980s, they developed accounts for air pollutant emissions, which were closely tied to the energy accounts. The energy accounts were integrated into models used for macroeconomic planning, taking into consideration the roles of resource-based sectors in economic growth.

The Netherlands was also a leader in the development and adoption of environmental accounting. Dutch interest in this area originated with the work of Roefie Hueting, who developed and sought to implement a measure of sustainable national income that would take into account the degradation and depletion of environmental assets resulting from economic activity.

Although his approach was not implemented at that time, his work led the national income accountants to develop the national accounts matrix including environmental accounts (NAMEA), which builds on portions of the national income accounts by adding physical data on pollutant emissions by sector. The NAMEA approach has been adopted by Eurostat, implemented in many other European countries, and integrated into the environmental accounting procedures developed.

France was a third early adopter of environmental accounting. In the 1980s, it began developing an approach termed the Comptes du patrimoine, or patrimony accounts. These involved an integrated system structured around three distinct, but linked units of analysis.
First natural, cultural, and historical resources were to be measured in physical terms and their stocks and flows quantified. Second, places were to be organized into geographic accounts, giving physical data about assets organized by location and by ecological and land characteristics. Third, people and institutions were to be described in both physical and monetary terms in agent accounts, which were to be linked to data about how and where each agent used resources. Portions of this system were constructed, particularly those focused on forests and water, but its complexity made it difficult to implement fully (Hecht 2000).

An accounting effort that had considerable influence on the field was a study of Indonesia undertaken by the World Resources Institute (Repetto et al. 1989). The authors estimated what GDP might have been, had natural resources been depreciated in the same way as manufactured ones. They, then compared trends in conventional GDP with trends in their environmentally adjusted measure over a period of 15 years. The results show that Indonesian growth rates would have been considerably lower with the adjusted GDP than in the conventional accounts. Though widely criticized on technical grounds and rejected by the Indonesian government, this study has been very influential. It was written for a lay audience and distributed widely, and did much to stimulate interest in the field.

Another early accounting project took a very different approach. In the late 1980s, US Environmental Protection Agency (EPA) undertook the development of a set of pilot accounts for the Chesapeake Bay region of the eastern United States (Grambsch et al. 1989). This work was led by an economist, Henry Peskin, who felt that the accounts should incorporate the full value of non-marketed goods and services, and that all changes in value of capital should be deducted from gross indicators to calculate net ones, rather than adjusting only for changes attributable to economic activity. Peskin also brought this approach to USAID-funded work in the Philippines. These accounts, built by the Department of Natural Resources rather than the accounting agency, added in the value of non-marketed services of the environment, subtracted harm caused by pollution, and calculated an environmental NDP by subtracting the depletion of natural capital and adding in both the natural growth of forests and new discoveries of minerals (ENRAP 1999).
THE IDEA OF DOUBLE ENTRY ACCOUNTING SYSTEM WAS ADOPTED IN THE YEAR 1775 AND IT WAS SYSTEMATISED IN THE YEAR 1880. VARIOUS IDEAS AND METHODS TO ASSESS THE COST AND VALUE WERE INTRODUCED DURING THE PERIOD OF INDUSTRIAL REVOLUTION. THE ABOVE CHART SHOWS WORLD DEMOGRAPHIC CHART OF ACCOUNTS.
3.1.2 COUNTRIES ADOPTING ENVIRONMENTAL ACCOUNTING

NORWAY: Norway was the first country in the world to prepare environmental accounts in the 1970s. It collected data on energy sources, fisheries, forests and minerals to address the issue of resource scarcity. Subsequently, the country had added data on air pollutant emissions in its environmental accounts. After feeding environmental accounting data into the national economy, policymakers in Norway assess the energy implications of alternative growth strategies.

PHILIPPINES: The Philippines Environmental and Natural Resource Accounting Project (ENRAP) have been working on environmental accounts since 1993. Treating the environment as a productive sector in the economy, they integrated the valuation of pollution impacts, non-marketed goods and services and other economic aspects of the environment into conventional accounts. Though, this method of preparation of environmental accounts different from SEEA, government agencies and researchers in Philippines get a rich array of data from their accounts for policymaking and analysis.

NAMIBIA: In Namibia, the SEEA approach to environmental accounting has been adopted in a phased manner. It is focused on several key natural resources sector and is designed to answer such questions, as how to allocated water among competing uses and how land degradation, affects the productivity of range land.

NETHERLANDS: in Netherlands, the National Accounting Matrix, including Environmental Accounts (NAMEA), are routinely constructed which is an extended from of National accounts input and output matrix. NAMEA tracks pollution emission by the economic sector and assesses the accomplishment of environmental protection objectives by the country.

CHILE: In Chile, the Central Bank undertook the development of environmental accounts that focused on the forest and mineral sectors. These accounts suggest that the country’s forest-based development strategy may not be sustainable and hence warrants change in the strategy for sustainable development.

USA: The United States of America has not been a leader in the environmental accounting endeavor. In the beginning of the Clinton Administration, the Bureau of Economic Analysis (BEA) made a foray into environmental accounting in the mineral sector. Opposition from the mineral industry as well as political controversy stood in the way
of operational zing environmental accounting in the country. The government then asked the National Research Council (NRC) to form a blue-ribbon panel to consider what the country should do on the environmental accounting front.

**JAPAN:** In Japan, the Ministry of Environment has issued comprehensive guidelines titled “Environmental Accounting Guidelines-2002” in March 2002, encompassing the definition, functions, roles, basic dimensions and structural elements of environmental accounting. The guidelines emphatically state that environmental management has to occupy the center stage of management strategy and environmental accounting would work as a vital tool of environmental management. The guidelines also envisage that the environmental conservation cost benefits, including economic benefits associated with environmental conservation activities, are to be measured. Environmental accounting information, both physical as well as monetary units, needs to be disclosed in the environmental report for the benefit of management as well as the general public. According to the guidelines, environmental accounting comprises three key elements, viz., environmental conservation cost (monetary value), environmental benefit (physical units) and the economic benefits associated with environmental conservation activities (monetary value).

Environmental conservation costs include investments and expenses incurred towards prevention, reduction or avoidance of environmental impact, removal of such impact, restoration following the occurrence of a disaster and other activities that are measured in monetary value. Investment amounts are expenditures earmarked for a target period for the purpose of environmental conservation and shown as expenses like the way depreciation is charged in current year.

Expense amounts are the expenses or losses that result from the consumption of goods and services for undertaking environmental conservation activities. Environmental conservation benefits, that are measured in physical units, relate to benefits arising out of prevention, reduction or avoidance of impact, removal of such impact, and restoration in the event of any disaster. Benefits to a company’s profit as a result of carrying forward with environmental conservation activities are measured in monetary value.

The guidelines clearly state that, environmental accounting is to perform two functions that would help in measuring the costs of environmental expenditures and benefits by the company. External functions would communicate to the stakeholders the
environmental conservation activities under taken by the company. In order to make environmental accounting sound and meaningful, the accounting data should be relevant, reliable, comparable, easy to understand and verifiable. For disclosing environmental accounting information uniformly to the public society, the guidelines stipulate three standard formats, namely, Disclosure Format A-focusing on environmental conservation cost, Disclosure Format B-comparing environmental conservation benefits, and Disclosure Format C-for the comparison of the overall benefits of conservation activities. The guidelines prescribe exhaustive methods for measuring costs and benefits by stipulating the components of environmental conservation costs and environmental conservation benefits. Accounting Guidelines 2002 clearly reveal the concerns of the Japanese Government for allowing the country’s development without jeopardizing the environment.

3.2 INTERNATIONAL INITIATIVE IN ENVIRONMENTAL ACCOUNTING ARENA

In the international arena, work on the design of environmental accounts has been underway since the 1970s. In the 1980s., the United Nations Environmental Program (UNEP), the United Nations Statistical Division (UNSTAT) and the World Bank launched concerned international efforts to build consensus on how the SNA (System of National Accounts) might be modified to include environmental issue. As a result, in 1993, a draft titled “Handbook for integrated Economic and Environmental Accounting” was published, encompassing the preliminary methodology to be tested and refined. The approach in this document is often referred to as a system of Integrated Economic and Environment Accounting (SEEA). The SEEA tries to integrate the various methods available for environmental accounting into a single framework. This document offers a series of versions or ‘building blocks’ for the construction of accounts beginning with physical accounts and disaggregation of data already included in SNA. It also works towards more complex information such as calculation of depletion and estimation of maintenance costs required for sustainable use of resources. None of the versions of SEEA encompasses the valuation of non-marketed environmental services. UNSTAT, with UNEP and other experts, is preparing a practical manual or Work Book for implementing SEEA. The SEEA is a proposed methodology and does not have official approval of the United Nations. This is to be tested over the years for bringing refinement in the methodology.
3.3 DEFINING ENVIRONMENTAL ACCOUNTING

The term “environmental accounting” is open to interpretation. In this guideline, environmental accounting is the identification, measurement and allocation of environmental costs, the integration of these environmental costs into business decisions, and the subsequent communication of the information to a company’s stakeholders. Identification includes a broad examination of the impact of corporate products, services and activities on all corporate stakeholders. After companies identify the impacts on stakeholders as far as they can, they measure those impacts (costs and benefits) as precisely as possible in order to permit informed management decision-making. Measurements might be quantified in physical units or monetized equivalents. After their environmental impacts are identified and measured, companies develop reporting systems to inform internal and external decision makers. The amount and type of information needed for management decisions will differ substantially from that required for external financial disclosures and for annual environmental reports. Organizations use environmental accounting for several reasons, including the following:

* To help managers make decisions that will reduce or eliminate their environmental costs;
* To better track environmental costs that may have been previously obscured in overhead accounts or otherwise overlooked;
* To better understand the environmental costs and performance of processes and products for more accurate costing and pricing of products;
* To broaden and improve the investment analysis and appraisal process to include potential environmental impacts; and
* To support the development and operation of an overall environmental management system.

Stakeholders are those with an interest in the environmental effects, activities, products and services of an organization. Examples of stakeholders include bondholders, shareholders, managers, Board of Directors, customers, suppliers, regulators, policy makers, employees, consumers, and community and environmental groups.
3.4 WHY ENVIRONMENTAL ACCOUNTING?

Environmental costs are one of the many different types of costs, businesses incur as they provide goods and services to their customers. Environmental performance is one of the many important measures of business success. Environmental costs and performance deserve management attention for the following reasons:

(1) Many environmental costs can be **significantly reduced or eliminated** as a result of business decisions, ranging from operational and housekeeping changes, to investment in “greener” process technology, to redesign of processes/products. Many environmental costs (e.g., wasted raw materials) may provide no added value to a process, system, or product.

(2) Environmental costs (and, thus, potential cost savings) **may be obscured in overhead accounts or Overlooked otherwise**

(3) Many companies have discovered that environmental costs can be offset by generating **revenues** through sale of waste, by-products or transferable pollution allowances, or licensing of clean technologies, for example.

(4) Better management of environmental costs can result in **improved environmental performance and significant benefits to human health** as well as business success.

(5) Understanding the environmental costs and performance of processes and products can promote **more accurate costing and pricing** of products and can aid companies in the **design of more environmentally preferable** processes, products, and services for the future.

(6) **Competitive advantage** with customers can result from processes, products, and services that can be demonstrated to be environmentally preferable.

(7) Accounting for environmental costs and performance can support a company’s development and operation of an overall **environmental management system**. Such a system will soon be a necessity for companies engaged in international trade due to pending international consensus standard ISO 14001, developed by the International Organization for Standardization.

- EPA's work with key stakeholders leads it to believe that, as businesses more fully account for environmental costs and benefits, they will clearly see the financial advantages of pollution prevention (P2) practices. Environmental costs often can be reduced or avoided through P2 practices such as product
design changes, input materials substitution, process re-design, and improved operation and maintenance (O&M) practices. For example, increased environmental costs may result from use of chemical A (e.g., a chlorinated solvent), but not from chemical B (e.g., an aqueous-based solvent). This is true even though chemical A and chemical B, can be substitutable. Another example: some environmental compliance costs are required only when use of a substance or generation of a waste exceeds a defined threshold. A company that can reduce chemical use below such thresholds or employ substitutes for regulated chemicals, can realize substantial cost savings from design, engineering, and operational decisions. In two of the most thorough reports on the subject of pollution prevention in the industrial community, the not-for-profit group INFORM3 studied 29 companies in the organic chemical industry in 1985 and again in 1992.3 This research found that chemical “plants with some type of environmental cost accounting program” had “an average of three times as many” P2 projects “as plants with no cost accounting system.”4 The study also showed that the average annual savings per P2 project in production facilities, where data were available, were just over $351,000, which equaled an average savings of $3.49 for every dollar spent. Not only were substantial savings and returns on investment documented for P2 projects, but an average of 1.6 million pounds of waste were reduced for each project. Results like these have highlighted the potential benefits of environmental accounting to the business community. For example, responses to a questionnaire administered by George Nagle of the Bristol-Myers Squibb Company at the spring 1994 Global Environmental Management Initiative (GEMI) Conference, showed that corporate professionals are placing a high priority on environmental accounting.5 Of the 25 respondents to the informal survey, half stated that their company had some form of a tracking system for environmental costs. All but two reported that they believed environmental accounting issues would be more important to their companies in the near future. In addition, the Business Roundtable expects to, turn its attention to environmental accounting issues in 1995, and companies of all sizes in the U.S. are beginning to consider implementing environmental accounting in their facilities.5

REFERENCE

Supporting Techniques (Committee Draft, February 1995) adds that tracking environmental benefits and costs can support the appropriate allocation of resources for achieving environmental objectives.


5. Green Ledgers: Case Studies in Corporate Environmental Accounting, edited by Daryl Ditz, Janet Ranganathan, and Darryl Banks (World Resources Institute, 1995) and Environmental Accounting Case Studies, EPA 742-R-95-00X (forthcoming).

3.5 UTILIZATION OF ENVIRONMENTAL ACCOUNTING

Environmental accounting is used to determine measures to promote sustainable environmental management.

Reducing environmental impact, using measures that will lead to the creation of benefits, is crucial to promoting sustainable environmental management. The Ricoh Group uses environmental accounting to determine what measures should be taken for what processes and for what operations so that the maximum effect can be obtained. Therefore, we first identify those processes that have a high environmental impact in business operations, based on the Eco Balance. We examine a number of improvement plans to reduce the identified environmental impact, in consideration of developments in society and laws/regulations and competition. Then, using segment environmental accounting, we assess the effectiveness of each possible approach and decide what methods should be adopted to gain the best results.

3.5.1 FLOW TO UTILIZE ENVIRONMENTAL ACCOUNTING

This is a tool to inform the public, of relevant information compiled in accordance with the Environmental Accounting Guidelines of Japan's Ministry of the Environment. The Ricoh Group takes the necessary portion from the Eco Balance data, and calculates the cost and effect (in quantity and monetary value) of its environmental conservation activities based
on its own formulas and indicators. The calculated results are disclosed to the public after being verified by a third party organization. We will continue to improve the accuracy of the information to be disclosed and will make a positive effort to make it comparable to already standardized documents, such as financial statements.

3.6 ENVIRONMENTAL ACCOUNTING

3.6.1 DEFINITION

There is no standard definition of natural resources and environmental accounting. The term environmental accounting could, in a general sense, be used to indicate taking account of the environment and changes in it, and integrating the results with the systems of national accounts (SNA) so as to provide a valuable information base for planning and laying policies for the integrated sustainable development and growth of the nation. There are three terms-(1) Environmental Accounting, (2) Environmental Management, & (3) Environmental Science, used about environment. They differ as follows:

(1) Environmental Accounting (Already stated above in detail). In short, it measures in terms of money, the amount of loss which has been done to the environment by the habitants & its effect on national income or enterprise income to take remedial steps.

(2) Environmental management. A deal with how the environment should be managed using optimum efforts to reap its maximum benefits.

(3) Environmental science. It is a positive science concern with finding out the Truth of the proposition for its own sake. In simple words, it is related to find out with certainty the precise knowledge (Truthfulness) related to environment (Biodiversity).

3.6.2 WHAT IS ENVIRONMENTAL ACCOUNTING?

Different uses of the umbrella term environmental accounting arise from three distinct contexts:

National income accounting is a macro-economic measure. Gross Domestic Product (GDP) is an example. The GDP is a measure of the flow of goods and services through the economy. It is often cited as a key measure of our society’s economic well-being. The term
environmental accounting may refer to this national economic context. For example, environmental accounting can use physical or monetary units to refer to the consumption of the nation’s natural resources, both renewable and nonrenewable. In this context, environmental accounting has been termed “natural resources accounting.”

**Financial Accounting** enables companies to prepare financial reports for use by investors, lenders, and others. Publicly held corporations, report information on their financial condition and performance through quarterly and annual reports, governed by rules set by the U.S. Securities and Exchange Commission (SEC) with input from industry's self-regulatory body, the Financial Accounting Standards Board (FASB). Generally Accepted Accounting Principles (GAAP) are the basis for this reporting. Environmental accounting in this context refers to the estimation and public reporting of environmental liabilities and financially material environmental costs.

### 3.6.3 TYPE OF ENVIRONMENTAL ACCOUNTING FOCUS AUDIENCE

1. National income accounting - nation
2. Financial accounting - firm
3. Managerial or management accounting – firm, division internal or external

**Management Accounting** is the process of identifying, collecting, and analyzing information principally for internal purposes. Because a key purpose of management accounting is to support a business's forward-looking management decisions, it is the focus of the remainder of this primer. Management accounting can involve data on costs, production levels, inventory and backlog, and other vital aspects of a business. The information collected under a business's management accounting system is used to plan, evaluate, and control in a variety of ways:

1. planning and directing management attention, (2) informing decisions such as purchasing (e.g., make vs. buy), capital investments, product costing and pricing, risk management, process/product design, and compliance strategies, and (3) controlling and motivating behavior to improve business results.

Unlike financial accounting, which is governed by Generally Accepted Accounting Principles (GAAP), management accounting practices and systems differ according to the
needs of the businesses they serve. Some businesses have simple systems, others have elaborate ones. Just as management accounting refers to the use of a broad set of cost and performance data by a company’s managers in making a myriad of business decisions, environmental accounting refers to the use of data about environmental costs and performance in business decisions and operations. Table lists many types of internal management decisions that can benefit from the consideration of environmental costs and benefits. This primer, later summarizes how environmental accounting can be integrated into cost allocation, capital budgeting, and process/product design.

3.6.4 OBJECTIVES

(1) Taking the total stock of assets or reserves related to environmental issue & changes therein.

(2) Estimation of the total expenditure protection or enhancement of environment.

(3) To identify that part of the gross domestic product which reflects the cost necessary to compensate for the negative impact of economic growth i.e. the so-called defensive expenditure to protect environment.

(4) Assessment of environmental costs & benefits

(i) The decrease (depletion) in natural resources due to their use in production & final demand and

(ii) The changes in environmental quality resulting from pollution & other impacts of production & consumption & other natural events on one hand, & the expenditure for environmental protection & enhancement of the environment on the other.

(5) Elaboration & measurement of indicators, relating to environmentally adjusted product & income which are disclosed by Environmentally Adjusted Net Domestic Product (EDP), i.e., Net Domestic Product minus Environmental costs.

(6) Analysis of EDP : It is to plan the use of resources by squeezing them & reducing waste to attain sustainable development.

3.6.5 SEGMENT ENVIRONMENTAL ACCOUNTING

This is an internal environmental accounting tool to select an investment activity, or a project, related to environmental conservation from among all processes of operations, and to evaluate environmental effects for a certain period. The effect of investment on
environmental conservation will be calculated based on the concept of “Return on Investment” (ROI). The calculation result is used internally for decision making in sustainable environmental management. Ricoh Group companies and divisions, such as its recycling business division, increasingly utilize segment environmental accounting for their operations.

3.6.6 BUSINESS SECTOR ENVIRONMENTAL ACCOUNTING

The Ricoh Group engages in environmental activities in many business sectors. This is an indicator of how such environmental activities contribute to environmental management conditions in respective business sectors. Because the properties of operations differ by business sector, we have repeatedly discussed which indicator would be appropriate for a given sector.

3.7 FORMS OF ENVIRONMENTAL ACCOUNTING

(1) Environmental Management Accounting (EMA): Management accounting with a particular focus on material and energy flow information and environmental cost information. This type of accounting can be further classified in the following sub-systems:
   (a) Segment Environmental Accounting: This is an internal environmental accounting tool to select an investment activity, or a project, related to environmental conservation from among all process of operations, and to evaluate environmental effects for a certain period.
   (b) Eco Balance Environmental Accounting: This is an internal environmental accounting tool to support PDCA for sustainable environmental management activities.
   (c) Corporate Environmental Accounting: This is a tool to inform the public of relevant information compiled in accordance with the Environmental Accounting. It should be called as Corporate Environmental Reporting. For this purpose, the cost and effect (in quantity and monetary value) of its environmental conservation activities are used.
(2) Environmental Financial Accounting (EFA): It is the Financial Accounting with a particular focus on reporting environmental liability costs and other significant environmental costs.

(3) Environmental National Accounting (ENA): It is a National Level Accounting with a particular focus on natural resources stocks and flaws, environmental costs and externality costs, etc.

3.8 THE NEED FOR ENVIRONMENTAL ACCOUNTING AT CORPORATE LEVEL

It helps to know whether: corporation has been discharging its responsibilities towards environment or not. A company has to fulfill following environmental responsibilities.

(a) Meeting regulatory requirements or exceeding that expectation.
(b) Cleaning up pollution that already exists and properly disposing of the hazardous material.
(c) Disclosing to the investors both potential and current, the amount and nature of the preventative measures taken by the management (disclosure required if the estimated liability is greater than a certain percent say 10% of the company’s net worth).
(d) Operating in a way that those environmental damages do not occur.
(e) Promoting a company having wide environmental awareness.
(f) Control over operational and material efficiency gains driven by the competition global market.
(g) Control over increase in costs for raw materials, waste management and potential liability.

3.9 SCOPE OF ENVIRONMENTAL ACCOUNTING

The scope of Environmental Accounting (EA) is very wide; it includes corporate, national and international levels. Here, the emphasis is given on the corporate level accounting. The following aspects are included in EA:

(1) From internal point of view, investments are made by the corporate sector for minimization of losses to environment. It includes investment made into the
environment saving equipment devices. This type of accounting is easy as money measurement is possible.

(2) From external point of view all types of losses to the environment either occur directly or indirectly due to business operation/activities. It mainly includes:

(a) Degradation and destruction like soil erosion, loss of biodiversity, air pollution, water pollution, noise pollution, problem of solid waste, coastal and marine pollution.

(b) Depletion of non-renewable natural resources i.e., loss emerged due to over exploitation of non-renewable natural resources like minerals, water, gas, etc.

(c) Deforestation and Land uses.

This type of accounting is not easy as losses to the environment cannot be measured exactly in monetary value. Further, it is very hard to decide that how much loss was occurred to the environment due to a particular industry. For this purpose, approximate idea can be given or other measurement of loss like quantity of non-renewable natural resources used, how much sq. meter area deforested and total area used for business purpose including residential quarters area employees, etc., how much solid waste produced by the factory, how much wasteful air pass through chimney in air and what types of elements are included in a standard quantity of wasteful air, type and degree of noise made by the factory, etc., can be used.

### 3.10 LIMITATION OF ENVIRONMENTAL ACCOUNTING

EA suffers from various serious limitations as follows:

1. There is no standard accounting method.
2. Comparison between two firms or countries is not possible if method of accounting is different, which is quite obvious.
3. Input for EA is not easily available, because costs and benefits relevant to the environment are not easily measurable.
4. Many business and the government organization even large and well-managed ones do not adequately track the use energy and material or the cost of inefficient materials.
use, waste management and related issue. Many organizations therefore significantly, underestimate the cost of poor environment performance to their organization.

(5) It mainly considers the cost internal to the company and excludes cost to society.

(6) EA is a long-term process therefore to draw a conclusion with help of it, is not easy.

(7) EA cannot work independently. It should be integrated with the financial accounting which is not easy.

(8) EA must be analyzed along with other aspects of accounting. Because costs and benefits related to the environment itself depend upon the results of the financial accounting, management accounting, cost accounting, tax accounting, national accounting, etc.

(9) The user of information contained in the EA needs adequate knowledge of the process of EA as well as rules and regulation prevail in that country either directly or indirectly related to environmental aspects.
3.11 SCHEMATIC ENVIRONMENT ACCOUNTS

PRODUCED ASSETS

<table>
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<th>Description</th>
<th>Amount</th>
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</thead>
<tbody>
<tr>
<td>Opening Stock Of Produced Assets</td>
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</tr>
<tr>
<td>Add: Gross Capital Formation Of All Other Produced Assets For Environmental Protection</td>
<td>*</td>
</tr>
<tr>
<td>Other Accumulation Of Produced Economic Assets</td>
<td>*</td>
</tr>
<tr>
<td>Gross Capital Formation Of All Produced Assets</td>
<td>*</td>
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<tr>
<td>-------------</td>
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<tr>
<td>Gross Capital Accumulation</td>
<td>*****</td>
</tr>
<tr>
<td>Less: Consumption of Fixed Capital of Other Than Produced Assets For Environmental Protection</td>
<td>*</td>
</tr>
<tr>
<td>Degradation of Produced Assets Not Reflected In Market Value of Assets</td>
<td>*</td>
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<tr>
<td>-------------</td>
<td></td>
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<tr>
<td>Net Capital Accumulation</td>
<td>**</td>
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<tr>
<td>Add: Holding Gains On Produced Assets</td>
<td>*</td>
</tr>
<tr>
<td>Less: Other Changes In Volume Of Produced Assets Other Than Degradation</td>
<td>*</td>
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<tr>
<td>Holding Losses On Produced Assets</td>
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<tr>
<td>-------------</td>
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<tr>
<td>Closing Stock Of Produced Assets</td>
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</table>

NON PRODUCED ECONOMIC ASSETS

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
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</thead>
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<td>Opening stock of non produced economic assets</td>
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<td>Add: gross capital formation of all other non Produced economic assets</td>
<td>*</td>
</tr>
<tr>
<td>All other increases in non-produced economic Assets</td>
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<tr>
<td>gross capital accumulation</td>
<td>*****</td>
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<td>less: depletion of non produced economic assets</td>
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<tr>
<td>depletion of non produced assets reflected in market value of assets</td>
<td>*</td>
</tr>
<tr>
<td>degradation of non produced assets not reflected in market value of assets</td>
<td>*</td>
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<td>-------------</td>
<td></td>
</tr>
<tr>
<td>net capital accumulation</td>
<td>**</td>
</tr>
</tbody>
</table>
add: holding gains on non produced economic assets
less: other gains in volume of produced economic
assets other than depletion, degradation and other
accumulation
holding loss on non produced economic assets

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closing stock of non produced economic assets

OTHER NON PRODUCED ENVIRONMENTAL ASSETS
opening stock of other, non produced environmental
assets
add: gross capital formation of all other non
produced environmental assets
all other increases in non produced
environnemental assets

----------------
GROSS CAPITAL ACCUMULATION

less: depletion of non produced environmental
assets
depletion of other non produced assets reflected in
market value of assets
degradation of other non produced assets not
reflected in market value of assets

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net capital accumulation

less: other charges in volume of produced environmental
assets other than depletion, degradation and other
accumulation
holding loss on non produced
environmental assets

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CLOSING STOCK OF NON PRODUCED ENVIRONMENTAL ASSETS

3.12 ENVIRONMENTAL ACCOUNTING

3.12.1 ROLE OF ACCOUNTANTS

Promoting Sustainability. According to Adams, the accounting profession is also a
stakeholder in meeting the challenges of Agenda 21, set down at the first Earth Summit in
Rio de Janero in 1992. He is of the view, that the accounting profession is not a narrow small
box. Instead, accountants do influence, how organizations develop and thus can promote
sustainability.
A look at the boards of directors of most multinational corporation (MNCs) will reveal that professionally qualified accountants are acting not just as finance directors; very often they are managers. “Once you accept that accountants have a role as businessmen, they have a role in sustainable development in determining the way in which companies make their strategic choices – the extent to which they are prepared to take environmental issues into account in planning their market strategy for the next 10 to 20 years.”

**Reporting.** Reporting is one way of demonstrating the accountability and transparency of a company’s operations. Traditionally, you get only one auditor’s report in two, three or four paragraphs. In Shell’s case, as stated above, separate, targeted comments were made by the auditors on different parts of their sustainability report.

**Verification.** Accountants are the verifiers of sustainability reports. It is possible that in the case of some companies these reports are merely a “glossing over of all the dirt, what is now called the commercialization of environmental issues.” The auditors have a responsibility to professionally verify the environmental reports in depth.

**Standards on Reporting.** The Global Reporting Initiative (GRI) has issued guidelines on sustainability standards. One section of the report deals with the concepts of reporting. The concepts of sustainability are based primarily on the conceptual framework (CFW) of the International Accounting Standards Committee (IASC), which requires that reports be relevant, timely, understandable and complete. The guidelines spell out the range of qualitative characteristics the report should present. Thus, the accounting profession has standards to ensure the quality of a sustainability report. To quote Adams, “While a lot of environmental reports would have probably done what can be called cheapskate auditing,… the professional accountants are traditionally skilled in corporate reporting techniques” to take care of such reporting.

Accountants have National Accountants Standards, which focus on environmental issues. Many practical examples given therein, explain how environmental issues may give rise to major liabilities. They also tell accountants how they must account for such costs.
“There is also a practice note from the International Auditing Practice Committee (IAPC) that instructs financial statements auditors on how they must integrate environmental issues into their audit and financial statements.”

**Taxation.** Governments are using taxation as a means of involving companies in sustainable development. They are introducing an accelerated tax depreciation allowance for companies that invest in environmentally beneficial technology. Accountants are involved in this area. They provide tax advice. In the UK, the Government has the landfill tax and the climate change levy.

**Small and Medium Industries.** Small and medium industries are the biggest polluting culprits all over the world. Governments have been trying to use different initiatives. There are initiatives relating to green business clubs where small businesses in similar areas can get together and talk about the environmental challenges they face.

There can be government-sponsored consultancies where small businesses can get free consultation. The accounting profession can provide advice on energy use. Governments can use the taxation system - capital allowances – to encourage small business to recognize the financial benefits they can get.

Many small and medium enterprises have limited financial resources to implement the ISO 14000 certification. They need to be helped.

**Externalities.** Emissions of solid waste into water and into air can cause harm to the environment and increase pollution. These are called externalities that companies cause.

In most countries, companies are not required under law either to reduce emissions or to pay for the cost of cleaning up the environment or for the health care cost.

Polluters should pay for the cost to the environment. Companies which “have invested in pollution control technology or paid for things like carbon sinks, no waste disposal off site, recycling and redesigning all its products so that they create no waste” would incur cost on all these things. It means the prices of the products or services should include all these additional costs in the price structure. Professionals, therefore, advocate full cost accounting. To avoid externalities, companies are advised to invest in pollution control technology. No company can make all the required investment in one year, and get rid of
externalities. It cannot make all-in-one investment. It should be spread over a period of years. This is called CONTINUAL INVESTMENT for reducing the externalities.

Legislation.“The way to get companies to move in the direction of continual investment, is by, progressively tightening legislation. Progressively refuse to let companies put so many ton of whatever in the atmosphere, or tax the solid waste going to landfill at rates that force the companies to invest in other technologies to eliminate waste.”

There are only two countries in Europe – the Netherlands and Denmark – where mandatory environmental reporting is in force. The experience shows that “where the country has specified or prescribed the environmental minimum, the companies would do the legal minimum, and nothing more. Instead, by allowing voluntary approach, you allow these companies to explore the available space, to obtain the plaudits and the praise from other organizations – NGOs and international providers of finance who want to ensure that there are no environmental risks in the investments they make.”

3.12.2 ROLE OF MANAGEMENT ACCOUNTANT

Given ever changing environmental laws and the complexities of environmental management, proactive business recognizes the need to environmental consideration into decision made throughout the organization.

Incorporating environmental considerations into decision making throughout the organization, requires the combined skills of multiple disciplines, including environmental managers, engineers, scientist, operation managers, economists, planners, lawyers and management accountant.

The management accountant has an important role to play on the corporate environment team, the management accountant may help to develop and important better environmental analysis tools and techniques in several ways such as

1. Helping assess the need for new of modified management information and financial system.
2. Developing or seeking capital investment and appraisal tools that more effectively incorporate environmental costs and benefits.
3. Isolating and computing individual environmental costs helping resolve conflicts between environmental management and traditional financial management system, such as those, that occur in capital investment appraisal.

4. Offering expertise in the financial evaluation of environmental litigation and settlement options.

5. Working with other professionals in the organization to assess the potential costs of failing to undertake environmental initiatives.

6. Training line personnel in environmental accounting reports and concepts and in performing new procedures (e.g. coding) to implement environmental accounting processes and system.

7. Helping improve methods for reallocating internal environmental costs to specific products and activities, and

8. Considering the financial costs and risks associated with an investment or product/processes design choices that will likely cause or increase pollution.

3.12.3 ENVIRONMENTAL ACCOUNTING AS A MANAGEMENT TOOL

Different Dimensions of Environmental Accounting

Environmental Accounting has been accepted as an umbrella term with various meanings and uses. However, votaries of this innovative concept have consensus regarding its focus in three different dimensions.

Chart 3.12.1 Environmental Accounting

<table>
<thead>
<tr>
<th>National Income Accounting</th>
<th>Financial Accounting</th>
<th>Management Accounting</th>
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<tbody>
<tr>
<td>the focus is one nation and it is for external use.</td>
<td>the focus is on the firm and it is mostly for the external use of stakeholders/others</td>
<td>with the focus on firm and its internal functions.</td>
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</tbody>
</table>
While the National Income Accounting concept is a macroeconomic one and it is called Natural Resources Accounting, the Financial Accounting concept is used to prepare the financial reports of the firm, so as to disclose various aspects to its stakeholders in the quarterly, half-yearly and annual reports. Environmental Accounting, in this context refers to the estimation and public reporting of environmental liabilities and financially material environmental costs. The third concept which we deal exclusively here, is from the management accounting angle. In management accounting, data is identified, collected and analyzed mainly for internal uses, as its prime purpose is to support management decisions. Thus it involves data on cost, production level, inventory, processes, waste and the like, and on many other vital aspects of the business. Once data is collected under this system, it is analyzed and used to plan, evaluate and control the internal system in the best interests of the organization. It may be in the form of planning and directing the management’s attention, informing decisions as to the alternatives available and the best suited alternative for the firm, capital investment, product costing and pricing thereto, risk management, production processes, compliance strategies etc. It attempts to control and motivate behavior so as to improve the business parameters.

Management accounting is the process of identification, measurement, accumulation, analysis, preparation, interpretation and communication of the financial information used by the management to plan, evaluate, and control things within an organization and to assure the appropriate use and accountability of its resources. Management accounting practices and its systems, vary according to the organization’s requirement, and thus the system is a flexible one. The managers use a broad set of cost and performance data to take innumerable business decisions. Environmental accounting in this context refers to the use of data about environmental costs and performance in business decisions and operations. This concept is being integrated into management accounting in a growing manner and it is influencing the critical business decisions. Product designing to process design, capital investment to product pricing, risk management to waste management, cost control to purchase decisions, product retention and product mix to performance evaluation, last but not the least operational management to performance evaluation – in all these spheres, information about environmental cost can influence the managerial decisions. Knowledge of environmental cost also paves the way for environmental compliance strategies.
3.12.4 ROLE OF MEDIA IN ENVIRONMENTAL ACCOUNTING

Media, particularly in a democratic set up, is an important component of the civil society to act as the vanguard of the society. Enjoying constitutionally granted freedom, and building capacity in terms of reach and coverage, the media contributes through several activates to only one ultimate goal of revealing the truth, which is relative. The traditional role of media concentrating on only the socio-political aspect of the society has undergone a sea change, particularly due to increased influence of professionalism and technology. Moreover, due to sophisticated technology, the media is now able to mirror-reflect the pulse of the public that is not only the directing force in every walk of the society, but also the rectifying agent. The challenge for the media, therefore, is to combine two areas of professional practice: Socio-ecologic journalism and development journalism. In doing so, they must restore the reputation of development journalism, which has been tarnished by too close an association with the economic goals of national governments (Berger, 2002).

Corporate accounting and reporting, as an activity, cannot be kept in isolation from the media impact. Media attention has forced companies to examine, and in some cases revise, their policies and practices on a range of CSR issues. Empirical research examining the occurrence of socio-ecologic information in the annual reports, has identified an increasing quantity of social and environmental disclosure in case of companies receiving low environmental performance ratings, publication of negative environmental events or the occurrence of fines and prosecutions for spills and disasters (Rockness, 1985; Patten, 1992; Deegan and Gordon, 1996). In case of corporate houses, experiencing negative environmental effects provide little negative socio-ecological information in their annual reports, if the event has not been published. The results of the prior studies while assuming greater importance of highlight of negative socio-economic events, calls for the media in general, and broadcasters in particular, to play a key role for sustainability or for safeguarding the planet’s resources for future generation. Protecting the natural environment requires not just changes in government policies, but also modifications in the behavior of every citizen-individual or corporate. Many of the day-to-day decisions are shaped by the media as it is widely regarded as the most influential medium of all, because of its capacity to shape government policy by influencing public opinion.
The inclusion of media people in the very environmental audit committee of several organizations, is a testimony of their contribution to environmental accounting and reporting. Media can influence socio-ecologic accounting practice by its intervention in every vital aspect, be it the framework of objectives, valuation concepts, measurement methodology or reporting standards. Various stakeholders’ perception about the socio-ecologic goals and activities of a company can very well be captured by media for cross-transmission and modification. ‘You Decide’ program of NDTV 24 x 7 and ‘Jawabdehi’ of Zee News channel are really vital programs carried on in India through which media organizations can transmit information from one party to the other, not only to activate them to play their individual role towards socio-environmental goals, but also to build trust and faith among each other, which is the essence of SUSTAINABILITY. This act of media can significantly influence the goal-setting process of the corporate entities and also the way the inputs and impacts are valued. Further, because of the interpersonal and inter-temporal implications involved in socio-ecologic accounting, the measurement methodologies adopted are to be in tune with those valuation concepts or else the figures put in the accounting reports will lack transparency. Finally, the reporting standard to be followed for the disclosure of the socio-ecologic information needs public vetting and the role of media cannot be ignored in this regard.

Judging from media reports and public opinion polls, the level of public trust in corporations is at an all-time low. The disruption and loss to workers, investors and communities associated with the recent corporate failures have taken a severe toll on economies and societies. Since reputation, the most important intangible assets, is the driver of an organizational value, every corporation would like to come up with a clean image for creation of green- and blue value by providing the socio-ecological information in annual reports as a response to the media campaign. Further, the coverage of socio-ecologic reporting by the media as a policy commitment in its editorial column can help broadcasters in negotiation with the government for legislations and fostering accountability and ethics, the two pillars of sustainability, in the industrial landscape.
3.13 LEGAL FRAMEWORK FOR ENVIRONMENTAL ACCOUNTING IN INDIA

While industrial licensing has been abolished for all practical purposes, environmental clearance from various government authorities has now taken the center stage. Increasing concern with the protection of the environment and taking anti-pollution measures have become major concern all over the world in the last two decades. India also set up the Central Ministry of Environment with the object of coordinating among the states and the various ministries, the environmental protection and anti-pollution measures. Necessary legislation has also been passed.

(1) The various laws relevant to the environmental protection are as under:

(a) Directly related to the environmental protection:

(3) The Air (Prevention and Control of Pollution) Act, 1981.

(b) Indirectly related to the environmental protecting:

(6) Constitutional provision (Article 51A).
(12) Merchant of shipping Act, 1958.
(13) Indian Port Act.
(14) Indian penal Code.

(2) It is important to note that all new projects require environment clearance. This clearance concerns both the Central Ministry of Environment and Forests and the corresponding State Government’s department of environment. Guidelines have been
announced and all such projects are expected to obtain environmental and anti-
pollution clearance before they are actually set up.

(3) The Central Pollution Control Board (CPCB) has also been set up. Wherever cases of
violating of standards of water or air pollution have been detected, show cause notices
have been issued to industrial units and all such units are being kept under constant
surveillance.

(4) According to the Annual Report of the Ministry 1997-98, out of 1551 large and 1261
have installed the requisite pollution control facilities and 165 units are in the process
of installing such facilities. 125 units have been closed down.

(5) Accounting Requirement:
(a) A Gazette Notification on Environmental Audit issued by the Ministry of
Environment and Forests in 1992 (amended vide notification GSR 386 (E), date, 22-
04-1993), under the Environmental (Protection) Act, 1986 has made it mandatory for
all the industrial units to submit an environmental statement to the concerned State
Pollution Control Boards, while seeking consent to operate under the relevant
environmental norms. The Environment Statements enable the units to take a
comprehensive look at the industrial operations, facilitate the understanding of
material flows and help them to focus on areas where waste reduction and
consequently saving in material cost, is possible.

(b) Indian Companies Act, 1956 requires to include in Director’s report environment
related policies/problems and annexure details of energy consumption energy
conservation.

(c) Cost Accounting record rules for various industries made by the Central Government
also require disclosing monetary and quantitative values in Cost Accounting.

The central government and state government have passed various statues to contain and
control the problem of environmental pollution and ecological imbalances. Some of the
significant enactments relating to various aspects of environment are as follows.
Important Enactments Relating to Environmental Pollution

(A) Water pollution
   2. North India Canal and Drainage Act, 1873
   3. Indian Ports Act, 1908
   4. River Boards Act, 1956
   5. Merchant Shipping Act, 1958
   6. Water Prevention and Control of Pollution Act, 1974
   7. Water Prevention and Control of Pollution Cess Act, 1977

(B) Air Pollution
   1. Indian Boilers Act, 1923
   3. Factories Act, 1947
   4. Industries Development and Regulation Act 1951
   5. Air prevention and Control of Pollution Act, 1981

(C) Radiation
   1. Atomic energy Act, 1962
   2. Radiation Protection Rules, 1971
   3. The Chemical Weapons Convention Act, 2002

(D) Health laws
   1. Medical Termination of Pregnancy Act, 1971
   2. Pre Natal Diagnostic (Prohibition of misuse) Act, 1994

(E) Forest and wildlife
   1. Indian Forest Act, 1927
   2. Forest Conservation Act, 1980
   3. Wildlife Protection Act, 1972
   4. Biological Diversity Act, 2002
   5. The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006
(F) Others

1. Poisons Act, 1919
2. Factories Act, 1948
3. Insecticides Act, 1968
4. Indian Fisheries Act, 1897
5. Prevention Food Adulteration Act, 1954
6. Urban Land Sealing and Regulation Act, 1976
7. Mines Act, 1952
8. Indian Penal Code, 1860
10. Ancient Monuments and Archaeological Sites and Remains Act, 1958
11. Criminal Procedure Code, 1973
12. Indian Exclusive Act, 1884
13. Indian Easements Act, 1882
15. National Environment Tribunal Act, 1995
17. Motor Vehicle Act, 1988

The Environment Act, 1986 also includes seven schedules lying down the standards for quality of environment and for emission or discharge of environmental pollutants, and nine notified rules on handling and management of various hazardous substances.

Various schedules under environmental protection Act, 1986
Schedule I – Industries parameters and standards of emission
Schedule II – Omitted
Schedule III – Ambient air quality standards in respect of noise
Schedule IV – Standards for emission of smoke, vapor etc. from motor vehicles
Schedule V – List of authorities who will initiate action in case the discharge is in excess of prescribed limits.
Schedule VI – General standards for discharge of environmental pollutants
  Part A – Effluence
  Part B – Waste water generations standards
Part C- Local based standards
Part D – General emissions standards
  1. Concentration based
  2. Equipment based
  3. Load / mass based
  4. For oil refineries
Part E – Noise standards for automobiles
Schedule VII – National ambient air quality standards

3.14 THE INDIAN CONSTITUTION AND ENVIRONMENT PROTECTION

The constitution is known as the basic law of the land from which all other laws
derive their sanctity and validity. Therefore it must be a living and growing law – means
must be able to cope with the newer situations and development. Mrs. Indira Gandhi was the
first head of state to address the first international conference on human environment at
Stockholm in 1972 and voiced deep concern about the degradation of the environment and
eco imbalances. She also emphasized that pollution, population and poverty are interrelated
problems and there must be an integrated approach to deal them. India was also one of the
signatories of the Stockholm declaration which is known as The Magna Karta on own
human environment.

Therefore to fulfill its promise made at the Stockholm conference, the Indian
parliament passed the 42nd Amendment to the constitution in 1976 (1) and incorporated
specially two articles relating to protection and improvement of the environment. Thus,
INDIA BECAME THE FIRST COUNTRY IN THE WORLD TO HAVE PROVISIONS IN
THE ENVIRONMENT IN THE CONSTITUTION.

1. According to Article 253, parliament has power to make any law for the whole or any
   part of the territory of India for implementing any treaty, agreement or convention
   with any other country.
2. According to Article 48 A, the state shall endeavor to protect and improve the
   environment and to safe guard the forest and wildlife of the country.
3. According to Article 51-1(G) it shall be a duty of every citizen of India to protect and improve the natural environment including forest lakes and wild life.

Apart from aforesaid articles, there are few more fundamental and other rights which can be sighted as under.¹

1. Right to pollution-free and healthful environment – fundamental right
2. Right to equality and environment
3. Freedom of trade and commerce and environment
4. Right to life and right to clean, healthy environment
5. Right to livelihood
6. Right to shelter
7. Right to Salubrious and decent environment
8. Right to life guaranteed under article 21
9. Right to sweet water/potable water
10. Right to health, strength and hygienic working condition
11. Right to sleep peacefully

REFERENCE