

## Integrating Environmental Accounting in Agro-Allied and Manufacturing Industries: Role of TVET Institutions in Sustainability

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**Abstract:** 'ONLY WHEN THE LAST TREE IS CUT, ONLY WHEN THE LAST RIVER IS POLLUTED, ONLY WHEN THE LAST FISH IS CAUGHT, ONLY THEN WILL THEY REALIZE THAT YOU CANNOT EAT MONEY' American proverb

Due to growing awareness and concern on the impact of human activity on the ecosystem, there is an increasing trend to judge organizations in relation to the community in which it operates. The impact of the activities on the environment with regard to pollution of water, air, land and abuse of natural resources are coming under scrutiny of governments, stakeholders and citizens. Education is considered the key to effective development strategies and TVET institutions then must be the master key that can alleviate poverty, promote peace, conserve the environment, improve the quality of life for all and help achieve sustainable development. Unless proper accounting work is done, it cannot be determined that both have been fulfilling their responsibilities. The aim of the study was to explore whether distinctive processes of environmental accounting are possible in agro-allied and manufacturing industries with a view to enhancing sustainability. To accomplish this aim, this research explores environmental accountability practices in TVET institutions. This paper is in part of an exploratory research project and it is limited in that it attempts to be illuminative and theoretically driven. The paper aims to prove that environmental reporting and disclosure will enable in agro-allied and manufacturing industries undertake a major transformation that includes approaches that harmonize economic prosperity, environmental conservation and social well-being. However, while strategies for achieving this goal are not widespread, a range of international experiences is beginning to suggest ways forward. These initiatives include national TVET policy reforms, green campus, green curriculum, green community, green research and green culture. The paper includes suggested templates that can be useful in agro-allied and manufacturing industries.

**Keywords:** Environmental Accounting, Sustainability, Agro-allied and Manufacturing Industries, TVET Institutions

### I. Introduction

The beginning of the 21st century is marked by a number of big challenges for the environment and for international development: Mitigating the impact of climate change, fighting poverty, providing fair opportunities for development and an existence worth living for a world population that is anticipated to pass the nine billion mark by 2015, putting an end to the dramatic loss of biodiversity and effectively addressing environmental pollution which is on the rise globally. (TVET Green Economy, 2013 pg. 13)

Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts which includes the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs. (World Commission on Environment and Development, 1987)

In the context of sustainable development, the concept of green economy has established itself on a global level as the new environmental guiding principle. The key issue is that the environmental protection should be considered as more than just a general cost factor. On the contrary, it may offer more opportunities for more economic growth, increased prosperity and social justice. The main idea is that environmental protection, economic growth and poverty reduction can go hand in hand. Therefore a greening economy seems indispensable because continuing 'business as usual' will inevitably lead to an ecological and social dead end. It

would be important to better utilize and realize the value of resources to create income and employment and to reduce poverty. (TVET Green Economy, 2013 pg. 9)

The concept of sustainable development was stated at first in the report of Our Common Future prepared by Commission on Environment And Development of United Nations in the year of 1987 and has become prevalent. In this report, the sustainable development is described as satisfaction of today needs without making concessions from satisfaction of needs of future generations.

In this report, it is stated that environmental problems has threatened the earth and all people of both developed and developing countries, crisis over the world are interrelating and environmental problems could not be differentiated from other problems and it is also declared that development in the current evaluation level of the humanity would be ended after a while and this would be prevented by understanding of “sustainable development” and development of countries would be ensured via common quest of people. (Haftacı & Soylu, 2007, p.112)

From the perspective of these developments, enterprises have taken important steps in the subject of environment since beginning of 1990s. However, progresses related to this matter in the field of accounting and finance was reluctant and superficial at the beginning. It is known that unless a realistic movement and change in the economic structure is supported by accounting and finance practices, it would not be successful. For this reason, contributions and achievements of corporations in this subject have been late. (Akün, 1999, p.152)

Since 2008 the United Nations Environmental Programme (UNEP) has been advocating in favour of the concept of a green economy, meaning a low-carbon, resource-efficient and socially inclusive economy. When put in relation to the guiding principle of sustainable development, green economy is considered an addition and represents a more specific wording within each respective sector, seeking to increase prosperity, mitigate environmental impact and promote social justice. Its expectation is that an ecologically-relevant remodeling of the economy triggers a push in innovation in environmentally friendly technologies beneficial to all: the environment and climate, economy and employment and last but not least, society. “With smart public policies, governments can grow their economies, generate decent employment and accelerate social progress in a way that keeps humanity’s ecological footprint within the planet’s carrying capacity,” says UN Secretary-General Ban Ki-moon when presenting an UNEP study on the topic in November 2011 (Kürschner-Pelkmann 2012, 1).

Many companies and organizations currently engage in environmental management and environmental accounting supplements environmental management. Data that is produced by the organization can be utilized both internally and outside the organization by the preparation of environmental reports. This environmental accounting data forms a major part of an environmental report. (Environmental accounting guidelines 2002 pg. 2).

The quantitative management of environmental conservation activities is an effective way of achieving and maintaining sound business management. It enables environmental activities to be accurately identified, measured, classified and analyzed. This will not only improve efficiency of environmental management activities but will also be able to supplement rational decision making. (Environmental accounting guidelines 2002 pg. 2).

Companies and other organizations are required to have accountability to stakeholders such as consumers, business partners, investors and employees when utilizing environmental resources. Disclosure of environmental accounting information is a key process in performing accountability. Consequently, environmental accounting helps companies and other organizations to boost their public trust and confidence and is associated with receiving of fair assessment. (Environmental accounting guidelines 2002 pg. 2).

Environmental accounting covers two distinctive contexts. It can be used to provide an insight on the interaction between the environment and a nation or a region, or it can target the activities of a company or organization. Information obtained from environmental accounting by companies is given in two forms i.e. monetary value and physical units. (Environmental accounting guidelines 2002 pg. 2).

Environmental accounting is composed of environmental conservation cost in terms of monetary value, environmental conservation benefits in form of physical units and economic benefits associated with environmental conservation activities in monetary values. Environmental accounting is structured to identify, measure and communicate a company’s activities based its environmental conservation cost or economic benefits associated with environmental conservation activities, the company’s financial performance which is expressed in monetary value, and its environmental conservation benefits, the organization’s environmental performance which is designated in physical units.(EMA august 2005).

Conventional corporate reporting emphasizes on economic performance of companies and does not normally take company related environmental impact into account. Consequently environmental costs and benefits are not identified and therefore not considered when making business decisions.(EMA august 2005).

TVET should be ascribed a central role in the discussion and implementation of sustainable development and green economy as it prepares people to consider environmental and sustainability aspects for appropriate applications in their professional practice. (TVET Green Economy, 2013 pg. 9)

Within the context of green economy, international organizations, such as the International Labour Organization (ILO), the European Centre for the Development of Vocational Training (CEDEFOP) and the United Nations Environmental Programme (UNEP) have researched through empirical studies how green skills requirements are being addressed by national TVET systems and derived lessons learnt. Amongst others, the following findings were presented:

TVET has not been integrated into national sustainability strategies and programmes; environmental and vocational training policies are often not harmonized.

- There is no common understanding of the terms green jobs or environmental professions.
- Improving existing vocational skills is more important than developing green jobs and green TVET separately.
- Reliable data collection with respect to green skills needs is a considerable global challenge
- A shortage of skilled labor seriously impedes the transition to a green economy.
- Competences in the fields of mathematics, information technology, natural sciences and technology are preconditions for green economic growth.

Substantial expansion of TVET should be one of the objectives of education strategy especially with respect to set to become more important in the future such as renewable energies and natural raw materials. In order to open up more employment opportunities in the control of greening opportunities in the context of greening economies, job profiles and curricula are to be revised and expanded. In development cooperation with respect to energy and resource protection as well as renewable energies. Two approaches should be employed in integrating green skills into vocational training courses and existing continuing education and secondly supporting building of skill profiles for independent environmental professions. (TVET for green economy pg. 10).

The continued growth of Kenya's labor force and the envisaged vision 2030 goals provide an opportunity for Kenya to position herself strategically on the global scene. Success of vision 2030 is hinged on sheer numbers, skill and quantity of the country's manpower. The GOK therefore has committed itself to facilitate the development of infrastructure and human resource capacity, ensuring good governance, strengthening quality and assurance of training and providing incentive for industry linkages and participation in TVET. In this regard, the GOK seeks the concerted and supportive efforts by all stakeholders in the Kenyan TVET sector. (TVET Policy, GOK – 2012)

## **II. Statement Of The Problem**

It is not possible to say that while meeting its endless demands and needs, humankind has made use of the ecological environment economically. The signs that have been seen over the last ten years show that due to this consumption desire, human kind will lead the world up to a calamity faster than it is estimated. This course of events has to be stopped urgently for the sake of future generations. The concept of sustainable development therefore becomes important. For sustainable development to be achieved, all sectors of the society have great roles. Enterprises are one of these sections (serol et al 2009).

There is an increasing trend to judge an enterprise in relation to the community in which it operates just as a responsible citizen is judged by his actions in relation to the community in which he lives. The impact of the activities of the organization on the environment with respect to pollution of water, air, land and abuse of natural resources are coming under the scrutiny of government, shareholders and citizens. (<http://www.iucnus.org/greenaccounting.html>)

Unless proper accounting work is done either by individual organization or by the government itself, it cannot be determined that both have been fulfilling their responsibilities towards the environment. Therefore the need for environmental accounting had emerged.

To ensure sustainable development, it is seen that environmental accounting is a promising approach in terms of providing information to assist in ensuring the equilibrium between the economy and the environment (mutlu, 2007 pg. 169).

Environmental accounting at organizational level aims to address the needs of the organization to measure the economic efficiency of their environment conservation and the business activities of the organization as a whole.

In today's rapidly changing knowledge economy, TVET is increasingly being regarded as the key to improving the competitiveness of workers and helping countries achieve sustainable economic growth (kim 2006).

Since education is considered the key to effective development strategies, TVET must be the master key that can alleviate poverty, promote peace, conserve the environment, improve the quality of life for all and help achieve sustainable development. This is in line with major UNESCO priorities such as education for all, poverty alleviation, meeting the needs of youth, women and girls and the disadvantaged, equitable and sustainable development. These are the key themes in the 2005 – 2014 UN Decade of education for sustainable development. (Bonn declaration 2004)

### **III. Aim Of The Study**

The aim of the study was to explore the effects of integrating environmental accounting in agro-allied and manufacturing industries sustainability whilst looking at the role of TVET institution.

### **IV. Objectives Of The Study**

The objectives of the study are to:

1. Explain the approaches of environmental accounting
2. Establish the implication of integrating environmental accounting processes in agro-allied and manufacturing industries
3. Discuss the role of TVET in integrating environmental accounting and its effects on sustainability of agro-allied and manufacturing industries.

### **V. Literature Review**

Many internal and external stakeholders are showing increasing interest in the environmental performance of organizations, particularly private sector companies. An example of internal stakeholders might be employees affected by pollution in the work environment. External stakeholders include communities affected by local pollution, environmental activist groups, government regulators, shareholders, investors, customers, suppliers and others. The types and intensities of environmental pressures can vary widely from country to country and among different business sectors. It is safe to say, however, that environmental pressure is forcing many organizations to look for new, creative and cost-efficient ways to manage and minimize environmental impacts. Prominent examples of environmental pressure relevant at the international level include:

- supply chain pressures, such as large companies requiring their suppliers to comply with the Environmental Management System (EMS) standard of the International Standardization Organization
- disclosure pressures from various stakeholders for companies to publicly report their environmental performance in annual financial accounts and reports or in voluntary corporate environmental performance reports, for example, via the guidelines of the Global Reporting Initiative; financing pressures via the worldwide growth of socially responsible investment (SRI) funds, investment rating systems such as the Dow Jones Sustainability Index and investment policy disclosure requirements;
- regulatory control pressures, for example, the RoHS Directive, a European Union (EU) regulation that restricts the use of certain hazardous substances in electrical and electronic equipment sold in the EU;
- environmental tax pressures, for example, various government-imposed environment-related taxes such as carbon taxes, energy use taxes, landfill fees and other emissions fees;

There is growing awareness and concern on the impact of human activity on the ecosystem. This concern at global level about the impact of human activity on the environment and the need for mitigating the effects led to the codification of 'soft law' on the environment which began with the United Nations Stockholm Conference on Human Environment and the launch of UN environmental programme in 1972. The principles such as 'polluter pays', absolute liability, no fault liability, precautionary principle, intergenerational equity and good neighborliness began to take root in international and national regulations. (<http://www.iucn.org/greenaccounting.html>).

The Brundtland Commission report states 'humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs'

Forms of environmental accounting include:

Environmental Management Accounting (EMA). This focuses on internal business strategy decisions and is the process of identification, collection, and analysis of information for internal decision making. It involves physical information on use, flows and fails of energy, water, and materials and monetary information on environmentally related costs earnings and savings.

Environmental Financial Accounting (EFA). This is used to provide information needed by external stakeholders on a company's financial performance. This type of accounting allows companies to prepare financial reports for investors, lenders and other interested parties.

Environmental National Accounts. This is done at the national level with particular focus on natural resources, stocks and flows, environmental costs and externality costs.

The scope of environmental accounts includes from an internal point of view, the investment made by corporate sector for minimization of losses to the environment, and from an external point of view, it includes all types of losses incurred indirectly due to business operation activities. These mainly includes degradation and destruction like soil erosion, air pollution, water pollution, solid waste, coastal and marine pollution, depletion of nonrenewable natural resources and the deforestation and land use.

Environmental performance is one of the many important measures of business success. Many environmental costs can be significantly reduced or eliminated as a result of business decisions for example by investing in greener processes. (Qureshi et al 2012).

Environmental costs can be offset by generating revenues through sale of waste by products. Better management of environmental costs can result in improved environmental performance and significant benefits to human health as well as business success. Understanding the environmental costs and performance of processes and products can promote more accurately costing and pricing of products and can aid companies in the design of more environmentally preferable processes, products and services for the future. Also competitive advantage with customers can result from processes, products and services that can be demonstrated to be environmentally preferable. Finally 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 on ISO 14000. (Qureshi et al 2012).

Environmental reporting is the term now commonly used for environmentally related data regarding environmental risks, environmental impacts and policies. Corporate environmental protection should include reporting initiatives taken by the enterprise, the adverse impact of its production process and products on the environment both in quantitative and qualitative terms, and its initiatives in the process and product innovation in order to achieve sustainable growth.

## **VI. Research Methodology**

The researchers conducted a desk review of documents both at organizational level, country level and at international level i.e. an external desk review. Data collection was mainly dependent on secondary data sources. The researcher also conducted interviews with selected key informants and groups as well as interviewing stakeholders where appropriate.

This desk review was developed to address the research questions as outlined in the appendices (appendix 2). The desk review expanded on the questions thus providing a wider and fuller interpretation of the two variables namely environmental accounting and sustainability. The role of TVET in this context was also examined.

The documents used for the review included books, journals, reports, etc. as was found appropriate. Data triangulation was achieved by interviewing a range of stakeholders at different levels from a variety of institutions and reviewing a wide range of documents.

### **Challenges and Limitations**

The challenges faced by this review included the limitations of counterfactuals, constraints in identifying sound basis for comparison between the agro-allied and manufacturing entities that had applied environmental accounting systems and the role that TVET institutions played. There were also possible biases of the key informants and stakeholders. The researchers sought to minimize possible biases through triangulation of the methods and data wherever feasible. There was also lack of baseline and end line data for most these indicators at output and outcome levels. The researchers encountered limited availability of monitoring data and reports were usually delayed hence not useful.

## **FINDINGS**

### **Approaches of Environmental Accounting**

Approaches to environmental accounting include environmental conservation cost, environmental conservation benefits and economic benefits associated with environmental costs.

Environmental Conservation Cost includes Investments and expense related to the prevention, reduction, and/or avoidance of environmental impact, removal of such impact, restoration following the occurrence of a disaster, and other activities are measured in monetary value.

Investment amounts are expenditures allocated during a target period for the purpose of environmental conservation. Expense amounts refer to the expense or losses recorded under financial accounting standards resulting from the consumption of goods or services for the purpose of environmental conservation. (environmental accounting guidelines 2002).

The integration of the environmental accounting into the agro allied and manufacturing industries will cause the realization of various environmental conservation benefits. It will also ease the classification of environmental costs in order to match the expense incurred to benefits received. (environmental accounting guidelines 2002).

These benefits can be broken down into four categories namely environmental conservation benefits associated with inputs of resources into business operations, environmental conservation benefits associated with environmental impact and waste emissions from business operations, environmental conservation benefits associated with goods and services produced by the business operations and environmental conservation benefits associated with transport and other operations.

Environmental benefits associated with environmental conservation activities can be divided into actual benefits and estimated benefits depending on whether the data is confirmed. Actual benefits are the economic benefits calculated on confirmed data. Estimated benefits are those benefits calculated based on certain premise.

### **Implication of Integrating Environmental Accounting Processes In Agro-Allied and Manufacturing Industries**

(Hoffman 2011) highlighted that the transition to a low carbon economy has been focused to have a positive impact on employment. In view of the assumption that the strengthened regulations to reverse climate change will lead to more environmental products and services being produced and the expansion of green sectors will create green jobs. The implication of this therefore is that with more environmental jobs and services created there will be a heightened need for environmental accounting.

There will also be a need to incorporate green skills components into occupations. The extent of skill change will determine whether new occupations are emerging or whether existing occupations are changing. (Hoffman 2011). The agro allied and manufacturing industries will have to recognize and appreciate this skills change to enhance their sustainability, therefore the element of accounting has to come in as an attempt will have to be made to match the cost and benefits of these green processes.

**Table 1: Suggested Template for Matching Environmental Costs and Benefits**

Environmental Costs			Green Sources Benefits		Savings
Category	Key activity	Amount	Description	Amount	Amount
Business area cost					
Upstream/downstream costs					
Administration costs					
Research and development costs					
Social activity costs					
Environmental remediation costs					

Source: researcher study data

### **Role of TVET Institutions in Intergrating Environmental Accounting for Sustainability Of Agro – Allied And Manufacturing Industries**

Yakub (2011) has stressed that the key elements in making TVET systems respond to green economy are the alignment of skills development policy with green growth, public private and social sectors coordinate trained and skilled educators in green TVET and strong quality assurance and monitoring mechanisms.

He offered possible emulation of best practices for greening of TVET keeping in mind five key dimensions: green campus, green curriculum, green community, green research and green culture. All these will not be successfully applied and sustained unless some accountability is done.

Majumdar (2011) proposed to have a three tier approach for implementing a greening TVET framework comprised of national framework, institutional framework and international cooperation, a reflection of a broad range of essentials and a representation of multiple players across sectors that may have existing relevant but fragmented approaches to achieve sustainable development. Under the national framework, countries need to consider formulating a green policy and a strategic plan upon which a green framework can be drawn. This should have a holistic approach to transform the existing TVET institutions into green TVET with clear objectives and monitoring mechanisms. He proposed that the institutional framework should have a focus on giving strategic directions to managing a green campus, adapting green curriculum, fostering green research, building capacity of green community and promoting green culture.

The green campus is based on the philosophy of practicing what is being preached in managing campus resources such as energy, water and waste resources. This dimension intends to reduce the carbon footprint of students, teachers and staff within the TVET institutions. This will be beneficial to agro-allied and manufacturing industries when they absorb graduates of TVET institutions. This will assist the various organizations in this sector to reduce their carbon footprint.

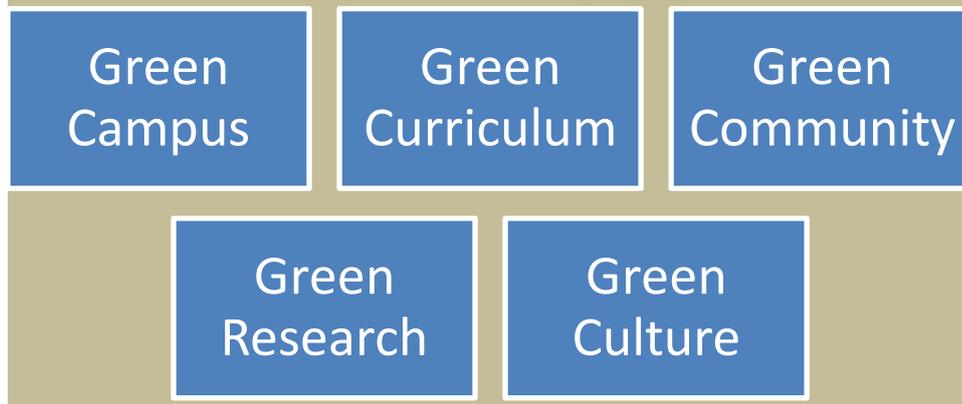
The second dimension on green curriculum necessitates the need to upgrade the curriculum to meet the necessary skills for clean and green jobs. As more and more green jobs are created in the agro allied and manufacturing industries, it will ensure the appropriate personnel are absorbed.

A third dimension is the need to build a green community through extending sustainable development practices at the community level so that the movement of TVET institutions extends to the society at large. This will help create the demand for green jobs and services which will stimulate growth and sustainability in industries in the agro-allied and manufacturing sector.

Majumdar (2011) further adds that the fourth dimension on green research is to foster development on research culture in relevant areas of sustainable development. The research done by TVET institutions will foster solution of the sector problems.

The fifth dimension is on green culture which hopes to strengthen education values, ethical standards attitudes and behaviors. To ensure that all this is being implemented correctly, environmental accounting should be integrated at national and institutional level.

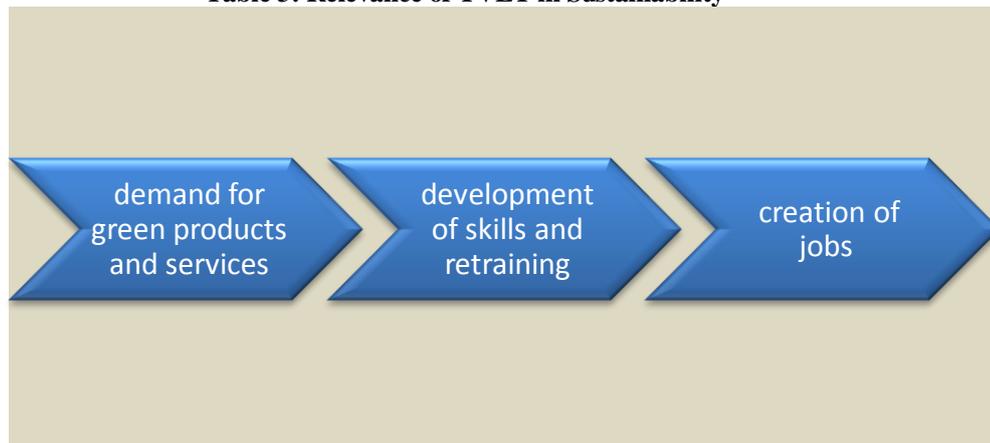
**Table 2: Summary of Role of TVET Institutions in integrating Environmental Accounting**



Source: researchers study data

Yakub (2011) has offered a working continuum that can be useful to the sustainability of agro allied and manufacturing industries. The continuum starts with driving the demand for green products and services, providing access, developing skills and making retraining provisions for those who already possess the skills, and creating jobs that will allow enterprise generation and employment. It is at this point that the relevance of TVET institutions will come to the forefront. The TVET institutions can therefore take lead in developing skills and making retraining provisions for those who are already in possession of those skills.

**Table 3: Relevance of TVET in Sustainability**



Source: researchers study data

## APPENDICES

### Appendix 1: References

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### Appendix 2: Research Questions

- [1.] What are the approaches of environmental accounting?
- [2.] What are the implications of integrating environmental accounting processes in agro-allied and manufacturing industries?
- [3.] What is the role of TVET institutions in integrating environmental accounting and its effects on sustainability?