Table of Content

Chapter 1 Introduction

In this introductory chapter, a general overview of the growing environmental awareness over the past decades and today, in the developing and developed world are outlined paying more attention on Rachel Carson's book of "Silent Spring" which heralded the arrival of environmental era during the 1960s as well as the 1972 Earth Summit on "Human Environment" held in Stockholm. The chapter then proceeded with the concept of "Sustainable Development" that emerged in the 1980s to replace the "limit to growth" or "Zero growth" thinking toward the environment during the 1970s. The chapter then ends with the various tools for environmental management which were developed during the 1990s to meet the goals of sustainable development as well as the problem formulation.

1.1 Historical Overview of Environmental Concerns over the past decades and today

The book *Silent Spring*, on the global problems of herbicides and pesticides written my Rachel Carson in 1962, heralded the arrival of the environmental era. The 1960s also saw the emergence of environmental economics as a separate branch of economics. During this period, it was felt that growth and development and protection of the environment could not go hand in hand. Thus, most of the theories that developed during this period were anti-growth environmental developments, but also by initiating change within an organization and responding with new environmentally friendly products and production processes (Welford 1998).

During the 1970s and 1980s, there was a significant interest in and the awareness of environmental issues in developing countries. The close interrelationship between the environment and development came into sharper focus and became clearer than ever before. The current view from the south can be summed up as follows: "*environment must not be ignored but development must not be impeded"*. It is now generally accepted that environment and development are the two sides of the same coin.

The interest in environmental management in developing countries can be judge by the exponential growth of national environmental *"machineries"* (laws, regulation, legislation,

etc), during the 1972 Earth Summit on ``*The Human Environment*``, held in Stockholm, where only 11 national machineries were notable and predominantly in the industrialized countries. A decade later in 1981, the situation changed dramatically, when 106 countries had such governmental machineries, majority of which were in developing countries. Another decade later in 1991, nearly all countries of the south have had some form of governmental machineries to deal with various environmental problems. In one sense, the situation is very similar in the industrialized countries: the machineries works more efficiently in some countries than in other, and their effectiveness even in one country often varies with time, depending on the people who are in power and the overall socio-political climate. (Asit, K. Biswas, 1993).

The Stockholm conference which is said to be the first conference to have laid the foundation for environmental action at an international level lead to the establishment of the United Nations Environmental Programme (UNEP), in order to encourage United Nations agencies around the world to integrate environmental measures into their programmes. During this decade, on one hand, there were some environmental economists who were quite optimistic and felt that resources could never be completely exhausted, and that the development of substitutes or technological changes like recycling, in order to conserve resources, was bound to take place. On the other hand, the Club of Rome`s which renowned *The Limits to Growth* in 1972, concluded that even under the most optimistic assumptions, the world could not support the rate at which the world's population and economy were growing for more than a few decades (Welford 1998).

After the Stockholm conference on human environment, the 1980s witnessed a shift in thinking. The concept of *Zero growth* was replaced by sustainable development in 1987 by United Nation commission, which essentially involves meeting the needs of the present without compromising the ability of future generations to meet their own needs (Bruntland Report, 1991). Its objective was to prepare a status report for the relationship between the environment and development in the world today, and on this background to propose a global program for change. The commission which has the title *"Our common Future"*, described scarcity of resources, population growth, environmental impacts and

unequally distribution of economic welfare and growth as interacting threats to our common future on earth.*(World Commission on Environment and Development, 1987).* With this definition of the concept of sustainability, the focus was on our environment's ability to fulfill our needs and those of future generations. Included were:

- The material resources, non-renewable and renewable
- Biological diversity, genetic resources
- The health of the environment in which our own and future generations must live.

According to Pearce, Markandya and Barbier`s *Blueprint for a Green Economy* (1989), sustainable development might be achieved through market forces and regulations, was said to be the first attempts to show that preservation of the environment and economic growth are not necessarily incompatible. This period also marked the rise to prominence of environmental organizations like *Greenpeace* and *Friends of the Earth*.

Sustainability was further defined to have three dimensions: an economic, a social and environmental. In the business community, this has been coined *"the triple bottom line"* pointing out that sustainable development for business involves "the simultaneous pursuit of economic prosperity, environmental quality, and social equity" (Elkington 1997, Remmen and Thrane 2005). In other words, businesses have to expand their responsibility to include the environmental and social dimension of sustainability. Thus this bring us to the 3P, Profit, People and Planet as illustrated in figure 1.1

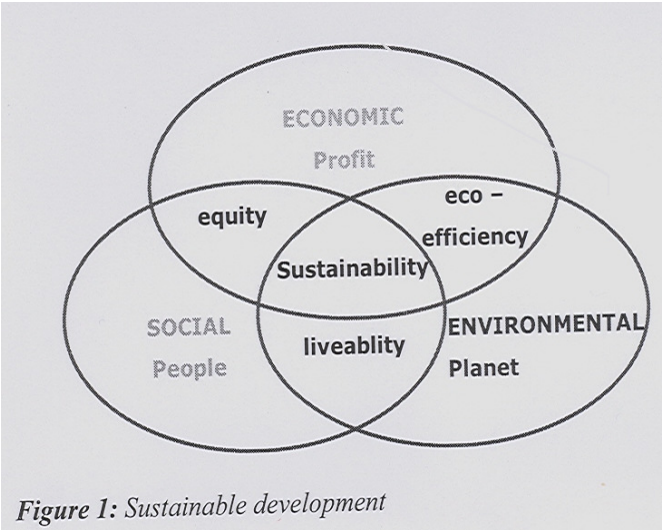

***Figure 1.1**: Sustainable development (Remmen & Thrane, 2005)*

The 1990s, which saw the second Earth Summit in Rio de Janeiro (1992), might be regarded as the period of strategic action, both on the part of government and by some companies at the corporate level. In the 1970s, environmental management was regarded by companies with indifference and even hostility, with the exception of a few such as 3M (Royston, 1979). More recently, leading companies have begun to regard environmental management as a strategic tool for gaining competitive advantage (Shrivastava et al, 1992). In most western countries, governments for their part have increased the level of legislation affecting business with increased emphasis on the "Polluter Pays" principle. In Europe there has also been an emphasis on the concepts of BATNEEC (Best available techniques option), which emphasize the importance of drawing a balance between economic growth and preservation of the environment. Today, there has emerged an expectation on the part of many stakeholders that companies should report on and be accountable for their environmental performance (Welford 1998).

After the concept of sustainable development was introduced, tools for environmental management were developed to meet the goals between the economic and environmental dimension of sustainability. Ingvar Andersson, (1998), defines environmental management (EM) as *"the management of those activities of a country or firm that have or can have an impact on the environment".* Since the late 1980s, some countries around the world have gradually taken more responsibility for the environment through pollution prevention: from environmental optimisation of manufacturing processes, through implementation of Environmental management system (EMS), to development and marketing of cleaner products. Cleaner production, EMS and cleaner products represent three different steps towards sustainable development as illustrated in figure 1.2.

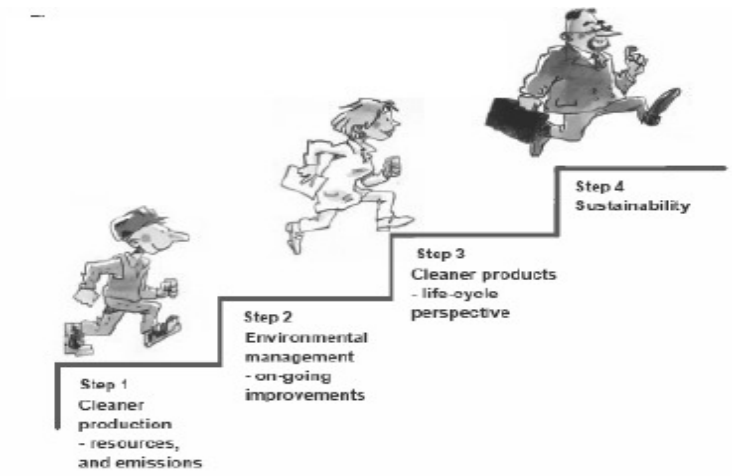

Figure 1.2: *Steps toward sustainability (Remmen & Munster, 2003)*

The link between the economic and environmental dimension of sustainability have expanded during the past decade from a rather reactive interest in cost reductions and resource savings towards a strategic business interest, in achieving competitive edge on the market by introduction of more environmental friendly products. These developments are like stairs. The benefits from the first step are sustained when taking the second step and at the same time further benefits can be achieved. This can be summarised in the following way:

Environmental strategy	Economic benefits
Cleaner production	Resource savings
Environmental management Systems	Improved image
Cleaner products	Competitive advantage

***Table 1.1**: Linkages between business strategies and economic benefits (Adapted from Remmen and Thrane, 2005).*

1.2 Tools for Environmental Management

a) Pollution Prevention

Pollution prevention has been a strategy used in both public regulation and inside the fence of companies to gives an overview of the historical changes in the understanding of environmental problems and the shift from end-of-pipe solution (pollution abatement) to pollution prevention. Pollution prevention emerged as a result of insufficiencies and limitations connected to end-of-pine solution. End-of-pipe solutions is the characteristics of the attitude of most industries, governments and citizens towards environmental problems during the 1970s, where the solutions of pollution were just been changed from one media to another and therefore the focus changed towards pollution prevention-prevention is better then cure during the 1980s (*Remmen & Thrane, 2005*).

According to UNEP (2005b), pollution prevention can be defined as "a strategy of continuously reducing pollution and environmental impact through source reduction- that is eliminating waste within the process rather than at the end-of-pipe". Thus, it is all about taking early action by reducing resource consumption and avoiding the emission in the first place. Reduction of energy consumption and in particular the use of oil, coal and gas (fossil fuel) is a preventive strategy to cope with global warming. A non-preventive solution would be to obtain paper material from a supplier who does not take into consideration sustainable forestry or a newspaper company that do not seek to use either recycled fibre, or "virgin" wood fibre that comes from a well-managed forests. Hence, pollution prevention is basically a forward-looking "anticipate and prevent" strategy as opposed to abatement and end-of-pipe solution that represent an "after-the-event" approach (UNEP, 2005b).

b) Cleaner Production

UNEP, (2002a) defines cleaner production *as "…the continuous application of an integrated preventive environmental strategy to processes products, and services to increase overall efficiency and reduce risks to human and the environment. Cleaner production can be applied to the processes used in any industry, to products themselves and to various services provided in society*". Therefore, the goal of cleaner production is to obtain reductions in the consumption of resources/input and emission/outputs per product produced. Cleaner production is a preventive approach that addresses the technology applied in the manufacturing process. The aim is to avoid pollution in the first place by prevention at the source in contrast to pollution abatement that only addresses emission *"after-the- event"*. Resources here refers to materials such as, energy or chemical, which enter a company; while emission are wastewater, waste and air emission which are generated in the process of the product production. Cleaner production also addresses occupational health and safety in the company in order to avoid negative impacts on the "internal" environment as a result of efforts to reduce the impacts on the "external" environment (Thrane & Holgaard, 2005).

c) Environmental management Systems (EMS)

The British Standards Institute (1994, p6) defines an environmental management system as: *´the organizational structure, responsibilities, practices, procedures, processes and resources for determining and implementing environmental policy.'*

ISO 14001 EMS

ISO 14001 is an international standard covering environmental management aim at providing organizations with the necessary elements for an effective environmental management system that can be integrated with other management requirements and help organizations to attain both environmental and economic goals. However, this standard is not to be used to create non-tariff trade barriers or to increase or change an organization's legal obligations (ISO 14001:2004).

ISO 14001 specifies requirements for an environmental management system and thus enables an organization to develop and implement a policy and objectives which take into account legal requirements and information about environmental aspects of significance.

It can be applied to all types and sizes of organizations and accommodates diverse geographical, cultural and social conditions. However, this system is successful depending on commitment from all levels and functions of the organization especially from top management. It thus enables an organization to develop an environmental policy, establish objectives and processes to achieve the policy commitments, take action when needed, to improve its performance and demonstrate that it system is in conformity with the requirements of the ISO 14001 standard. This is a continuous process as shown in the diagram in figure 2. ISO14001 is based on the Plan-Do- Check- Act (PDCA) methodology which is described below as;

- Plan: establish the objectives and processes necessary to deliver results in accordance with the organization's environmental policy.
- Do: implement the processes
- Check: monitor and measure processes against environmental policy, objectives targets, legal and other requirements, and report the results
- Act: take action to continually improve performance

An organization that demonstrates a successful implementation of ISO 14001 can use this to assure its stakeholders or interested parties that an appropriate environmental management system is in place. Though implementing this standard can result to optimal outcomes for an organization, by itself, ISO14001 does not guarantee optimal environmental outcomes. Organizations can be encouraged by the environmental management system to adopt the use of best available techniques where necessary and with economic means and should fully take into account, the cost effectiveness of such techniques. Also this standard does not include requirements specific to other management systems such as those for quality, occupational health and safety, financial or risk management, though its elements can be integrated with those of other management systems (ISO 14001, 2004).

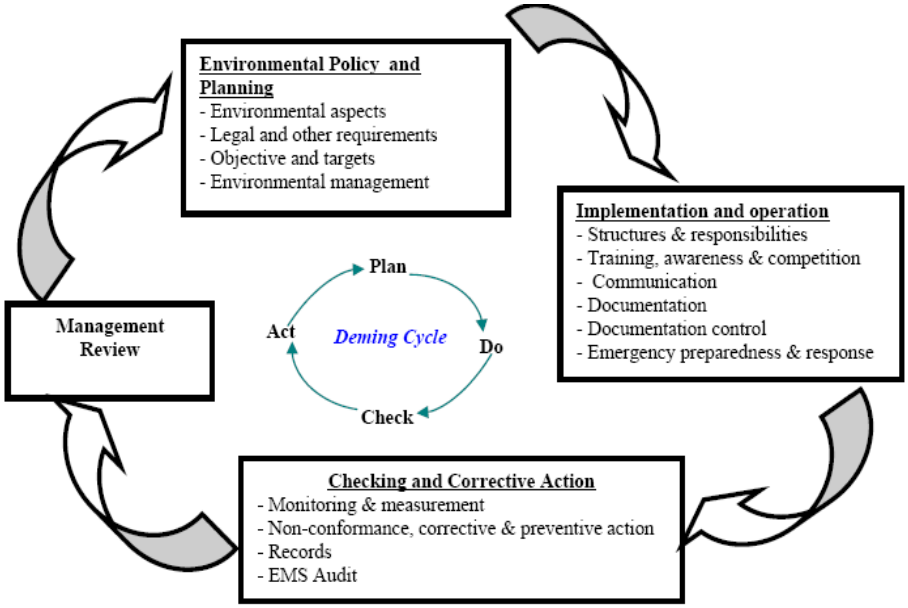

Figure1.3: *ISO 14001 and the Deming Cycle (Welford, 1996: p80)*

ISO14001 guidelines and basic principles of an EMS are as follows:

- A policy statement which indicates commitment to environmental improvement and conservation and protection of natural resources;
- A set of plans and programs to implement policy within and outside the organizational culture;
- The measurement, audit and review of the environmental management performance of the organization against the policy, plans and programs;
- The provision of education and training to increase understanding of environmental issues within the organization; and
- The publication of information on the environmental performance of the organization.

The stages of audit, measurement and review are quite ´similar to the elements of quality management systems ,developed to ensure that the organization's activities, policies and processes conform to specified quality requirements (Welford, 1998). ISO 14001 is aimed at providing a framework for organizations to identify and quantify the effects of their activities on the environment and also provide a commitment to continuous improvement of environmental performance in participating organizations through an EMS. This is a

voluntary standard which have to be externally verified by nationally accepted bodies (ISO 14001, 2004).

1.3 Problem Formulation

Although these environmental management tools are developed over the past years and today in solving environmental problems, countries around the world today use different approaches in achieving the goals of sustainable development. These differences in approach may be due to many factors within the reached of each continent or country.

It is paramount to note here that, environmental management tools are a necessary but not a sufficient condition for sustainable development. In concert with the greening of industry, there are other factors or areas where action is required. Poverty alleviation, population control, health crises, regional conflicts, inequality, famine and starvation, consumerism, political structures, the power of trans-national corporations and a multitude of other issues all need to be tackled. (welford, 1998). This study therefore seeks to answer the research question:

"Why is the Environmental Management in Companies in Denmark and Cameroon different?"

It is on this background that the researcher chooses to compare the way the environment is management with its main focus on a developed and a developing country, with Denmark as a developed and Cameroon as a developing country. In order to get an in-depth of the approaches employed by each country, the researcher has taken two production companies with same production activities (Cattle Slaughtering and Printing plant) in each country as representatives. These companies environmental management approaches will be used to generalised as the country's overall environmental management approach. In order to answer this research question, some sub-research questions have been developed to serve as guide and these include;

- What are the environmental policies of both Denmark and Cameroon
- What institutions are responsible for institutionalising these policies
- Are Stakeholders involves in the development and implementation of these policies

- Do they have the necessarily institutional capacity building (ICB) for the implement of these policies
- How is the relationship of these governmental environmental institutions with the society/stakeholders
- How are these policies implemented by the selected organisations
- Do the selected organisations have the necessary institutional capacity building to implement the state policies
- What strategies are used by the states to enforced the implementations of these policies

Conclusively, there have been a numerous initiatives to combat the effects of human activities on the environment over the past decades and today. The shift from "*zero growth"* with its known unbalance relationship between the environment and development, to the concept of the *"limit to growth"* which, assumed that the world could not support the rate at which the world's population and economy were growing for more than a few decades, gave way for the concept of sustainability. Although, tools for environmental management were developed during the 80s and 90s at the international and national levels to meet the goals of sustainability, it is still believe that, there are many socio-economic, cultural and political aspects that could impeded the out come of these goals at the international, national and regional levels. The next chapter looks at the global perspective of environmental issues as well as the case countries continental environmental issues over the past, present and future predictions.

Chapter 2 Environmental Impacts of Food and Printing Industry

In this chapter, the environmental impacts of the cattle slaughterhouses and newsprint products production as well as the types and techniques of slaughterhouses and printing respectively, are outlined with more emphasis on environmental impacts of the complete product chain from raw material extraction to disposal stages, which shall set the background for evaluating the two case companies in each case country. The chapter then ends with Europe and Africa state of environment with which the case countries are imbedded as well as socio-economic and political aspects that has shaped the continents over the past decades and today.

When ever environmental impacts of industries or companies are mentioned, most people usually direct their attention to industries involved in the production of material for construction or in the extraction of oil. The food and printing industry also has an impact on the environment, and recently there has been an increase in consumer awareness on the environment which has lead to an increase in their demands for environmentally friendly food and newsprint products.

2.1 Environmental Impact of the Food Industry

At first, food industries were used to limiting their environmental activities to meeting the requirements set up by the authorities but recently progressive industries are considering environmental issues as an essential part of their industries' image (Journal of Food Science, 2004).

In many parts of the world, meat and meat products are considered as essential part of the diet. Meat processing industries are engaged in activities such as slaughter, canning, cooking, freezing or making meat products as well as processing inedible and discarded remains into useful by-products. Recently, the meat processing is facing challenging with respect to economic and safety issues such as market competition and public concern on meat processing operations (WRRC, 2006).

2.2 Purpose and types of Slaughterhouses

Slaughterhouses are facilities where farm animals are slaughtered and processed into meat products, slaughtered animals such as cattle (beef and veal), sheep (lamb and mutton), pigs (pork), poultry, and horses, commonly use as food. Slaughterhouses emerged primary to serve the large scale demand for meat in urban areas where there were no livestock.The design, process, and location of slaughterhouses respond to a variety of concerns. There has been an international variation in slaughterhouses due to the level of technological advancement. In the developing countries, slaughter premises like; modern abattoirs, old slaughterhouses, slaughterslabs, and makeshift premieses differ in their activities.

Modern abattoirs (slaughterhouses) repesent the most progressive and the ideal in conventional abattoir design, equipping and services. They are built and controlled by central governments with foreign technical assistance and management. They are operated on industrial lines with a wide range of services featuring cold storage, processing, by product utilization and waste recycling activities. Some modern abattoirs have export objectives primarily in chilled and frozen meat although at times some of their manufactured products (and by products) are channelled into local sale in substitution for import. (J. de Wit et la 1996).

The old slaughterhouses and slaugherslabs handle the bulk of public slaughters. In these premieses, facilities are made available merely for used by licensed butchers and traders for the slaughter of livestock at stipulated fees, and in accordance with public health, inspection and marketing regulations. Slaughterhouses and slaughterslabs thus operate as service establishment under the management of municipal and local authorities. Their field of activities is thus limited to the larger towns and built-up areas.

The third category of slaughterhouse, is the makeshift, include all kinds of places such as converted buildings or rooms, shade of trees as well as open baregrounds that a butcher or a community may find convenient for the operation. They are mostly privately owned and under no formal authority or licensing. Their premises and products are neither inspected, quantified nor subjected to trade nor health regulations. Makeshift slaughter

premises are characteristic of village and rural locations. Occastionally, however, they may occur in the suburbs or on the fringes of larger towns.

The categorisations of slaughterhouses in developed countries differ with that of developing countries in the abattoir design, equipping and services. Slaughterhouses in developed countries are classified based on the quantity of waste produced. They are classified as simple, complex, low processing packinghouse and high processing packinghouse slaughterhouses.

Simple slaughterhouse is a plant that slaughters animals and does a very limited amount of by-product processing. Its main product been fresh meat in the form of whole, half or quarter carcasses or in smaller meat cuts whereas, complex slaughterhouse plant slaughters and does extensive processing of by products. Usually at least three of the following operation takes place: rendering, paunch and viscera handling, blood processing and hide and hair processing. (J. de Wit et la 1996).

Low processing packinghouse plant slaughers and processes fresh meat into cured, smoked, canned and other meat products. Only meat from animals slaughtered at the plant is processed. Carcasses may also be sold. The high processing packinghouse plant also processes meat but meat that is purchases from outside.(St. John A. Clottey 1985).

2.2.1 Environmental impacts resulting from slaughterhouses

In both developed and developing countries, there is a huge environmental impact resulting from the activities performed in slaughterhouses. Animal products for human consumption (meat and dairy products) or for other human needs (leather), leads inevitably to the production of waste. Under traditional conditions, the quantities of products processed in a certain area used to be small and by-products can easily be utilized, thus resulted to the production of smaller quantities of waste than at present. Nature can cope with these little amounts of waste throught variety of natural cleaning techniques. But, if the concentration of the waste products increases, nature's mechanism becomes overburdened and pollution problems start to occur. Normally, small scale production home processing activities produce relatively small amounts of waste and waste water, which nature can cope with. Yet the consequence of the increasing

emphasis on large scale production (e.g. for reasons of efficiency, increase in scale of production and hygiene) considerably greater amounts of waste will be produced and steps will have to be taken to keep this production at acceptable levels. (J. de Wit et la 1996).

2.2.2 Environmental Impact of a Cattle Slaughterhouse

Environmental impacts associated with the cattle slaughtering plant involve water use, wastewater generation and treatment and energy consumption. The cattle processing plant consumes a lot of water and although some portion of the water used is recycled, most of it becomes waste which contains significant amounts of organic solids such as particles of fat and blood as well as nitrogen compounds, phosphorous and chlorine. A cattle slaughtering plant as an example of a meat processor generates the highest amount of biochemical oxygen demand (BOD) in wastewater. Consequently the slaughtering of cattle contributes significantly to the overall environmental load produced over the life cycle of meat production and consumption. Thus cattle slaughtering plants have to operate in a manner that would guarantee safety for human health and the environment as well as maintaining the highest food safety standard (WRRC, 2006).

Cattle slaughtering may be carried out either on farms, at the butcher's premises or at abattoirs and the scale on which slaughtering takes place varies as well as the methods and equipments for slaughtering (Hansen et al, 2000).

In cattle farms, the cattle are reared, fattened and transported to slaughterhouses. Following processing, the meat is stored before transportation to retail outlets. The preceding activities produce manure and during storage and transport, cooling facilities are needed. Consequently, there is a heavy claim on energy sources, together with waste products occurring in the form of waste water, solid materials, volatile compounds or gases (J. de Wit et al, 1996).

As mention before, the main environmental impacts associated with a cattle slaughterhouse include; high consumption of energy, water, waste (effluent) discharge as well as noise, odour, and solid waste. In order to maintain high hygienic standards, there is the need for large quantities of water in processes such as watering and washing of

cattle, cleaning process equipment and work areas as well as washing the carcases. These processes incur the largest amount of water.

Also, the discharge of large quantities of effluent is common in cattle slaughterhouse and this effluent contain blood, fat, manure, undigested stomach contents and cleaning agents. These discharges have high content of organic matter, fat, nitrogen/phosphorous and salt.

Furthermore, cleaning, sterilising and rendering require thermal energy in the form of steam and hot water. Electricity is also necessary for operations of machinery, refrigeration, ventilation, lighting and production of compressed air and all these processes is to ensure the meat is of good quality. Hence in addition to depletion of fossil resources, energy consumption also results in air pollution and greenhouse gas emissions linked to global warming.

In addition to the above, the release of by-products becomes a subject of concern when not managed properly as this will result in bad odour. Air emissions resulting from energy consumption in the form of steam (usually produced from boilers), includes oxides of nitrogen and sulphur as well as suspended particulate matter. Also operations involving the use of refrigeration based on chlorofluorocarbons release CFCs which pose a threat to atmospheric ozone by depleting it. Finally, cattle slaughterhouse located in residential arrears; usually exude a lot of noise which result from various items of equipment and manoeuvring of trucks delivering the livestock (Hansen et al, 2000).

2.3 Types of Printing Technique

If not mentioned, this information is gotten from http://www.junk.org.uk/

The printing industry is divided into four sectors namely:

- Newspaper industry
- Commercial printing industry
- Publishers
- Packaging industry

All the sectors have in common the processing of printed or otherwise distributed information. What distinguished the sectors are mainly the types of delivered products. In the printing industry, the printers mass produce printed communication by utilizing a variety of printing presses and processes that apply ink to materials such as paper, books, magazines, newspapers, brochures, labels, plastics, metals, textiles and ceramics.

Printing techniques could be classified into five categories, lithography, letterpress, screen printing, flexography and gravure, which vary in their use of material, image quality, print run time and final product.

Lithography printing: Its combines water or alcohol-based fountain solutions with petroleum-based inks on a printing plate or cylinder. Lithography is used for printing books, artwork and periodicals.

Flexography printing: Its uses an acid or alkaline-etched metal plate to make an engraved printing mold. A flexible plastic or rubber plate is formed from the metal mold and placed on a cylinder. This process uses both solvent and water-based inks, and is good for printing of plastics and metals, and on soft materials such as cardboard and paper packaging.

Gravure printing: Its transfers an image to material using an electro-mechanically or chemically engraved copper cylinder. Solvent-based inks are applied to the cylinder, the cylinder is wiped and the image is transferred to the material or substrate. Gravure printing is mainly used for large press runs for colour newspaper advertising supplements and catalogues

Letterpress printing: Its uses a process similar to flexography and was historically used for printing newspapers

Screen printing: Its uses a mesh screen of fabric stretched over a frame as the printing plate. A special resistive coating is applied onto the screen to fill up the areas that are not needed. When ink is added, it penetrates the unfilled mesh areas and is transferred to the material. This is best for commercial application such as posters, billboards, displays, stickers, signs, flags, T-shirts and packaging.

2.3.1 Environmental impacts of the Printing Industry

Paper is the primarily source of material use in the printing industry, it is therefore paramount to focus on the input materials and the output emissions use for its production, in order to know the source of forest at which the paper is produced of as well as the source of energy used for its production as shown on figure 2.3 below.

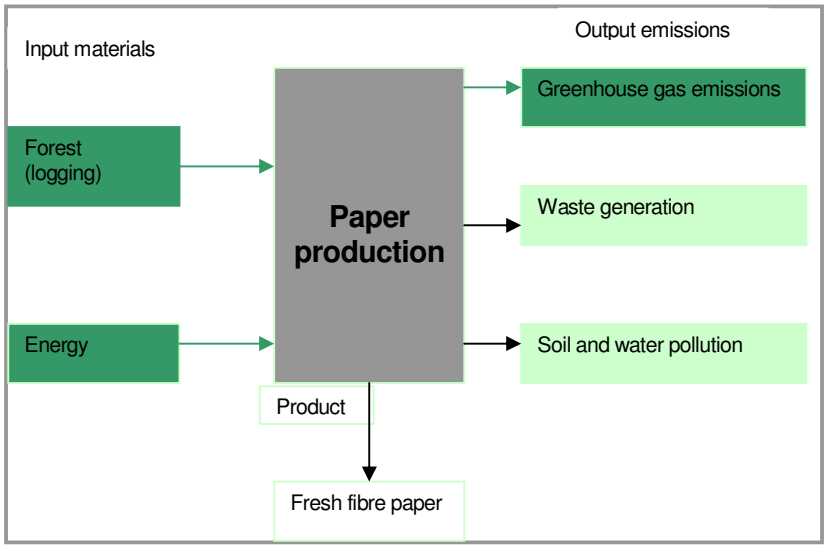

***Figure 2.1**: The input materials and the output emissions for paper production where a fresh fibre paper is obtained (adapted in Field Survey, 2007).*

2.3.2 Importance of forest to both humans and the environment

Forest cover around 3870million hectares (ha) or 29% of the Earth's land area. About 47% of the world's forests are located in the tropical zone, 9% in the sub-tropics, and 11% and 33% respectively in the temperate and boreal zones.

Forests are one of the most valuable eco-systems in the world, containing over 60% of the world's biodiversity. This biodiversity has multiple social and economic values, apart from its intrinsic value, varying from the important ecological functions of forests in terms of soil and watershed protection to the economic value of the numerous products which can be extracted from the forest. For many indigenous and other forest-dependent peoples, forests are their livelihood. They provide them with edible and medicinal plants, bushmeat, fruits, honey, shelter, firewood and many other goods, as well as with cultural and spiritual values.

Over the last decade and today, increasing attention has been paid to the role of the world's forests in the carbon cycle. On a global scale, all forests play a crucial role in climate regulation and constitute one of the major carbon sinks on earth, their survival thus preventing an increase in the greenhouse effect. (European Communities, 2006).

The most important direct causes of deforestation include logging, the conversion of forested lands for agriculture and cattle-raring, urbanization, newsprint production mining and oil exploitation, etc. However, there has been a tendency of highlighting small-scale migratory farmers or "poverty" as the major cause of forest loss. In other countries, clear-cut logging practices have been the main reason for forest loss. In the early nineties, Canada and Malaysia were famous examples of countries where logging companies ruthlessly cleared mile upon mile of precious primary forests. Here too, the historical perspective should not be overlooked. Countries like Ireland and Scotland used to be almost entirely forested, but were nearly completely cleared under British rule to provide timber for English shipbuilders. Today, logging still forms the most important direct threat to forests in regions like the Guianan shield (stable area of low relief in the Earth's crust), Central Africa, East Siberia and British Columbia.

2.3.3 Printing and Energy consumption

The most harmful part of newsprint production is the breaking down of wood fibre to make paper, which consumes a lot of energy and in many cases comes from coal power plants. The newspaper industry emits the fourth-highest level of carbon dioxide among manufacturers, such as the chemical, petroleum and coal products, and primary metals industries as the leading emitters (Louise Story, 2006).

According to Enolth (2001), energy consumed within a newsprint plant for printing, for running of offices, distributing of publications and in business travel also played a major role in environmental impact, thus a significant contribution for carbon dioxide emission into the atmosphere. It is therefore necessary for companies with printing plant to choose the best available source of electricity for their newsprint to enhance their CO_2 emission efficiency. Employing best house-keeping is a strategy that alternatively saves a lot of energy consumed within the printing plant, through educating the employees. Hence, the source of electricity use for running the printing plant should be one from renewable

sources and cogeneration centres rather than coal power plant with high green house emission.

2.3.4 Printing and Output Emissions

Figure 4.5 below shows the chemicals input for newsprint production as well as the energy (fuel) use for transportation during the distribution. Most of the output emissions are indicated with the green arrows. More focus is paid on the types of hazardous materials that are input for the production process. On the output side, the emission of VOCs, waste, noise, dust and soil/water pollution during the use and disposal stages are of paramount concerns.

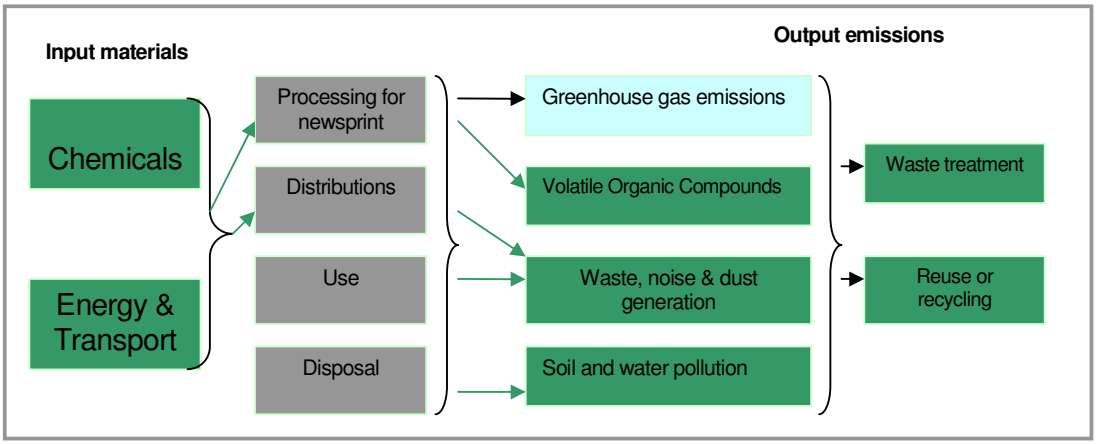

***Figure 2.2**: Chemicals and energy used for transportation for newspaper production and distribution (adapted in Field Survey, 2007).*

2.3.5 Newsprint and hazardous materials input

If not mentioned this information is gotten from www.junk-mail.org.uk/

The use and the generation of potentially hazardous materials in the printing industry each year, account for over two million pounds of ink, mostly petroleum-based. Distinct environmental concerns are associated with specific printing applications, equipment and chemicals utilized by printing operations. They generate some level of hazardous waste. In addition to ink components, the majority of toxic chemicals, mostly petroleum-based, are used in press cleaning and blanket washes. Readily available and affordable, these chemicals remove ink and evaporate quickly for minimal press down time and greater efficiency and profitability.

However, they present serious environmental risks. Petroleum-based cleaners contain more than 60% VOCs, which contribute to the creation of smog. Also, these substances are comprised of a complex blend of hydrocarbons derived from crude oil that contain hazardous attributes, which make them flammable, toxic, corrosive and/or explosive. The raw materials, intermediate products, final products and waste products whose emission could result to environmental risk are as follows:

***Volatile Organic Compounds (VOCs) such as*:** acetone, carbon disulfide, ethanol and methanol, methyl isobutyl ketone, xylene and benzene, cyclohexane, isopropyl alcohol and methyl ethyl ketone (MEK), toluene and toluene diisocyante.

Halogenated Solvent such as: Tetrachloroethene (PCE), 1,1,1-Trichlorethane (TCA), 1,1,1-trichloroethane, chlorobenzene, Trichloroethene (TCE), Methylene chloride and Trifluoroethane

Metals such as: Chromium, lead and barium (from waste ink), Silver (from photochemical imaging), and others like Sodium thiosulfate.

The release of VOCs is one of the most important environmental issues facing the printing industry, which is usually due to evaporation. VOCs are commonly found in inks, solvents, thinners, equipment cleaners and other chemicals. Once they are released, they can combine with nitrous oxides (NO_x) in sunlight to form ground-level ozone, which is a major component of urban smog. This smog have an effect to the lung, hence, causes health problems for all life, including animals and plants.

Ink waste that contains chemicals such as chromium, barium and lead may be contaminated with cleaning solvents such as trichloroethylene, methylene chloride, carbon tetrachloride, acetone and methanol can result in the contamination of soil and water. Wastes from developing negatives and prints which include photochemical solutions from fixers, rinse water and alkaline or acid process baths may also result in the contamination of soil and water. Plate processing wastes such as acid plate etching chemicals for metallic generated lithographic plates, and perchloroethylene and butynol for flexographic photopolymer plates are all sources of pollution to the environment.

Others potential environmental exposures of these substances may be due to the follows:

- *On-site mishandling and improper disposal, storage and transportation of hazardous inks, solvents and other hazardous waste*
- *Improper management of ink mixtures that can contain chemicals such as barium and lead*
- *Dangerous mixtures of liquid solvent wastes from press cleaning*
- *Neglect in identifying, labelling and recording hazardous materials*
- *Negligence in tracking the volume of generated hazardous waste and wastewater*
- *Leaking or rusting aboveground bulk liquid storage tanks*
- *Inadequate ventilation or drainage in the storage tanks*
- *Treatment and disposal of potentially hazardous waste at off-site treatment facilities*
- *Incomplete distinction of different types of waste newsprint or incorrect information on container manifests can result in improper management such as: incinerating waste that should not be incinerated, blending incompatible wastes etc.*
- *Unknown historical use of a property, insufficient freeboard in wastewater lagoons, past spills of inks and solvents into floor drains*
- *Improper management underground storage tanks and associated pipes*
- *Underground storage tanks that were removed/abandoned for unknown reasons, leaking or improperly maintained PCB-containing electrical equipment and poor housekeeping practices, are all sources of improper management of these substances.*

2.3.6 Printing and *Waste generation*

Major sources of waste in the newsprint production operations include: paper from printing, packaging materials, office waste, end-of-life equipment and hazardous materials such as waste oils and chemicals. It is therefore necessary that printers should maximise the amounts of waste for recycle or re-use and where disposal is the only option, they should carry it in a legal and responsible manner (D. Jespen and C. Tebert 2003).

2.3.7 Contracted printing and product distribution services

Certain operations which are contracted out-notably the printing of magazine supplements and the distribution of road printed products- may also have significant environmental impacts. Potential impacts include energy consumption from printing and road transport and VOC emissions and wastes arising from printing processes. Therefore, printers with major print and distribution suppliers should have effective environmental polices and programmes and, wherever possible, should be certified to either the ISO 14001 or EMAS environmental management system standards (D. Jespen and C. Tebert 2003).

During the last few decades, the forest crisis prompted many international, regional and national preservation initiatives, yet many have had little success. There is general agreement that, this is due to the fact that these strategies were too focused on the immediate causes of deforestation, and neglected the underlying causes which are multiple and interrelated. In some cases they are related to major international economic phenomena, such as macro-economic strategies which provide a strong incentive for short-term profit-making instead of long-term sustainability. Also important are deep-rooted social structures, which result in inequalities in land tenure, discrimination against indigenous peoples, subsistence farmers and poor people in general. In other cases they include political factors such as the lack of participatory democracy, the influence of the military and the exploitation of rural areas by urban elites. Over-consumption by consumers in high-income countries constitutes another of the major underlying causes of deforestation, while in some regions uncontrolled industrialization is at the heart of forest degradation with widespread pollution resulting in acid-rain. (European Commission, 2003).

From the above description, it can be concluded that the environmental impacts resulting from cattle slaughterhouse and the newsprint plant are of paramount concern and thus necessitates the need for proactive environmental management to mitigate or reduce the impacts. A proactive environmental performance according to Berry and Rondinelli (1998) requires a systematic management framework for information collection, analysis, evaluation and continuous improvement. Successful proactive firms usually start with compliance followed by monitoring of existing and emerging control strategies, adopting the latest control techniques. This would allow them with freedom to move beyond compliance and progress towards building environmental considerations into product and service design.

Haven outlined the environmental impacts resulting from the products production of both case companies, it is necessary to know the state of the environment as well as the

socio-economic and political aspects of the continents (in which the case countries are imbedded), that has shaped the continents over the past decades and today.

2.4 Europe Global State of the Environment

The late 20th century has been a dramatic period in Europe's turbulent history. Until the late 1980s, the region was marked by sharp political and socio-economic divisions between market economies in the west and centrally-planned economies in the rest of the region, with very limited cooperation and often deep conflict between east and west.

In the Western Europe, the material standard of living has improved steadily since 1945, along with growing agricultural and industrial production. Signs of severe environmental degradation became increasingly obvious during the 1960s and 1970s and most countries responded by developing environmental policies-initially directed at local and regional air and water pollution problems. These policies, in combination with factors such as the relatively high price of energy during the oil crisis years, have improved the situation – for example sulphur dioxide emissions fell by more than one-half between 1980 and 1995 (EMEP/MSC 1998). But there has been less progress in other areas: for example, Western Europe is responsible for nearly 14 per cent of the world's carbon dioxide emissions (CDIAC 1998:UNDP 2000).

Development under the centrally-planned economies in Central and Eastern Europe was understood mainly in terms of growth of physical production (especially in the industry and energy sectors) and this resulted in the severe exploitation of renewable and non-renewable resources. Heavy industry, resource extraction, energy production and the military sector were all associated with high levels of environmental pollution. Extreme specialization was an important element of central planning, resulting in a relatively large demand for transport which increased environmental pressures in some areas. But there were also some positive elements for the environment: re-usable packaging for foodstuffs, some sustainable farming and forestry practices, and the separate collection of garbage for recycling in some countries. High educational levels were also a positive force.

One of the most influential changes during the past decade has been the increase in European integration. At the same time, the European Union is expanding, and trade between countries within the region is also growing. Some changes, such as the harmonization of Central and Eastern European legislation to European Union law and a possible shift from medium-distance air travel to high-speed trains, may be beneficial; others, such as increasing car use, are more likely to be harmful to the environment.

Although European integration is generally regarded as a positive development, it may threaten the environment in several ways. The desire of people in the transition countries, especially the young, to attain the living standards and consumption levels of Western countries, with pressures to develop the economy first and solve environmental problems later, may have serious repercussions. And blindly adapting to Western resource management techniques may result in the loss of traditional, more sustainable approaches that still exist in some parts of Central and Eastern Europe. (UNDP 2000).

2.5 Africa Global State of the Environment

Africa is the world's second largest continent with a land area of nearly 30million km^2. The continent has a wealth of natural resources, including minerals, forests, wildlife and rich biological diversity. This natural wealth is, however, largely unexploited, and is not reflected in the welfare of the region's inhabitants for complex socio-economic reasons which developed mainly over the past 100years.

The continent includes some of the driest deserts, largest tropical rain forests and highest equatorial mountains in the world. But key natural resources are unevenly distributed. For example, more than 20 per cent of the remaining tropical forest is in a single country, the Democratic Republic of the Congo, while a major share of the continent's water resources are in a few large basins such as the Congo, Niger, Nile and Zambezi river systems. (UNDP 2000).

Many of the events that have shaped Africa's geo-political, socio-economic and environmental development over the past century are related to the colonization of the region and its subsequent partition in 1885 among several European countries. During the first half of the 20^{th} century, the colonial authorities imported economic development

policies and patterns which largely neglected the adverse impacts on the poor majority of people and on the environment. On achieving independence during and after the 1960s, African governments inherited and maintained centralized economic and sectoral institutions and narrowly focused economic growth policies, usually with the encouragement and support of international aid agencies. These national and international 'development' policies, in combination with rapid population growth and increased poverty, had progressively adverse impacts on the state of the environment throughout the continent.

Since the 1970s, the environment and key natural resources in most African countries have been increasingly threatened by escalating and unsustainable pressures from fast-growing populations and cities as well as expanding agricultural and industrial activities. Significant economic and environmental damage has also resulted from civil conflicts and war caused in part by the arbitrary division of territory and peoples, as well as inequitable development patterns set during colonial times. In the push for accelerated economic growth after independence, many national development projects as well as international aid and lending policies failed to take into account the adverse impacts of their activities on the environment and natural resource base.

Throughout Africa, reducing the poverty of the poor majority of people is the overriding priority for governments. This poverty is a major cause and consequence of the environmental degradation and resource depletion which threaten present and future economic growth. Improving the health, income and living conditions of the poor majority remain the top political and policy imperative if Africa is to move toward development that is economically, socially and environmentally sustainable. (UNDP 2000).

Chapter 3 Methodology

This chapter explores the methodological approach of how data is collected in order to find solution to the research question. The chapter starts by outlining the methods, research purpose as well as the research design. It then proceeded with the methods use for data collection and ends with the assumptions, limitations and scope of this report.

3.1 Methods

This study "Comparative Environmental Management Approaches" is fairly broad and demands data from various sources to understand the characteristics and functions of the cattle slaughterhouses and the newsprint plants in both countries as well as the countries socio-economic, cultural, political and environmental status for the past and present which would save as evidence during the analytical process. To extract meaning from data demands an application of methods. Accordingly, a comprehensive report requires a good structure and method in view of the issues related to validity and reliability. Thus, "methods are the tools the researcher's trade" (Moore, 2000). "A clear, unambiguous research aim coupled with a precise statement of research objectives will provide a researcher with an initial sense of direction" (Ibid).

The structure of this thesis report is outlined at the end of the introductory chapter under the heading "content of chapters". The problem that initiated this study is vividly described in the first chapter. Identification of the environmental impacts of the cattle slaughterhouse as well as the printing plant form the basis in identifying the different concepts, tools, strategies and systems for environmental management the companies employ in solving its environmental impacts as well as the difficulties in meeting the demands of the national and international environmental policies within the arena of the companies operational activities. In accordance with this, sources of information in this report comprise of both empirical and literature study as shown in figure 3.1 below.

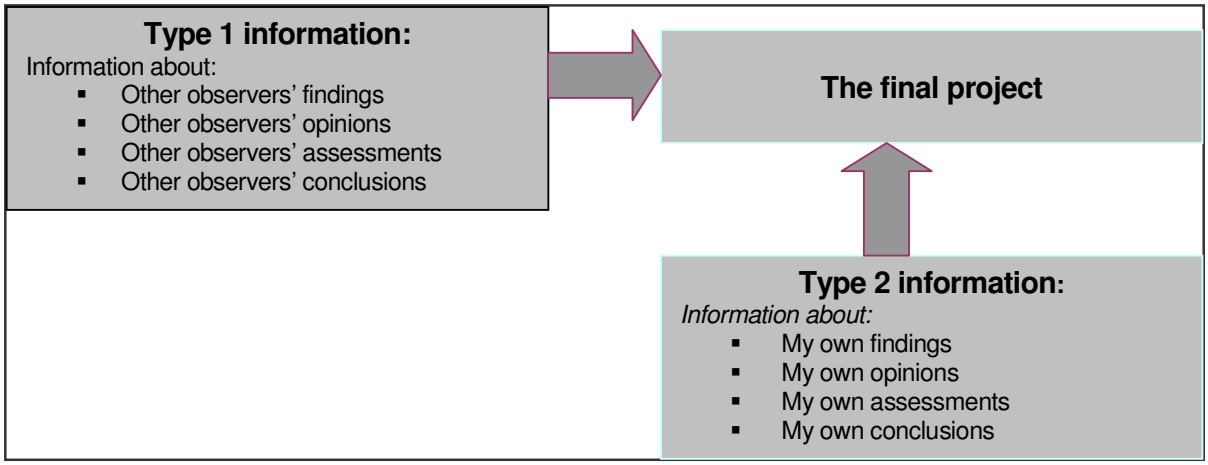

***Figure 3.1**: Types of information in the project (Iversen et al., 1997)*

3.2 Research Purpose

A research purpose is organized depending on the objectives that are set in a research aim. A research can be exploratory, explanatory or descriptive. Each one of these approaches can have either a single or multiple-case study (Yin, 1994, P. 13, 18 & 40; Explanatory research, 2002). According to Leedy and Omrod (2001)*, "a case study is a type of qualitative research in which in-depth data are gathered relative to a single individual, program, or event, for the purpose of learning more about an unknown or poorly understood situation".* To undertake a case study, it is important to understand the problem to be investigated, what data or information will be essential to collect and how, and in addition, how the result will be interpreted (Ibid; Yin, 1994: 2003).

The purpose of this report is to gain a comprehensive understanding of the different ways or approaches in which Denmark and Cameroon embark on solving the environmental impacts they create through their cattle and newsprint production activities, and which its could try to determine why the goals of sustainable development are usually very hard to meet, even though tools, concepts, strategies and systems are developed over the past and present in solving these environmental issues. Thus, the current research question implies this research has a descriptive purpose where it will seek to understand the various approaches and barriers that makes differences in the effectiveness of both Denmark and Cameroon in term of environmental performance and sustainability. The knowledge that will be acquired from this study will become apparent to make a distinction on the different levels of environmental management approaches between the

two case countries, and the factors that hinder the outcome for sustainability, and how they could improve their environmental performances both at country's institutional and company level to become proactive and sustainable in the near future.

3.3 Research Design

According to Yin (2000: 2003), a research design can be seen as a logical plan that links an initial set of questions to be answered to some set of conclusions. This design will not only indicate what type of data to collect but also indicate what would be done with the collected data. The success of a research is based on the ability of the researcher's understanding of what the case is and choosing the right unit of analysis which could bring out the true meaning of the problem defined. The unit of analysis is related to the problem of defining what the "case" is (Yin, 2003).

In this report, the case is the Presbyterian Printing Press, Limbe, Cameroon/ Nordjyske Medier Printing Press, Aalborg Denmark and Danish Crown Slaughterhouse Aalborg-Denmark / Bamenda Cattle Slaughterhouse–Cameroon, whereas the unit of analysis is the Capacity for Environmental Policy and Management (CEPM). Hence, this report is based on one unit of analysis which would be studied to elucidate *"why is Environmental management in Denmark and Cameroon different".* This thesis report thus utilizes data triangulation as form of triangulation and it involves the collection of data from multiple sources with the aim of strengthening the same fact evidence. Triangulation is multiple sources of "data collection" or "analytical methods" with the hope that they converge to support a particular study (Leedy & Ormrod, 2001). In a triangulation data scheme, the events or facts of a case study are supported by more than a single source of finding (Yin 2003) as illustrate in figure 3.2 below.

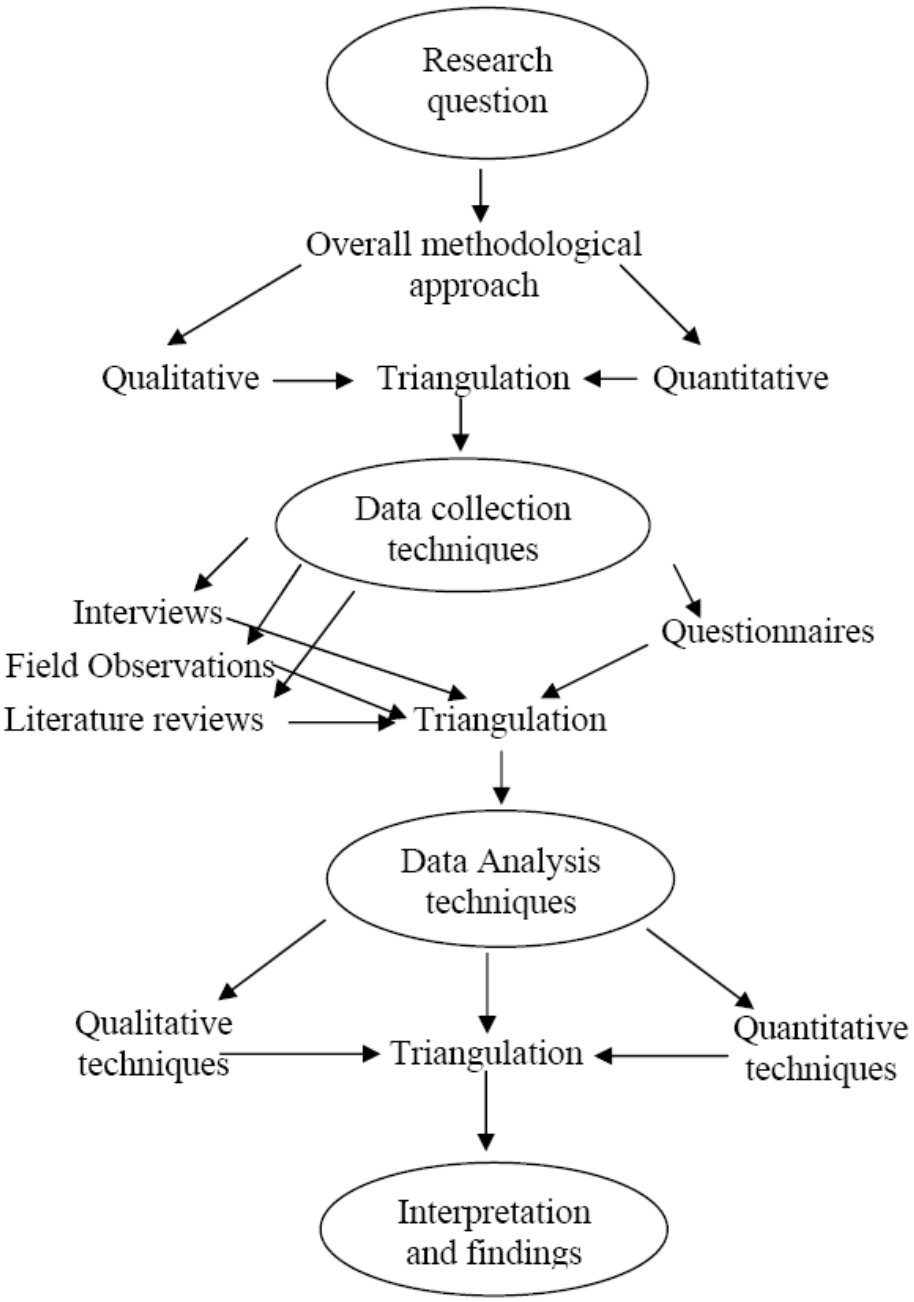

Figure 3.2: *A summary of the features found in the research Design (Brain White 2002, 28)*

The Author-Date system is the choice of reference style that would be adopted in this report and the Chicago Manual Style (2003), method of citation is used for references.

3.4 Data Collection and Analysis

Data collection in empirical research methods are mostly divided into two categories namely: quantitative and qualitative. A quantitative approach involves numerical data or information relating to measurable variables while a qualitative approach is characterized by describing and understanding phenomena from a researcher's point of view. Qualitative methods are often associated with case studies (Yin 1994; Moore, 2000; Leedy & Ormrad, 2001). The method adopted in this thesis report in data collection and processing is to employ a single case study. Based on this purpose, the report is mainly qualitative further than quantitative.

3.5 Reliability and Validity

The reliability and validity of a research result can be influenced by the method adopted for data collection. Accordingly, sources for data collection can be either primary or secondary. According to (Yin 1994; Moore, 2000; Leedy & Ormrad, 2001), there are six different sources for data collection namely; documents, interviews, archival records, direct observation, participant-observation and physical artifacts. The primary sources of data collection used in this report are interviews (focus interview with open-ended questions), with companies personnel, telephone interviews (combination of open and open-ended questions), and direction observations while secondary sources of data collection has been obtained from literature review of existing documents (textbooks, websites, academic journals and archival records/ annual reports of both the cattle and printing case companies environmental activities). Quantitative data is obtained from questionnaires while the interviews and direct field observation serve as qualitative data. This multiple sources of evidence employed in the report is illustrated in figure 3.2 below.

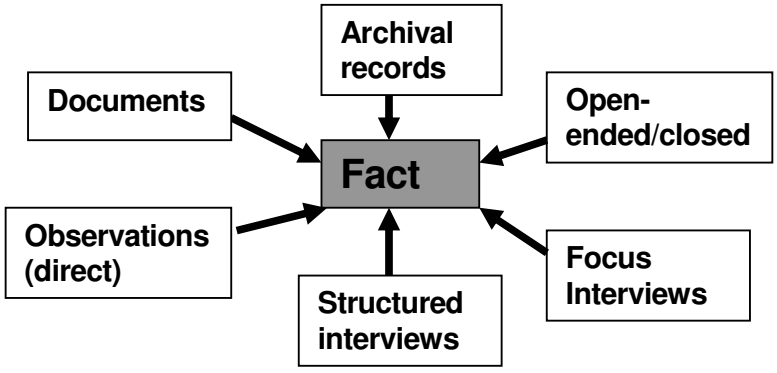

Figure 3.3: Convergence multiple sources of evidence (adapted from Yin 2003)

The analytical framework developed would be combined with the data collected to come out with an analysis of the findings obtained. The structure of the analysis takes the comparative structure, where there will be repetitions of the "facts" of the case, from different points of view. A comparative structure repeats the same case study two or more time; comparing different facts each time (Yin, 2003).

3.6 Information from field study

Interview with company personnel- A face to face interview with open ended questionnaire was conducted with Nordjyske Medier plant manager in March 2007 during the researcher traineeship to the company on the environmental performance on the newspaper production processes and site. Also, a face to face interview with open ended questionnaire was conducted with Danish Crown Aalborg slaughterhouse's environmental coordinator and the mother company's environmental coordinator in December 2006 during the researcher group project which was to find out why Danish Crown Aalborg slaughterhouse has not implemented the ISO 14001 EMS. In both cases, a follow-up interview was carryout to find out if these companies have made any changes on their overall structure on environmental issues. A face to face interview with open and open-end questions was conducted with the Cameroon case companies with the help of the researcher's former classmates who are holders of Bachelor degree in Environmental Science and Geography. To strengthen the reliability of the data from Cameroon, a telephone interview was further carryout by the researcher with CAMSUS slaughterhouse plant manager and Presbyterian Printing Press general manager.

Verbal interviews- a verbal interview was conducted in relations to the questionnaire questions to some potential staff and employees of all the case companies. In both cases, the questionnaires design include: a brief historical background of the companies, organizational structure as well as company mission, culture, goals, and environmental policies. More focus was paid on the companies' environmental impacts resulting from their production processes from raw material extraction to disposal stage, as well as their environmental performances. Lastly, the stakeholders' relationship with the companies in terms of cooperation in environmental activities as well as capacity building was also included.

Observations- A general observation was carryout in and around the slaughterhouses and the printing plants premises in both Denmark and Cameroon case companies. More focus was on waste disposal techniques, technology employ, noise, dust particles, odour, the use of safety equipment by workers; types/sources of input materials, training etc. in both cases, pictures were taken as evident.

Documentations- archival materials were also obtained form both Danish case companies on printing equipments, chemical, printing paper, company's history, culture as well as organizational structure. More documentation materials were also obtained concerning environmental aspects.

3.7 Information from literature study

The secondary data for this report emanates from textbooks, websites, and academic journals. All related to previous studies on Denmark and Cameroon environmental policy and management as well as the printing and food industries.

3.8 Scope and Limitations of this report

Scope

The comparative analysis of the environmental management approaches between Denmark and Cameroon companies is broad in scope encompassing many areas such as; mining, smelting, food industry, printing industry, agricultural industry, etc. In view of the fact that the realm of this subject is very broad, this study is limited to two industries namely: the slaughterhouse and printing industries. This report therefore is scale down to analysis just the environmental management of a slaughterhouse and a printing company in each case country. These companies are said to be the representatives of all the companies in Denmark as well as Cameroon. It is therefore assumed that the findings obtained from the two case companies would be generalized as an overall approach of environmental management in other companies.

Assumptions

- It is assumed that the main reason behind the outstanding environmental management of the Danish companies is not solely as a means to improve environmental performance, but also a way of improving the company's image both national and international so as to gain a competitive edge

Limitations

In most research works, there are limitations to interpretation and collection of data. There are few setbacks in this report relating to the way data was collected such as:

- There was lack of statistically or documented environmental data from the Cameroon case companies, thus reliability of data was based only on observation, interviews
- This thesis report was limited to two companies each from Denmark and Cameroon due to the time limit for the report because a thorough analysis requires the study of several companies to make the results of the research easily generalized.

Chapter 4 Theoretical Framework

In this theoretical framework chapter, the concept of capacity building is highlighted with focus on Janicke and Weidner capacity model. The chapter then proceeded with the model structural framework conditions for a country capacity for environmental policy and management. It then ends with elaboration on the various institutions within which the case companies are embedded with reference on Scott institutional pillars.

4.1 Introduction

Environmental management being a continue process where impacts to the environment seeks to be mitigated is a multi process exercise. In order that there is a continuous environmental improvement based on developed policies, implies that frameworks have to be in place for the stakeholders concerned with ensuring that firms takes responsibility of the environmental impact they create through their production activities with the aim of achieving the goals of sustainability.

Although tools for environmental management are developed for companies to implement alongside their production activities in order to mitigate their significant environmental impacts on the internal and external working environment as mentioned in the introductory chapter of this report, it is obvious that most companies are aimed at profit maximization rather than taking the environment as one of the company goal. This is the case with most firms in developing countries, although some few cases still are of developed countries (Janicke and Weider, 1996).

The lack of firms institutional capacity building to meet their organizations goals limit their ability to turn to the environment as an additional company goal. In some developing and developed countries, governments assist its firms with resources to strengthen their overall sustainability. This governmental assistance varies from country to country and from context to context depending on the socio-economic, political, cultural and environmental behavior imbedded in each country. This is made more complex by the fact that the result or the environmental performance of a country is based on the combination of the different frameworks or institutions within which it is imbedded but which yet aims at achieving the common objective of sustainability. As it has been

discovered that; “countries with very similar levels of income can have different levels of environmental performance, usually as a result of different policies and institutional capacities” (DFID UK, 2002). This is one reason why the research has decided to choose to compare the environmental management approach of Denmark which is a developed country and Cameroon which is a developing country, in order to know the different ways in which the goals of sustainability could be achieved. Although, the researcher’s focus is on a cattle slaughterhouse and printing company in both countries, it is of paramount important to take a close look at the capacities in environmental policy and management at the country level, because government failure as regards developed and more preventive forms of environmental policies might lead to lack of capture of the system of control by which it is meant to control (OECD 1992: 11: Janicke, 1996) and due to the fact that it is the sphere within which the companies are imbedded. To do this the researcher has focus on Martin Janicke and Helmut Weidner comparative study of capacity-building 1996 where they elaborate the important of capacity building for the environment as well as capacity development in environment.

4.2 A Country Capacity for Environmental Policy and Management

According to (Agenda 21, chapter 37), “The ability of a country to follow sustainable development paths is determined to a large extent by the capacity of its people and its institutions as well as by its ecological and geographical conditions. Specifically, capacity-building encompasses the country’s human, scientific, technological, organizational, institutional and resource capabilities”. The concept of capacity for environmental protection points to the objective limits to successful solutions of a given type of problem, limitations beyond which failure sets in, even in cases of good luck, skill and highly motivated voted actors. Lack of ecological, technological or administrative knowledge, lack of material or legal resources, the weakness of environmental organizations or institutions in relation to vested interests are well known examples of such limitations (Janick and Weidner, 1996).

Most of the outcome of the debate on sustainable development is that long-term strategies must include concepts for improving the conditions of environmental action, which is what the researcher refers to as capacity-building. The formulation and implementation of environmental policy could be regarded as one prominent field for the

discussion of limitation of government intervention. A country's capacity for environmental protection is not and cannot be restricted to government policies; it increasingly depends on societal forces of all kinds. Thus, the focus could be shifted from capacity for environmental policy to capacity for environmental policy and management or "societal capacity for the environment" (OECD, 1994: Janicke and Weidner, 1996).

This thesis report focus on Denmark and Cameroon, which are said to have two different levels of economic, political, cultural and environmental growth. The debate on capacity development in environmental protection is at present mainly restricted to developing countries due to the fact that they are candidates for transfer of expertise from the more successful developed donor countries (OECD 1995). There has been a development of capacity in the industrialized countries that can be empirically demonstrated by cases of best practice and successful environmental policy measures in fields such as air and water pollution control or the establishment of protected areas. Also there has been a remarkable increase in environmental policy capacity, but restrictions to ecologically sustainable strategies still exist.

Therefore, success in environmental policy and management depends on the type of problem to be solved. Success is more or less restricted to problems that can be handled without restricting markets or relevant societal routines. But big environmental problems-especially the problems of long-term resource management-government failure and capacity overload can be said to be frequently observed issues in the advanced industrialized countries (Janicke and Weidner, 1996). This could be easily observed in a politically difficult field like sustainable development where there is still doubt on how capacities for environmental policy and management could be developed and increased.

4.3 The Analytical Framework at the Case Countries Level

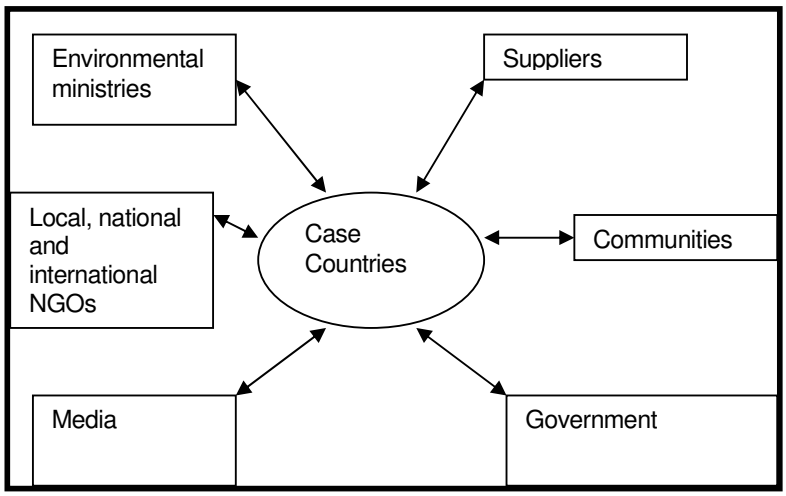

Figure 4.1: *Institutional capacity building and involvement of the stakeholders for environmental works within the case countries (Adapted from field survey, 2007).*

4.3.1 The Categories for explaining the environmental policy outcomes

In the two case studies, the preconditions for successful environmental policy and management that will be carried out by the author shall provide a set of categories to explain the differences in policy outcomes and environmental capacities as illustrated in figure 4.2 below.

Normally, perceived environmental problems lead actors to develop and implement strategies (typically against opposing target groups-like the case production companies for this report) under systemic conditions and within situative contexts. The outcome then is influenced mainly by the following factors: actors, strategies, systemic framework conditions, situative contexts and problems. The structure of problems as well as the capacity to respond to them is strongly influenced by economic performance. All these factors are seen in a national context.

The main aim of this model is to make clear that successful environmental protection is brought about by a complex interaction of influences and not by a single, isolated factor,

nor a favourite instrument, nor a single type of actor, nor a particular framework condition or institution (Janicke and Weidner, 1996). Although the five categories of policy explanation are described below, these factors will be used only for capacity analysis because differentiation between capacities is regarded as a relatively stable condition for action, and its utilization, which leads to the subjective and situative aspect of environmental policy and management.

Therefore, capacity defines the necessary structural conditions for successful environmental policy as well as the upper limit beyond which policy failure sets in, even in case of skilful, highly motivated and situatively well-placed proponents. In this context the roles of the category of "actors" is very important because the aim of this report is to bring out the success or failure in environmental management between the two case companies and countries. Thus, the dynamic interactions between the proponents and opponents of environmental actors and their conditions of action are of paramount concerned. Here, the author interest is in the possibilities available to the active part: the organized proponents of environmental policy and management (treating the opposing target groups of polluters-case companies, as a restrictive factor and part of the problem).

The case companies themselves can also learn and sometimes they even can become ecological modernizers. This type of ecological innovation can be influenced not only the particular events but also by the framework conditions such as a high general environmental awareness or an institutional framework condition of interaction that integrates ecological interests. Such framework conditions create an opportunities for proponents of environmental interests (and often originate from former environmental activities) might also explain the case companies innovative reactions. But the structural chances of the case companies for successfully opposing environmental protection measures must be analyzed separately, because they have their own dynamic. This separates analysis of the case companies' structural chances and the restrictions they might place on proponents is indeed necessary for evaluating whether or not the capacity of proponents is adequate to solve a certain problem generate by the case companies.

The capacities for the environment are constituted by: • The strength, competence and configuration of organized governmental and non-governmental proponents of environmental protection and • The Cognitive-information, political-institutional, and economic-technological framework conditions.
The utilization of the existing capacity depends on: • The strategy, will and skill of proponents and • Their situative opportunities.
This has to be related to: • The kind of the environmental problems generate by the case companies: its urgency as well as the power, resources and options of the case companies.

Figure 4.2: *The model of policy Explanation (adapted from Janicke and Weidner, 1996)*

4.3.2 A brief description of the model

a) Capacities of proponents

Actors: This refers to the proponents and opponents of special environmental issues, their support groups and also third parties. These groups of actors are representatives of organizations and coalitions, but they are often coalitions of relevant micro-actors across organizations and institutions. They have stable general interests and "core beliefs" as well as variable definitions of these, or situative opinions and attitudes that may change more readily. Their capacity for action depends on their strength, competence and constellation, but also on the structural framework conditions. Personal will and skill also make a difference (Janicke and Weidner, 1996).

Proponents of environmental policy can be specialized governmental environmental protection institutions such as ministry of environment and forestry, as well as non-governmental green interest organizations like: CARE international, WWF, etc. Comparative research in environmental policy shows that within the organization context individual "people make a difference" (Jacobson and Brown Weiss, 1994: 7). The establishment of such institutions may plausibly be regarded as the necessary condition

for successful measures. In this report, the establishment of such institutions shall be traced back from the 1970s and 1980s where environmental protection institutions were created in order to identified how committed the case countries were concerned about environmental protection.

The capacity development of such institutions usually begins with the institutionalization of the new policy area. In the early 1970s most industrial countries founded an environmental agency and ministry for the environment (Jorgens, 1996: Janicke and Weidner, 1996). These institutions were again differentiated as a rule, according to the growth of staff, budget and scientific competence. The empowerment of these institutions also implies policy integration throughout dispersed jurisdictions (intra-policy coordination) and a closer cooperation with polluting policy areas such as the printing, slaughtering or energy (inter-policy coordination). The next step would then be the spreading of decentralized institutions for cooperative environmental planning in cities and enterprises. If such environmental policy institutions do have the necessary capacity development, they should therefore base on the following norms:

- No central ministry/agency for environment
- Weak and isolated national ministry/agency
- Environmental institutions at all levels (including local communities)
- Environmental division in most other ministries also
- Institutions for integrated environmental planning.

b) Non-governmental proponents

There are three important groups of non-governmental proponents of environmental protection or management, all of them able to influence companies' environmental performance directly such as:

i) Environmental organizations which can immediately effected radical change often refer to as *"green interest organization".* The have the following behaviors:

- Local organization, no clear autonomous national interest organization
- Weak or non-professional national interest organization
- Strong and highly competent green organizations, playing a consultative role in political decisions
- Green organization playing a consultative role in industry.

ii) The media

- Few, largely official reports on the environmental situation
- Environmental reports in some critical sections of the media, but dominant media resistance
- Environmental problems widely reported in all the media
- Frequent direct media attacks against polluting companies

iii) Ecologically innovative firms, which have become very important tools in environmental improvements within industry, with the following behaviors:

- Environmental interests are scarcely articulated within the economic system
- Environmental interests are articulated mainly by the eco-industry (producers of clean-up technology)
- Environmental interests are articulated by particular green business organization
- Ecological pioneer enterprises (such as trade or insurance companies having a strong impact on the whole economy).

The competitiveness of such green parties in a country's party system does seem relevant at least to environmental policy formulations. Environmental policy studies emphases not only the growing direct influence of environmental organizations on companies, but also point to the increasing number of enterprises responding proactively to the challenge of environmentalism (Shrivastava, 1995).

4.4 The structural framework of action

4.4.1 Cognitive-informational framework conditions

Environmental knowledge and awareness are important factors influencing environmental policy and management. Culture and the value system in a country are also highly potential factor to be considered. A high degree of post-materialism for example could plausibly constitute a good cultural precondition for environmental policy success. On the other hand, post-materialism is statistically connected with a country GDP per capita, which is more closely related to environmental improvements (OECD, 1994: Binder, 1996a: Janicke and Weidner, 1996). Thus, the differences in environmental awareness between Denmark and Cameroon can be plausibly be explained by their cultural differences and GDP per capita. Although, culture is not the only factor influencing

environmental awareness, cultural traditions may be said to form a good background condition for environment awareness.

4.4.2 Political-institutional framework conditions

There are three main aspects under political-institutional framework, which are very pertinent for the outcome of a country's environmental policy and management namely: participative capacity, integrative capacity and capacity for strategic action (Janicke, 1992: Janicke and Weidner, 1996). These three aspects of political-institutional framework can be elaborated as follows:

a) Participative capacity

The openness of the input structures of the policy process is an important aspect of the opportunity structure of environmental interests. Decentralization and strong local communities are seen as a favourable condition for participation. Sometimes, the pressure from environmental movements is mentioned as a relevant factor for the general opening-up and modernization of political systems. The openness of the legal system to protective interests could be regarded as a catalyst to participation (Weidner, 1996). In terms of resources, environmental laws as well as constitutional mechanisms can be regarded as important tools for proponent

Participation and decentralization required a high level of integration. Volunteer cooperation which is often refers to as "consensual capacity" is generally stressed as an institutional condition for success in environmental policy (Janicke, 1992: Janicke and Weidner, 1996). One aspect which the researcher will focus on distinguishing between the two case countries will be the corporation arguments because "co-operation is a superior approach" and corporation is good for environmental policy, implying that, "low rates of unemployment correlate with improvements in the environment" (Badaracco, 1985: Janicke, 1992: Janincke and Weidner, 1996). This may indicate that in countries with better environmental improvements outcomes, there should not be no issue competing between environmental and development policy. This may be true for example only if and only if, the correlation between the reduction of CO_2 emissions and low inflation is considered, which is what the researcher will focus on.

b) Integrative capacity

Integrative capacity could be classified in three different levels namely: intra-policy cooperation, inter-policy coordination, and external integration. Intra-policy cooperation which involves the internal integration of the policy field is important because it includes the coordination of environmental policy at different levels and in respect to different jurisdictions of the political system (Knoepfel, 1993: Janicke and Weidner, 1996). Inter-policy coordination involves the cross-sectional integration of conflicting policies, while external integration involves the integration of environmental policy institutions, non-governmental actors and polluters (case companies), which is often refers to as "network management". Integrative and participative capacities offer possibilities for describing how confined political systems are open or close in regards to environmental policies implementations (This could be seen from open, but fragmented US-American system, or the closed and highly integrated French system or the open and integrated systems of smaller democracies such as the Netherlands or Norway (Kitschelt, 1983: Janicke and Weidner, 1996).

c) Capacity for strategic action within the political context

This capacity may be regarded as the highest stage of institutional capacity-building in environmental policy and management because it is at this level where all the decisions about environmental aspect is made. Thus, there should be enough capacity to empower the environmental institutions in order to developed and implement the various environmental policies, if a better outcome of environmental management is demanded of or within a country. According to (Janicke and Weidner, 1996), "there will be a great national different in institutional capacity-building between countries like Italy and Greece or Japan and Netherlands".

4.4.3 Economic-Technological framework conditions

The per capita GDP is most closely connected with environmental policy outcomes, but the statistical result is what ambivalent, because GDP per capita correlates with environmental improvements in some fields as well as deteriorated in others. For example, the probability of improvement is highest in rich countries where the standard technological solution such as clean-up technology, substitutes, higher efficiency, or recycling is available. The wealthier countries can both demand and afford stronger environmental measures in the filed of air protection and recycling activities. A high

research and development expenditure with successful air pollution control supports this argument (Binder, 1996: Janicke and Weidner, 1996).

Economic performance is a difficult aspect of environmental capacity, because it is not only strong, but a contradictory impact on the environment influencing both the structure of environmental problems and the capacity to solve them. The economic influence on capacity for environmental management is complex and more direct, implying a connection to research, educational, communicative or administrative capacities. However, the technological standard of a country's economy may be influenced more easily and directly with situations like transfer of technology and expertise. The prices of environmentally sensitive goods are another economic factor that can be influenced by policy (OECD, 1993: Janicke and Weidner, 1996). Thus the important aspect of economic framework shall be taken into considering when analyzing both the case countries' and companies' environmental performances.

4.4.4 Strategy

Strategy refers to the general approach of the environmental problem. Strategy is the purposeful use of instruments, capacities, and situative opportunities to achieve long-term goals by a company or country. It includes necessary sub-goals, the flexible application of instruments over time, and, the purposive improvement of capacities. Strategies depend on capacities such as available knowledge or the possibility of strategic and coordinated action. Environmental management needs strategy to compensate for the generally weak position of its proponents. The intelligent use of time is very important when implementing an environmental management tool because environmental management tool that is impossible to implement at present may be feasible after some years. Short term failure in implementing an environmental management tool often turned out to be success in the long run (Janicke and Weidner, 1996).

4.4.5 Situative Context

Situative context refers to the short-term variable conditions of action. There could be some situations which could change the opportunities of actors to implement environmental policy and management, such as public debate on a concrete waste management problem. Another situation change could be a discovery of win-win

constellations, where not only environmental but also economic interests are supported by the implementation of an environmental management tool. Thus situative changes sometimes have immediate influence on the proponents or opponents when implementing an environmental policy or management tools. Examples could be events such as the Bhopal, Chernobyl accidents which offered sudden situative opportunities for proponents of environmental management or the German industry which started reducing the use of cadmium mainly in reaction to a Swedish law on the substance as a result of public debate on the issue in Germany (Janicke and Weidner, 1996). Thus, there could be many situative factors that may be influencing or hindering the outcome of environmental management at both the case companies and countries levels which could result to their differences in environmental management approaches.

4.4.6 The character of the environmental problem

This refers to how easy or hard the environmental problem is to be solved. It would makes a difference if an environmental problem is urgent and experienced by the public and only threatening future generations or, if the case companies are economically relevant, has strong influence on society and no easy way out, or if the target group is weak or a technical or other solution is available.

4.5 Analytical Framework at Case Companies Level

The printing and the cattle slaughterhouse companies selected for this report from Cameroon and Denmark has environmental issues and their involvement in environmental management may need some form of institutional capacity building to produce a satisfactory environmental outcomes by incorporate the environmental impacts findings into design and implementation plans, monitoring and managing the environmental performances of their activities, and evaluating the results in order to improve their future activities. In most every company, some of these institutional capacities may already exist. Which ones exist, and how effectively they function, may directly affect the ability of the different stakeholders in influencing the activities of the case companies. For example, an environmental management tools will be less difficult to implement or carry out in companies where the legal framework already requires or have some form of environmental management plan.

Thus, building the capacity of firm or if a firm have the necessary resources which could sustain the organization goals will ultimately result to sustainable production. Capacity building is often refers to assistance provided to entities, usually developing country societies, which have a need to develop a certain skill or competence, or for general upgrading of performance ability. Most capacity is built by societies themselves, sometimes in the public, non-governmental and private sector. Many international organizations, such as the United Nation have provided capacity building as a part of their programmes of technical cooperation with their member countries. Bilaterally funded entities and private sector consulting firms or non-governmental organizations (NGOs) have also offered capacity building services. Some NGOs in developing countries are themselves recipients of capacity building.

Capacity-building is however, not limited to international aid work. More recently, capacity building is being used by governments to transform community and industry approaches to social and environmental problems. UNDP (1991), defined capacity building as *" the creation of an enabling environment with appropriate policy and legal frameworks, institutional development, including community participation (of women in particular), human resources development and strengthening of managerial systems, adding that, UNDP recognizes that capacity building is a long-term, continuing process, in which all stakeholders participate (ministries, local authorities, NGOs and water user groups, professional associations, academics and others)".*

In this thesis report, capacity building is defined to relate to environment and development for environment. According to OECD (1994), *"capacity in environment relates to the ability of societies to identify and solve ecological problems, while capacity development in environment relates to the process by which those abilities are developed".* Also according to WCO (n.d), capacity building refers to *"activities which strengthen the knowledge, abilities, skills and behaviour of individual and improve institutional structures and processes such that the organization can efficiently meet its mission and goals in a sustainable way".* Thus, this involves *"the capacity for capacity development",* to act by the printing and slaughtering companies, in solving the environmental impacts they create. To do this the research has decided to focus on W. Richard Scott institutional

theory, on how he looks at the various elements of institutions in his institutions and organization theory 2001.

4.5.1 Institutional Theory

Institutional theory is beyond the scope of this report, but this report seeks to establish its links and relevance to environmental management, looking at various frameworks of the concerned countries because environmental management cannot be taken out of the institutional framework within which it is carryout.

The term “institution” as used in this report covers government agencies, such as the ministry of the Environment, the line agencies with activities that affect the environment (news publication (printing industry), Agriculture (industry, slaughterhouses), ministries of energy, transportation, tourism etc.), or the State pollution Control Board; NGOs, such as a National Environmental Advocacy League, and private and quasi-private organizations, such as the environmental department of the national university, as industrial development corporation, or a national water supply and sewerage corporation (World Bank, 1999).

Further more, institutions may also imply an authority or leadership structure, a set of procedures or customs for handling environmental issues, and a system of incentives and constraints or rewards and sanctions that govern and guide the behavior of people or firms. Depending upon the society, relevant institution may also be village councils, elders of a clan, a religious brotherhood or an agency of local government. They may have customs that are locally unique, as well as elements of cultures with regional, national and international distribution. Also included under “institution” are the legal framework within which the organizations function, including environmental laws and other legal instruments that define the organization responsibility, authorities or privileges: the regulations or procedures with which the organization carry out their functions; and the relationship that exist among them (World Bank, 1999).

4.5.2 Scott Institutional Theory

As mentioned earlier, the process of environmental management does not happen in isolation but takes place within a system consisting of formal and informal rules,

monitoring and enforcement mechanisms and systems of meanings that define the context within which various stakeholders interact with each other, which is basically is the way some school of thought defined what an institution is (Scott, 2001).

According to Scott (2001), institution can be broken down into sub-division otherwise referred to as pillars on which the whole framework of environmental management rests. This process of environmental management is regarded as part of the social structure because people are involved. These pillars are broadly divided into three elements namely; regulative, normative and cultural-cognitive, which are multifaceted, durable social structure which could be made up of symbolic elements, social activities and natural resources and as said to be the building blocks of an institution.

The three elements of institution (pillars) form a continuum moving from the conscious to the sub-conscious, from the legally enforced to the taken for granted (Scott 2001), which in another sense can be seen as contributing in interdependent and mutually reinforcing ways to a powerful social framework in which environmental management is carried out especially in company perspective

The storyline behind the three pillars were summarized by Søren Lokke in his politic, institutions and discourse lecture in 2006 as follows; regulative pillar involves how we must behave and is governed by rules and supported by sanctions, the normative deals with how we ought to behave and is influenced by norms, values and roles and supported by value and norm expectation and desirable goals expected of particular individuals or social positions. Lastly, the cultural-cognitive pillar which deals with how we usually behave according to shared conceptions of the nature of social reality and the frames through which meaning is made (Søren Lokke, 2006). Table 4.1 below show the three pillars and their characteristics.

PILLARS

	Regulative	**Normative**	**Cultural -cognitive**
Basis of compliance	Expedience	Social obligations	Taken for grantedness Shared understanding
Basis of order	Regulative rules	Binding expectations	Constitutive schema

Mechanism	Coercive	Normative	Mimetic
Logic	Instrumentality	appropriateness	Orthodoxy
Indicators	Rules Laws sanctions	Certification Accreditation	Common beliefs Shared logics of action
Basis of legitimacy	Legally sanctioned	Morally governed	Comprehensible Recognizable Culturally supported

Table 4.1: *The Characteristics of Scott's institutional pillars (Adapted from Scott, 2001)*

These pillars of institution shall be analyst in detail at the level of the case companies, in order to understand how the companies incorporated environmental issues into their organizational activities as well as collaboration with its stakeholders both at local, regional and national levels, in handling the environmental issues resulting from their product production activities, as well as the involvement of the various stakeholders at all levels in reinforcing the case companies to take responsibility of the environmental impacts they create through the used of the various tools for environmental management. To achieve this, the researcher has design an analytical framework models at the case companies' level, as illustrated below in figure 4.1

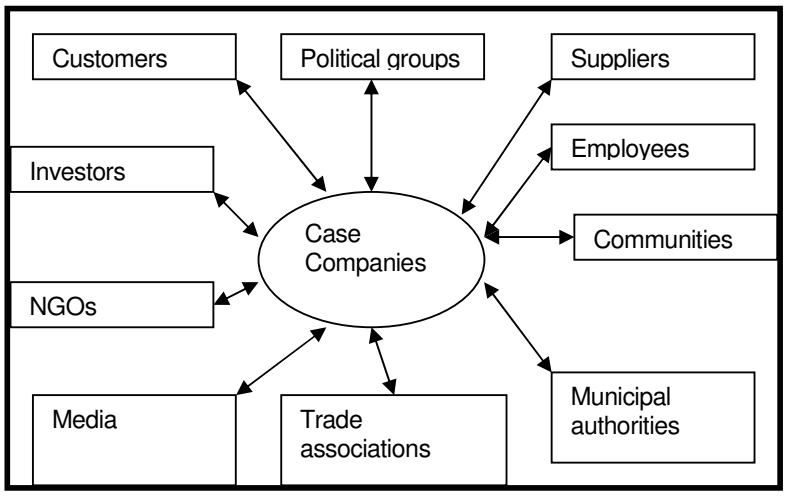

Figure 4.3: *Institutional capacity-building and involvement of stakeholders in environmental works with the case companies (Adapted from field survey, 2007).*

4.5.3 Regulative institutions and their capacity for capacity development

The printing and cattle slaughter processes involves activities which affect the environment and health of humans and thus the company management are required to set up and implement an environmental management plan to mitigate and monitor the environmental impacts of their product production processes. The municipal authority (town councils), the jurisdiction sectors in charge of environmental laws, the ministry of environment and forestry, and the ministry of livestock and animal industry (those directly involve with the activities of the chosen case companies) where the case companies are located are those with legal and economic instruments to enforce and assist the case companies with some form of capacity for the implementation of the countries' environmental permits.

The capacities to act by these institutions are of paramount concerns, because the lack of empowerment of these institutions with the necessary resources by the country government could lead to ineffective implementation of their plan of action as regards to monitor, advice, assist and sanctions of companies that do not compliance with environmental permits. On the other hand, the capacity to implement the various tools for environmental management by the companies should not be downplay because these tools demand resources which some companies are unable to afford, and this could turn out to indiscriminate acts of pollution which could create an unbalance relationship between the company's management and the legal system.

4.5.4 Cultural-Cognitive institutions and their capacity to act

According to Scott (2003), *"cultural-cognitive institutions are institutions with shared conception that constitutes the nature of social reality and the frames through which meaning is made".* This is more or less encapsulated in the target group behaviour which can be as basic as the willingness of the target group to participate in environmental works. This is most visible in the midst of the affected community (within which the companies are located), and how their culture shapes the way the whole environmental management is perceived and what values they place on the environment.

Depending upon the society, relevant cultural-cognitive institutions at the company's level may include; village councils, elders of a clan, a religious brotherhood and village youth groups, community women groups, etc. which the activities of the companies may directly affect them (host community). They may have customs that are locally unique, as well as elements of cultures with regional, national and international distribution.

Binder (1996a) assert that, *"the most important task regarding capacity building in environmental protection would not be to change cultural traditions but rather to improve informational and communicative capacities"*, which can be exhibited from the way the community had always interacted through community based discourse frameworks like; town meetings, elders meetings, or age group discourses. Thus, understanding the culture of the host community is important for the firm when implementing an environmental management plan, but most important is the discourse among the people about environmental protection as this goes a long way towards environmental capacity and their willingness to participate especially in identifying unaccepted methods of waste disposal, level of noise produced by production machine, dumping of waste to nearby streams etc, by these product production companies.

4.5.5 Normative institutions and their capacity to act

While the aspects of institutional framework with regards to legislative and cultural pillars are outlined, another pillar of institution that will be looked into is the normative institution which could be explained in terms of specifying how things should be done, a sort of definition of the legitimate means to a valued ends*. "Normative institutions define goals or objectives"* (Scott 2001), and various roles are assigned to members of the society depending on who they are (actors) or positions they hold in the society.

Normative institutions are a wide variety of groups that may not be affected by the activities of the case companies, but will still have an interest in the company's environmental activities. These groups cannot be surrogates from local and directly affected groups, but they may have important information and resources at their disposal. These normative institutions may include;

- **Local, national, Media or international NGOs**, which usually concerns with a particular environmental issue such as: biodiversity conservation,

technology transfer, energy conservation, agricultural development, green production, animal welfare, waste management, forest management etc

- **Universities, research institutes, or training programs,** which may have expertise with general interest or knowledge in environmental issues and the use of environmental management tools, its impacts and development in solving the environmental issues
- **Scientists and experts in a particular field,** whose knowledge can contribute to improving the environmental performances of the company or country.

Their involvement in environmental work can determine to great extent the outcome of environmental management process because companies or countries environmental management plans are nothing but statements and have no social existence until they are translated into actions aimed at delivering services to the citizens, which is the role performed by such institutions. There is no clear cut between these type of institutions both at the company and national levels because they can influence the environmental performances at both levels. Thus, involving or consulting them early on environmental issues at both company and country levels can often help identify key environmental issues and the opportunities of solving them. But consultation with and participation by these groups may generally be less effective than with affected groups, if they do not have the necessary institutional capacity building.

In this report, the researcher will therefore look at the differences that these regulative, normative and cultural-cognitive institutions offers as concern facilitating the out come of environmental improvement at the case companies' levels in both Denmark and Cameroon and which factors might have been the sole cause of their participation as well as ineffectiveness in environmental works. With these comparisons, it will be easy to draw a clear cut why the environmental management approach in each country is different from the other.

Chapter 5 Presentation of case Denmark and Cameroon

This chapter, a brief description Denmark and Cameroon as well as their economic and political aspects are highlighted. The chapter then proceeded with both countries' main environmental problems and environmental quality changes since 1970. It then ends with countries' development and main characteristics of environmental policy as well as the main environmental policy actors since 1970.

Part A: Denmark

5.1a Description

Denmark lies between 54^{o} and 58^{o} of latitude north and 8^{o} and 15^{o} of longitude east. The country is located in Northern Europe between the North Sea and the Baltic. The bulk of Denmark is the peninsula Jutland, which juts up from the European continent and has a border with Germany of just under 68km. Denmark also includes the Faroe Islands and Greenland in the North Atlantic (Andersen, 2007).

The population stands at 5.37 million. The language is everywhere Danish, and the vast majority of the population has been baptized into the established protestant church. Denmark is therefore nationally and culturally very homogeneous. 85% of the population lives in towns. The capital city Copenhagen account for 1, 08 million inhabitants of the country. The second city is Aarhus (218,000 inhabitants). In addition the entire country is otherwise covered by a network of medium-sized towns.

Denmark is poor in mineral deposits. However, chalk for the production of cement is found in considerable quantities, and oil and gas is extracted from the North Sea. In most of the country's land area, 65% is under cultivation. 10% is covered by deciduous or coniferous forest, while meadow, heath, marshland, bogs, sand hills and lakes constitute 10%. Built-up areas and traffic areas make up the remaining 13%. The climate is temperate, and precipitation is sufficient to provide all the water needed (Nielsen, 2007). The highest point of the country is only 175m above sea level. Annual precipitation varies from 0^{0}C in the coldest month to 16^{0}C in the warmest (Moe, 1995). The average wind force across the year is 7.6 m per second, which helps explain why Denmark is the world's largest exporter of wind turbines (Andersen, 2007).

In Denmark, agriculture is highly developed, producing a considerable surplus of manufactured foods which are exported to other countries. Industrial production is very varied in relation to the size of the country. Among the commodities that have made Denmark known abroad in addition to agriculture produce are; beer, medicines, furniture, shipping, wind turbines and products of the advanced metal industries. But agriculture and industry are highly effective. Agriculture and fisheries employed only 4%, and industry and construction 23% of the population. The remaining 73% are employed in the service sector, 35% in public and personal services and 38% in private business, including financial activities and the traditional shipping trade. Denmark is well provided with traffic systems. It has an open economy, and trade with the rest of the world is of great importance (Nielsen, 2007)

Denmark is a member of the European Union. The proximity of Germany has traditionally orientated the country south in an economic and political sense, but close co-operation with Sweden, Norway, Finland and Iceland, with which Denmark enjoys a passport union, also ties Denmark to the North (Nielsen, 2007). Denmark co-operation with EU has led her to five referenda; in 1986 on the Single European Act, in 1992 on the Maastricht Treaty, in 1993 on the Edinburgh Agreement, in 1998 on the Amsterdam Treaty, and in 2000 on Denmark's joining the Single European Currency, the euro (Zahle and Leksikon, 2007).

5.2a Main Environmental problems and Environmental Quality Changes since 1970

5.2.1a The trade and Industrial sector

The trade and industry sector in Denmark are the largest polluters, with effluents discharge as the main environmental problems. The Danish industrial sector accounts for 28% of total energy consumption in Denmark, but the consumption per unit produce has tended to fall. Approximately 50% of trade effluents are led directly to the sea. In 1993 these direct discharges together amounted to 2,600 tones N, 250 tones P and 26,000 tones BOD. The remaining 50% of industrial effluent is discharged to the municipal sewage system and is treated along with other urban sewage (treatment level over 90%). SO_2, NO_x and CO_2 emissions to the air from industry are secondary in relation to other sources, accounting for to 16%, 17% and 15%, respectively, of total Danish emission.

VOC emission from industry is secondary to those from the transport sector amounting to 19,200 tones in 1990. Since 1990, industrial energy consumption has decreased at the same time as the value of production has risen, due to the introduction of industrial wastewater treatment plans for the aquatic environment. But the industry still contribute significant amount of heavy metals to the air, and chemical substances which are damaging to health and are undesirable in the environment. With regards to waste, industrial waste accounts for 15-20% of total waste produced in 2005 (Denmark State of Environment, 2005).

5.2.2a The Energy Sector

The Danish energy consumption amounts to 800PJ. Much of the energy is produced in large coal-fired power stations, which are important sources of pollution accounting for 45% of Danish CO_2 emissions, 60% of SO_2 emissions and 30% of NO_x emissions (Danish Environmental Protection Agency, 1994: Moe, 1995). Windmill is an important source of renewable energy in Denmark accounting to approximately 500MW of the total energy generation. The country renewable sources energy account for 22PJ of the total energy generation in 1992. Since 1973 (the first energy crisis), the energy consumption has only grown slightly, and has been constant since the second energy crisis in 1979. Combined power plant/district heating network accounts for 63% of energy consumption for space heating (1992 estimate). It has been the idea of the Danish government to reduce and modified its energy consumption up to the year 2005 such that CO_2 emissions will be reduced by 20%. The Danish annual CO_2 emission has been constant at approximately 60 million tones and the CO_2 emission levy was raised in 1995 from a normal DKK 50 per tone to a normal DKK 90 per tone (Moe, 1995). In 2005, Denmark's energy production increase and a significant proportion are exported. The importance of oil as a source of energy has declined from 50% in 1985 to 40% in 2004, while natural gas and renewable energy have been on the increase. In 2005, sulphur emission falls by approximately 98% and the emission of nitrogen oxide by 50% since 1985. But since 2000, these emissions have increased in line with rising energy production. The emission of greenhouse gases varies from year to year due to climate variations and the annual energy trade balance. In 2003, emission were approximately 10% higher that in 1990. More so, renewable energy contribute to negative environmental impact through incineration of waste which leads to emission of polluting substances as well as ashes

and slag which are sent to landfill. Windmills visual environment and noise mostly those position in sea causes impacts on birds, fish and sea mammals (Denmark State of Environment, 2005).

5.2.3a The transport sector

The transport sector accounts for an increasing 20% of the energy consumption, 45% of NO_x, emissions and 20% of CO_2 emissions (Moe, 1995). Between 1990 and 2005, both personal and goods transportation grows roughly in line with the economic growth, while traffic was associated with broad spectrum of environmental impacts. This activity resulted to 30% of the final energy consumption, over half of the consumption of oil products, and significant shares of the emissions of substances such as nitrogen oxides, hydrocarbons, greenhouse gases and particles. When the government imposes stricter requirements with regards to engines and the use of cleaner fuels, these emissions reduces markedly but the emission of greenhouse gases from traffic were increased in step with increasing levels of traffic. The emission of particles falls to a greater deal as compare with that of 1990 (Denmark State of Environment, 2005).

5.2.4a The agricultural sector

Prior to 1984, the Danish agricultural sector was not considered as important source of pollution. But when incidents of oxygen deficit open marine waters during the past years and due to the recognition of a connection between this phenomenon and nitrate leaching from agricultural land, led the sector to firmly focus. Agriculture in Denmark is very intensive due to the well-suited soil and climate (Danish Statistik Aalborg, 1994: Moe, 1995). Pollution resulting from the Danish agricultural sector is primarily attributed to the annual animal manure production of 40 million tones, as well as the utilization of more than 300,000 tones commercial nitrate fertilizer and approximately 5,000 tones of pesticide active ingredients. The nitrogen that leaches from agricultural land poses percolation down into the groundwater where in the more vulnerable areas it has led to or will lead to the groundwater being unfit for human consumption. Part of this nitrogen also led through the watercourses to sea, where it contributes to eutrophication (Moe, 1995).

In 2005, the number of farms dropped due to specialization and intensification. This continued intensification and specialization has led to pollution being more concentrated

in certain areas. The emission of ammonia from livestock production during this period falls by around 30% from 1985 to 2003, but the livestock units continued to create problems for neighbours with regard to odour as well as sensitive natural areas. The leaching of nitrogen to water has fallen around 48% from 1989 to 2003, which is close to the goal for the Danish's National Action Plan for the Aquatic Environment. The consumption of pesticides in Denmark has decreased to 58% since the beginning of the 1980s (Denmark state of Environment, 2005).

5.3a Development and main characteristics of Environmental policy

5.3.1a The general political context of Denmark

Towards the end of the 10th century, Denmark was united into a single kingdom. It has been an independent country ever since, and is thus one of the oldest states in Europe. The form of the government is a parliamentary democracy with a royal head of state. The system of production is capitalist (economic liberalism) with private ownership of businesses and production. The state and other public authorities, however, exercise a considerable regulatory control and provide comprehensive services for the citizens (Nielsen, 2007).

The basic political framework is laid down in the constitution. Denmark's first constitution was adopted in 1849. Important amendments were introduced in 1866 and 1915. The current constitution dates from 5 June 1953. It established that Denmark is a constitutional hereditary monarchy. Denmark's present sovereign is Queen Margrethe II (b. 1940). In practice, the monarch's role is symbolic and representative. The legislative power rests jointly with the government and the Folketing, the executive power with the government and the judicial power with the courts (Bille and Leksikon, 2007).

The Folketing consists of 179 members, two of whom are elected in Greenland and Faroe islands. The remaining 175 members are elected in Denmark. The government is appointed by the Queen and consists of the Prime Minister and the other ministers.

The choice of Prime Minister and other ministers is determined by the party composition in the Folketing. Some of these parties with majorities seats include; the Denmark Liberal

Party, the Social Democrats, the Conservative People's Party, the Danish People's Party, the Social-Liberal Party, etc (Ministry of Foreign Affairs Denmark, 2007).

The Folketing and the government co-operate in legislation, but when a bill has been passed by the Folketing it must be approved by the Queen and the government. The Queen does not adopt an independent stance, but follows the advice of the government (Zahle and Leksikon, 2007).

The state administration is in the hands of the individual ministers. The public administration is not the province solely of the state. Most of the administration powers are delegated to the municipal authorities (which consist of 5 regions and the 98 authorities) into which Denmark is divided (statistic 2007). The Danish municipality has autonomy over all services provided to citizens The mass media keep a close watch on the activities of the administration, and this is strengthened by the quite extensive access to the documents of the administration provided for by the Access to Public Administration Files Act. (Christensen and Leksikon, 2007).

Denmark has foreign policy collaboration with EU, UN, NATO and WTO, and intends to strengthen its links with G8, ASEAN, ASEM, the Arab league, the African Union and the Organization of American States (Ministry of Foreign Affairs Denmark, 2007).

5.3.2a Denmark Economy

Gross domestic product (GDP) amounts to $29,890 per capita (est. 2002) of which; 6% is generated by the agricultural sector, 28% by the industry sector and 68% by the services sector. The foreign trade is extensive. Alone export of goods amounted to $ 47,222 per capita (est 2002). The country had previously been a debtor by importing too much, but the debt has being paid off. The balance of payment surplus amounted to DKK 36,000million in 1993 (Denmark, 2007).

5.3.3a The Starting Phase of Environmental Policy

Denmark environmental management policy, like the attendant legal and institutional framework did not have well-defined objectives and strategies for over the past 200 years.

Environmental protection concerns were merely incidental in the activities carried out within the agricultural and energy generation development policy.

However, there was some form of environmental awareness and legislations enacted by the Danish government around the 1600, when the country forests were subjected to violent felling. The Forest Reserve Act of 1805 was enacted and aims at replanting of forest. Legislation was enacted in 1792 following the project to prevent sand drift that was changing the water table. In the same period regulation to regulate the watercourses was introduced in order to construct a dense network of canals and ditches in the fields. But the changing ecological cycles that were recognised since the 1950s which was due primarily to the huge increase in the amount of energy and raw material consumed and the large amounts of chemicals introduced to the environment, pushed the government into new comprehensive legislation governing the development and usage of the Danish landscape. The aim that was, “to seek to ensure the quality of the exterior surroundings that have a bearing on health and recreational activities, and to preserve a varied plant and animal life”, was said to be Denmark’s break through consciousness on its environment.

In the 1960s, wide-reaching changes in the ecological cycles increased the need for more action, which is a reflection in the extent and character of the measures that were instigated by the State in the area of the environment. But the period between 1945 and 1985, saw Denmark with number of new laws concerning “the exterior surroundings” which was by far exceeded similar legislation introduced over the last 200 years. The regulations only really began to affect energy consumption and the chemical cycles in the years leading up to and following the setting up of the Danish Environmental Protection Act in 1973.

In the beginning, the legislation was mostly aimed at limiting the emission of chemicals to the air, soil and water. It was more of purification and, to a lesser extent, an attempt to change production methods and the pattern of consumption. “Pollution control” preceded “environmental protection”. How ever, before 1950, the waste water from homes and industry was mostly sent into the watercourses, lakes and sea without really being treated

in anyway. This gradually changed between 1975 and the middle of the 1980s. The municipal water purifying plants took in amount waste water that corresponded to around 10 million PE (person equivalent). In 1970, 20% of this waste water was treated biologically. 15 years later, almost 80% passed through biological and biochemical purification plants, and at the beginning of the 2000s, some 90% of the waste waster underwent further purification.

In the middle of the 1980s, the plants emitted approximately 24,000 tones of nitrogen, some 7000 tones of phosphorus and around 72,000 tones of organic matter to the aquatic environment. During the same period, the industry contributed some 5,000 tones of nitrogen, approximately 3,500 tones of phosphorus and almost 50,000 tones of organic matter. More so, actions were introduced to combat the emission of dust particles, sulphur dioxide and nitrogen oxides to the air from industry and power stations through the regulation “diluted the pollution”. Higher smokestacks were built and longer waste water pipes constructed. (Hunding, 2007).

These regulations were increasingly combined with actions aimed at the actual source of the pollution. Fuels containing high percentages of sulphur and heavy metals were replaced by others which caused less pollution. Pesticide action plan was introduced 1986 aimed to halve the consumption of pesticides over a ten-year period. In 1985, the consumption was almost 9000 tones. The chemical law introduced in 1980 was also means for new compounds and products to be evaluated by the environmental authorities before coming into use. In this regards, regulation reducing Denmark’s consumption of Freon (CFCs) by 60% from 1986 to 1992 was introduced and since 1995 the use of CFC was been prohibited.

Cleaner environment and cleaner nature was the principle introduced in 1970 by the Danish government onwards. This growing interest in the environment was accomplished by a wish to make better use of the open country for recreational activities. From the middle of the 1980s attention was also began to focus on providing a clean environment and a varied landscape to ensure that tourism, an important source of national income, would prosper.

Legislation was gradually seen as the dual objective of improving the environment and creating more “nature”. Some of these rules came as a result of the Danish initiatives, but others emerged as a result of co-operation with other EU countries. These include series of action plans aimed at reducing the emission of chemicals to the aquatic environment. Forestry Act was introduced in 1989 aimed to double the forested area over the course of the next 100 years.

The principle of closed cycles and sustainable development in the 1970s sees the Danish national regulations increasingly tried to limit the consumption of energy and raw materials. Energy consumption has been reduced by insulating building more efficiently, and by using equipment and machinery with lower energy requirements. Higher environmental duties on energy consumption, along with increased use of renewable sources of energy such as solar and wind power, has also had greater effect in the Danish development of environmental policy.

The rise in the consumption of raw materials has also been stemmed, in particular the conversion to production methods using less energy and fewer new raw materials and, thus creating less waste.

Finally, new products are analysed during their entire life cycle, “from cradle to grave”- to control their effects on the environment. These measures make it possible to intervene in production phases characterised by a particularly high degree of resource consumption and pollution. More so, they ensure that as many products as possible should be recycled to manufacture new products. The obligation to produce green account and the introduction of environmental management that increases companies awareness of their productions environmental impact have had the same effect.

Hence, since the international environmental conference in Rio in 1992, the concept of sustainable development has become a guideline for environmental policies in Denmark. In the 2000s, more than a third quarter of the Danish municipalities begun working with Agenda-21 to support sustainable development through local strategies. (Hunding, 2007).

5.3.4a Basic Institutions and Regulations

The environmental protection of Denmark up till 1970 was design for restoration of the landscape and to reduced the used of pesticides by the agricultural sector. Reduction in energy usage and waste water treatment was also the priority of the administrative. The government was using the principle of “end of pipe”, that is taking action on environmental issue only when the damage has been down on the environment. It could be said that, the regulative and legislatives enacted during this period was not well organised, because there was no clear environmental regulations that was governing the Danish industry. But it was only in 1972 after the world conference on “human environment” that environmental protection became prioritized for the government. In this light, the Danish Environmental Protection Act was set up to take action with regards to the country’s environmental issues, through the supervisory of the Ministry of Environment and Energy. Denmark being an EU member country is subjected to the EU environmental regulations, although the Danish national environmental regulations show some slight differences in some environmental areas.

The first Danish Environmental Protection Act (EPA) from 1973 was primarily aimed at industry, due to the fact that at the beginning of the 1970s, the western world view was still based on uncontrolled industrial growth and this was seen as a threat to man-kind’s survival (Danish EPA, 1973: Moe, 1995). With the lags for environmental performances from the Danish government during the past, coupled with the growing awareness on environmental issue, the Danish government was force to copy from Sweden on how to regulate its industry. The draft of the Danish EPA of 1972 was adapted in 1973 through thorough negotiation between the government and the industries. In 1991, a series of amendments were made on the 1973 Danish EPA by the minister of Environment with four basic Acts namely; the EPA, the Town and Country Planning Act, the Nature Protection Act and the Watercourse Act. His idea been that, the previous law did not lay down any procedure on which the Danish enterprises could be evaluated based on their environmental pollution. In this regards, the new law was accepted by every one including the industry on the bases that enterprises have to undergo an approval procedure to be classified based on it polluting levels (see section 5.2.2 of the Act). The 1991 EPA was adopted by a large parliamentary majority and entered into force on 1 January 1992.

What was so important for the 1973 EPA was the setting up of an Environmental Protection Agency with effective administrative apparatus consisting of several hundred full-time employees as the national administrative element, and technical administrative divisions in the counties and municipalities as the implementation element. Within the period from 1973 to 1992, the Danish EPA of 1973 had developed a series of strategies for combating pollution within the industrial sector.

The strategy of Polluter Pays Principle (PPP) was introduced by the Danish government right from the start and this principle was in harmony with what the European Communities (EC) recommended to Member States in 1975 (EPA, 1991, section 4 (1-2)). In this regards, economic instruments were introduced with the objective to influence the behaviour of companies and households in an environmentally sound direction.
Denmark environmental levy stems from 1986, with levy on unleaded petrol. In 1987 the waste levy was introduced. The levy for CO_2 emission was introduced in 1993 and was increased in 1995. Water supply and sewage disposal levies in 1994. A levy of DKK 10 per kg SO_2 emitted was introduced in 1996. Pesticides levy was introduced in 1996. In 1994, polluting commercial enterprises such as livestock farms and large chemical plants paid a fixed annual charge for authorisation and supervision for polluting. (Moe, 1995).

When the Danish government discovered that the PPP only stipulate that the polluters shall pay the costs of meeting the environmental requirements and not how the environmental requirements are to be determined, the Best Available Techniques (BAT) was introduced for evaluating the enterprises. In 1987, the Action Plan on the Aquatic Environment was introduced based on the environmental quality of the specify surroundings.

The Danish environmental regulation from the period 1973 to 1980 was mostly based on the dilution policy. This principle was change in 1995 from dilution to treatment to cleaner technology, due to the prevailing idea that acid rain was caused by SO_2 emission. The SO_2 abatement technique was implemented by the Danish government in 1995. In the mid 1980's it was discovered that the sea could no longer tolerate the effluent from the

industry following a serous episode of oxygen deficit in 1986. In this regards, all enterprises that discharge effluents into the sea were subjected to the treatment of effluents in accordance with the BAT principle. In 1996 BAT became the core principle in the environmental regulation in EU with the Integrated Pollution Prevention Control (IPPC) directive (EU Directive 96/61: IPPC). With the international meetings concerning thinning of the ozone layer and greenhouse effect, the precautionary principle was incorporated in the 1991 EPA with rules and guidelines.

In Denmark, cleaner production was introduced as part of support scheme for cleaner technology, which was the concept applied by Danish EPA (Thrane and Remmen, 2005). Cleaner production was enacted as a principle of justice in the EPA as "least polluting technology" in 1992 (Nielsen, 1996). This was a response to the problems with dilution and abatement, which dominated the environmental policies in the 1960s and 70s. With the cleaner production principle, individual producers were to evaluate the whole of the product's life cycle from raw material extraction through production and consumption to waste-"from cradle to grave".

In 1993, the EC regulation 1836/93 on eco-management and audit introduced a voluntary scheme that entered into force in 1995. The environmental audit only comprises enterprises that requested it, but the system includes that suppliers also have to live up to certain requirements on the environmental front. The concept of eco-labelling is an example of a "cradle to grave". The rules about eco-labelling are stipulated in Regulation 880/1992.

The 1993 EPA of Denmark gave the chance for neighbours to greatly influence the efforts of the authorities, when two cases were brought before the authorities a complained about an enterprise or from an enterprise, which required an environmental consent. Most of these complains from neighbours in practice were mainly noise and odour and purely local problems.

In 1994, Denmark adopted a new approach for EIA in accordance with the EC Environmental Impact Assessment Directive 85/337, although the Danish government

over the past 50 years in its planning practice has separated industry from housing, as is also reflected by Danish towns.

The Danish government operate a trade effluent regulation, and it is based on four different categories namely; the direct discharge, discharge to sewage system, discharge by spreading on agricultural land and discharge to the ground water through percolation. (Moe, 1995).

The EC Directive 80/68 on the protection of groundwater forbids or restricts the discharge of a number of substances to groundwater, but under the Danish law, the discharge of the substances in question is quite simply forbidden.

In the EC Directive 84/360 on combating air pollution from industrial facilities, the EC set forth some very framework-like provisions that states that “member States shall introduce consent criteria for new or modified facilities enumerated on a list, and the enterprises should employ BAT”. Under the Danish law, the Directive has not led to any changes because an approval system was already in operation and because it was based on the requirement to use BAT. But the Danish administration has implemented Guidelines on Industrial Air Pollution Control, no. 9/92 (Moe, 1995: see also DEPA (www.mst.dk/homepage/)).

The EC has harmonised noise requirements for certain products, e.g. Motor vehicles, construction plan and equipment, lawnmowers, etc. this has been incorporated into Danish law. In the case of noise from enterprises, there are no EC rules in force, but under Danish rules, external noise from enterprises is regulated by a Guideline.
In the case of hazards, the EC adopted Directive 82/501 on major-accident hazards of certain industrial activities in 1982. This has been incorporated in the Danish laws. The EC regulation on hazardous waste is in Danish terminology referred to as waste chemicals. Both EC and Denmark work on the same regulation. The EC regulations 259/93 regulate the export of waste. This regulation supersedes previous rules which only apply to hazardous waste. The new regulation on export of waste has been directly applicable in Denmark since 1994. This regulation does not apply to waste included in the

"green" list, if the waste will be benefiting another Member State. For non-hazardous waste, the EC original requirement under Directive 75/442 was that Member States should have suitable systems for the disposal of waste. This was amended by Directive 91/156, which stipulated considerably more detailed requirements to Member States. They shall register the amount of waste and supervise waste disposal in various ways. In Decision 94/3 the Commission established a detailed list of wastes pursuant to Directive 75/442- the "European Waste Catalogue". Denmark has incorporated this rule into its environmental policies and accord the Municipalities considerable influence on waste handling in Denmark.

In Denmark, the government has introduced the rules of internal control of enterprises, with the aim that enterprises are legally bound to keep records or undertake measurements such that the environmental authorities can base part of their supervision on internal control by the enterprise. This requirement for internal control form part of an environmental authorisation or an injunction. The EC Directive on emission from industrial plant, power stations and incineration plants also stipulate detailed requirements on internal control, and these requirements have been implement in Danish law through a Statutory Orders.

In 1996, Denmark introduced a requirement for the majority of listed enterprises to draw up environmental accounts. This principle is corresponds to the principle in the EC Directive on access to environmental information (Directive 90/313) and the Danish rules on freedom of information. This requirement for an environmental account is as yet specifically Danish, but is inspired by the EMS and the voluntary EC-management and audit scheme (Council Regulation 1836/93).

5.3.5a The Danish Policy Style

The Danish policy as related to service society shows strong commitment for environmental management. Over the past 35 years, Denmark has made a transition away from an industrial society with a large agricultural sector towards a service society. The Danish government have shown on one hand a strong propensity to enact stringent national environmental laws. There has been on the other hand recognition of well established environmental institutions that would enforce the laws effectively, due to the

availability of high capacity as regards to human and material resources. Denmark introduced the policy of "persuasion through dialogue" in 1973, when the industries and government took a dialogue on how to regulate the various industrial activities, when setting up its Environment Protection Act. This "persuasion through dialogue" applies that enterprises are to report regularly on the voluntary pollution abatement measures. To facilitate this dialogue, an Environmental Working Groups is set up in all the municipalities. This municipal environmental working groups is provided with guidelines by the Danish Environmental Protection Agency (DEPA) based on the activities perform by a said enterprise. At this point in time, the municipal authorities are legally bound to instruct on how the enterprises has to take responsibility for their environmental issues as stipulate in the DEPA Statutory Orders. This development has characterised the country's environmental policy, which has steadily expanded during the period, cutting an ever-increasing number of traditional boundaries. Denmark present-day environmental policy builds on principles such as a high level of conservation and protection, precaution on behalf of the environment, preventive measures, integration, the "polluter pays" principle, proximity as well as public awareness and citizen involvement. One could easily say that, the Danish Environmental policy has become progressively internationalised.

5.4a The main Actors

5.4.1a Environmental Policy Institutions

The Danish parliament plays a very decisive role as far as environmental policy is conducted in Denmark. The Parliament's work on environmental policy is concentrated in a standing committee-the Committee on the Environment and Regional planning. When drawing up EC rules for implementation, the decisive role is played by another standing committee- the European Affairs Committee. (Moe, 1995).

Denmark has had a ministry exclusively devoted to protecting nature and the environment since 1971 and a ministry of Energy since 1974. In 1994 the Ministry of the Environment and Ministry of Energy were merged as the new Ministry of Environment and Energy which placed more emphasis on the environment and resource aspects of the energy area. (Poder and Tortzen, 1997). The ministry proper comprises the Ministerial Division, which serves the immediate needs of the minister, as well as two interdisciplinary

divisions (Finance and Personnel) and a Regional Planning Department comprised of three divisions. The ministry of Environment and Energy has seven agencies which employ about 300 staff. Almost half of these works in the state forest districts under the jurisdiction of the National Forest and Nature Agency, which administers Denmark's natural resources and cultural heritage. The Danish Forest and Landscape Research Institute carries out research and development and disseminates information to benefit the forestry, park and landscape sectors.

The Danish environmental protection is totally the main focus of the Danish Environmental Protection Agency, which is also responsible for combating marine pollution. The Danish Energy Agency ensures that Denmark's system of energy production, supply and consumption develops in an economically and environmentally sound manner. The Geological Surveys of Denmark and Greenland and the National Environmental Research Institute (including the Greenland Environmental Research Institute) develop knowledge of Denmark's and Greenland's subsoil, nature and environment. The Mineral Resource Administration for Greenland administers the exploration and development of hydrocarbon and other mineral resources in Greenland. The Mineral Resources Administration also serves as the secretariat of the Denmark/Greenland Joint Committee on Mineral Resource in Greenland. The Spatial Planning Department, which is part of the Ministry's Department, ensures that spatial planning is carried out creatively and skilfully to protect and improve the environment (Poder and Tortzen, 1997).

The Environmental Board of Appeal and the Nature Protection Board of Appeals are boards where primary decision-making is taken. In this case the primary decision-making body in an environmental case is always the local authority, that is, the Municipality or the County. The Environmental Board of Appeals is independent of the Minister.

The Brundtland report "Our Common Future" in 1987, instigated considerable discussion in the Danish environmental sector. The greatest consideration was given to the environment when the concept was thoroughly integrated in the individual sector ministries. Decentralized environmental institutions were established among the following

ministries: the ministry for Agriculture and Fishery was given the responsibility to administer the environmental aspects of agriculture; the Ministry of Business and Industries was to administer the environmental aspects of industry; the minister of transport was to put forward plans for sustainable transport in 1990 and 1993; the Ministry of Defence takes control of their environmental problems through an environmental management programmes that leads to the BS 7750 environmental management certification. (Moe, 1995).

The Confederation of Danish Industries and other trade and industry organisations was established in 1973 by virtue of the fact that the adaptation of the DEPA was as a result of negotiation between the social Democrat government and the Trade and Industry Council (now the Confederation of Danish Industries), which is now the most influential organisation in the Danish trade and industry sector. On the other hand the various municipalities also have organisations that influence the Danish environmental policy. The most powerful is the National Association of Local Authority in Denmark (NALAD), which represents all Danish municipalities other than Copenhagen and Frederiksberg. The Association of County Council in Denmark also have certain amount of influence because the officials are well equipped with considerable expertise. But as compare to NALAD, it is regarded as been weak (Moe, 1995).

The courts play a vital role as far as criminal environmental law is concerns in Denmark. Criminal environmental acts range from fines, penalties, sanctions, formal and injurious infringement, through imprisonment. (Moe, 1995).

5.4.2a Green Organisations

In Denmark, there has been a long-standing tradition of actively involving individuals, nongovernmental organisation and associations and businesses formally and informally in formulating and implementing environmental policies. The Danish Society for the Conservation of Nature has had considerable influence on the Action Plan on the Aquatic Environment in 1986-87. The Danish Anglers Federation has had a consistently great influence since the time of the first Environmental Protection Act, although mainly as regards to condition of watercourses. Other green organisation include: the Greenpeace,

Open-air Council and World Wide Fun for Nature which are working in implementing environmental policies (Poder and Tortzen, 1997).

5.4.3a The Media

The involvement of the media in environmental issues has a long tradition in Denmark since the implementation of the principle of freedom of information adapted by Denmark from Sweden in 1970. The EC Environmental Information Directive, 90/313, is from many points of view quite close to the Danish freedom of information rules. Openness towards the press has been of considerable benefit to Danish environmental administration. It has accorded an aura of credibility to this group of authorities, and is partly the reason why environmental questions have had a prominent position in the Danish press since 1970.

5.4.4a Economic Actors

In Denmark, there are many firms that have labelled themselves as “environmental companies” ranging from environmental consultants/contractors through hazardous waste disposal companies to municipal waste management companies. The EC regulation 259/93 on the export of all kinds of waste is applicable in Denmark since 1994. Denmark mercury-containing waste is deposited in Harzen in Germany and Danish car batteries are recycled in Germany and Sweden. The supermarkets in Denmark are responsible for most of the bottles recycling.

The Danish rules accord the Municipalities considerable influence on waste handling in Denmark due to EC stringent regulations on waste handling. There are about 1,500 municipal sewage treatment plants and 38 incineration plants in Denmark covering the majority of the country’s municipalities. Since 1992 all landfills were publicly owned because problems with landfills can arise many years after they have closed, problems which can be expensive to remedy. Only some special wastes are handled by private environmental companies in Denmark. The largest special depository is run by the waste processing firm Kommunekemi A/S at Klintholm on the east coast of Funen. The Kommunekemi A/S in Nyborg is also responsible for disposal of waste oils and chemicals. It is the only incineration facility firm authorised to receive waste chemicals from industry and other sectors. The Danish Steel Works Ltd in Frederiksværk is responsible for recycling of scrap iron. (Moe, 1995).

5.5aTarget Groups of Environmental Policy

The parastatals are the most prominent target groups, since the government still plays the major role in the economy. The main problems in Denmark lie with agriculture, industry, urban sewage, power production, traffic and contaminated sites. Denmark has not made much progress with respect to reducing pollution from the agricultural sector. The problem first came apparent in the 1980s, and is one that is politically difficult to handle. In contrast, the results of 20 years endeavour to regulate industrial pollution and urban sewage has been decidedly positive, as is evident from various instruments used and regulations. Power production has become much cleaner over the years because of the introduction of cleaner fuels and abatement measures at power stations. Steep levies on energy have resulted in consumers saving so much energy that this has counterbalanced the increase in energy consumption by other sectors. Denmark has had the ambitious target of reducing CO2 emissions by 20% in relation to 1995 levels by the year 2005, but it was difficult to meet. With regards to traffic, Denmark has reaped the benefit of international endeavours aimed at cleaner motor vehicles, but as yet has not made any significant independent progress. Finally, concerns contaminated sites, less than 1,000 have been remediating over the last 12 years out of a possible total of over 10,000 in 1995 (Moe, 1995).

Part B: Cameroon

5.1b Description

The country Cameroon is located in the Gulf of Guinea, with a population of about 18million inhabitants (2007 estimate). It has a surface area of 475,000km^2 and shares boundaries with Nigeria on the northwest, Chad on the north east, Central African Republic on the southeast, the Gulf of Guinea of the southwest, and on the south by Congo, Gabon, and Equatorial Guinea. Cameroon is also open to the Atlantic Ocean. It is a member of the Central African Economic and Monetary Union, known under its French acronym as CEMAC.

The country is bilingual, with English and French as official languages. Situated at the meeting point between West and East Africa, is a melting pot of cultures and peoples,

bringing together more than 250 ethics groups. Its rich cultural variety has earned it the description “Africa in miniature”.

Its varied climate and abundant rainfall favour agricultural activity, livestock breeding and fishing. These activities form the backbone of the economy and have made Cameroon one of the principal food producing countries in the Central Africa region and enabled it to be food self sufficient. It also has a dense forest with very many tree species over some 20 million hectares. The country also has mineral resources (oil, gas, bauxite, iron etc,).

Cameroon has three main ports (Douala, Limbe, and Kribi), and three international airports (Douala, Yaounde and Garoua). Its main export products include; cocoa, coffee, timber, aluminium, banana, cotton, rubber, palm oil, pineapple, tea, etc,. in addition, it exports crude oil since it is also petroleum producer.

In early 1990, Cameroon adopted a liberal multiparty and democratic system. Many parties are registered and seven of them are represented in the National Assembly. These include: the CPDM, SDF, NUDP, UPC, UDC, MDR, and the MLJC (MINEF/UNIDO, 2001).

5.2b Main Environmental problems and Environmental Quality Changes since 1972

5.2.1b Industrial Pollution

The state of the environment in Cameroon today, besides the global and well-known environmental problems such as climate change, the destruction of the ozone layer etc, is characterized by a general degradation of the various ecological systems (Asangwe, 2006).

Cameroon both imports and manufactures products harmful to the ozone layer Importation of CFCs 11, 12 and 22, principally in the compressors of refrigerators, freezers and air conditioners, and for the manufacture of rigid (polystyrene) foams, constitutes the major share of products in annex A of the convention of hazardous substances. In 1991 Cameroon imported about 300 tones ozone harming substances through two major import agents. This amounted to 121 Ozone-Depleting Potential (ODP)

units. An estimated life of refrigeration equipment in Cameroon is only five years, which refers to the length of time set for the elimination of these substances in equipment already imported into the country (estimated in 1995 300,000 refrigerators and 280,000 freezers). From 1987 to 1995, a total of 542 ODP units were imported (Nemba, 1993: Blaikie and Simo, 1998). However, Cameroon manufactures refrigerators, cigarettes, and foams all of which involve the use of these substances mentioned above.

5.2.2b Water Pollution

In Cameroon cities, there is a noticeable lack of sewage treatment systems, infrastructure for the treatment of waste water, an insufficient supply of potable water as well as an inadequate management of the disposal of solid waste. Under such conditions, urban areas are generally very unhygienic. Rural areas have several industrial-scale plantations and many small-scale cash crop plantations such as cocoa and coffee farms. This intensive farming activity requires the use of chemical products like fertilizers and pesticides. The large-scale use of these products has a detrimental effect on the environment, especially as most farmers do not know how to use them properly.

Cameroon is a crude oil producer of an economic scale and runs a state owned refinery in the coastal city of Limbe. Douala is however the energy utilization center since it has the largest concentration of industries and serves as the depot for processed or refined oil products which powers the nation economy. The utilization of these products within the designated industrial zones and illegal locations for such activities has made the proper discharged of effluents resulting from production processes and serious environmental problem to the teeming human population of Douala. (World Bank, 2002).

More than 70% of the industries in Cameroon are located in Douala metropolitan area. Petroleum products effluents have become an integral part of the state of the environment. These effluents are generally any processes or unprocessed liquid, viscous and gaseous evacuation of agricultural and industrial constituents that contain petroleum input into the environment. These effluents are discharged during processing, transportation and utilization as hydraulic fluids, solvents, fertilizers sludge etc into the predominately aquatic terrain of Douala. They all end up in this coastal environment that is very sensitive to deterioration particularly of the aquatic terrain leading to contamination

and eventual pollution of surface water with consequent health hazards to the people. These different sources of petroleum effluents including agricultural such as fertilizers, chemical or industrial contain enormous quantities of contaminants ranging from hydrocarbon to trace metals. Some of these trace metals include; copper, cadium, mercury, zinc, lead, nickel, vanadium, phonol, cyanide, arsenic etc (Asangwe, 2006).

Table 5.1 below presents a number of manufacturing and marketing companies whose operation contributes significantly in the environmental deterioration and degradation in the Douala marine and coastal space

Company	Product	Contaminant
CIAC and PLASTICAM	Producers of plastic buckets, paints and tyres	Hydrocarbons, tubes
SAPCAM	Paint production	Combustible fuel oils
CONFITEX	Textiles	Acid waste oils
TOTALFINAELF	Crude oil exploitation and marketing oil products	Hydrocarbons and lead (Pb)
SCDP	Oil products storage and distribution	Oil dumps (contains leads, arsenic copper etc)
SHELL/TEXACO	Aviation, petrol, diesel fuel and wax	Hydrocarbons, lead, cadium, copper, zinc and other trace metals
CEP/Chemicals	Paints, detergents, vanish	Acid mercury, copper, lead, phosphates, trace metals

Table 5.1: *Producers of petroleum products effluents in Douala (Adapted from Asangwe, 2006)*

A study conducted under the regional seas programme of the United Nation Environmental Programme, (UNEP), on sea pollution from industrial sources in the West and Central African region in 1982, shows that although household waste plays a greater role in pollution, estimates indicate that industrial waste alone is estimated at about 2187 metric tones per year in biochemical oxygen demand, and about 48,000 metric tones per year in suspended solids in Douala alone. The publication (CIFA, Technical Paper No. 25) by the Food and Agricultural Organization (FAO) on the state of water pollution in Africa showed that some water systems in Cameroon have been contaminated by chemical products, especially pesticides from industrial plantations such as: lindane, aldrine, DDT and PCB.

The study on industrialization and industrial pollution, conducted as part of sartorial studies for Cameroon's National Environmental Management Plan, that was based on the survey of 147 industrial and small-scale processing plants on existing data on waste produced in Douala indicates that; the agro-industrial sector, chemical industry, the metal works industry account for a highest contributor of chemical oxygen demand, Biochemical oxygen demand, suspended solids, phosphate and Nitrogen content. The study of the coastal region of Cameroon, realized within the framework of the regional project entitled "water pollution control and the conservation of biodiversity on the Large Marine Ecosystems of the Gulf of Guinea". This study published data on solid wastes produced by some activities including industrial activity. The nine sectors examined were responsible for about 500 million metric tones of waste each year; 1million tones of putricible waste and sewage, 96,540 tones of dangerous waste and 2840 tones of non-dangerous wastes (UNIDO, 2001)

5.2.3b Urbanization

This issue of rapid urbanization is not a new phenomenon in the developing countries, because these countries have had a long-term situation of primate cities, which performed purely urban functions of administrative, economic, religious and cultural centers from the early contacts with Western Europe (Asangwe, 2006).

The urban population of the country Cameroon is approximately 49% (7.4 million) of the total population (2002 estimate). It is regarded as a highly urbanized country by sub-Saharan standards. The average annual urban growth rate in 1970 to 1995 was 6.1%. The percentage dropped in 2002 to an estimated annual growth rate of 4.1%. The urban system of Cameroon has two major zones: the main port and commercial center. Douala is the main commercial town of Cameroon with an estimated population of 1.4 million (estimate 2002) and Yaounde, the administrative and political capital, with an estimated population 1.1 million, (estimate 2002). This bipolarity is specified to Cameroon; in most African countries, a large proportion of the population is concentrated in the single largest town (usually the capital city). These two cities are followed by the secondary towns of Garoua, Bamenda, and Maroua, which have more than 200,000 persons each (World Bank, 2002).

The rapid growth in urbanization estimated at 8% per year, is not often accompanied by a corresponding growth in the development of urban environmental protection infrastructure and services such as potable water, waste disposal systems (UNIDO, 2001). It could be said that, the economic crisis which result in the mid-1980s led to enormous needs in terms of infrastructure, public facilities, and various urban services. In 1988, urban poverty reached a level of 60% and about 70% of the population was living in unplanned settlements. The majority of peri-urban residents lived in poorly drained and poorly serviced areas. The water supply and sewage sector was particularly affected by the deterioration of public services. Consequently, health indicators have deteriorated. In addition, the rate of primary school enrollment declined from nearly 100% in 1980-85 to 62% in 1997 (World Bank, 2002).

5.2.4b Energy sector

Cameroon has the highest hydro potential in Africa after Democratic Republic of Congo. Despite this potential and the solar potentials, its electricity sector still goes through insufficient power generation. Only 5% of the rural population has access to electricity and about 65% of the urban population has access to electricity. 95% of electricity production in Cameroon comes from hydropower. The rest of the energy is generated from diesel generators units installed in some big towns to augment power supply. 65% of the population especially in the rural areas depends on biomass for their energy needs. Renewable energy contributes a very negligible amount in meeting the energy needs of Cameroonians.

In the 1990s, the electricity sector of Cameroon went through difficult times due to poor management and a need to increase electricity supply. The sole national electricity corporation (SONEL) which had enjoyed monopoly could not meet up with the electricity demands of the population and industries. In 2001, SONEL was privatized to an American based energy multinational company, AES SIROCCO for 20 years and SONEL became AES SONEL. AES SONEL until date is still to meet the electrification demands of Cameroonians (Global Village Cameroon, 2006).

In this regards, Cameroon embark on three hydropower production plants, namely; Mbakaou construction on river Djerem, Bamendjin construction on river Noun and Mape construction on river Mbam as retaining dams to support the three existing ones (Edea, Songloulou and Lagdo). The construction of the three news dams is due frequent droughts that have occurred in the past two decades and the sedimentation that has taken a greater portion of the water retaining space.

According to Global Village Cameroon, (2006), some aquatic species in some regions of the existing dams has extinct while the introduced fish species flourish. The population in this region suffers from water related diseases like filarial, malaria and do not have good health facilities. They lack basic facilities of electricity, portable water, and communication. Poverty is at its peak in this region with many people living on less than a dollar per day. During the construction the people in this region suffered from corruption in the process of compensation and in some cases they were obliged to trade-of a certain percentage of their compensation amount to be paid.

Another dam called Lom Pangar which has to supply Bertoua, the capital city of the East Province to replace the fuel generating unit, had to flood the Deng Deng forest reserve which has Africa's last forest hardwood that harbours gorillas, chimpanzees, monkeys and other wildlife that are fully protected by the Cameroon law and IUCN. Although the environmental impact assessment has been conducted, the project is still to start (Global Village Cameroon, 2006).

Nevertheless, the Cameroon energy sector contributes to CO2 emissions and bio-chemical oxygen demands which are relates to climate change and water pollution respectively. According to Environment at a Glance, (2004), Cameroon energy production from oil sources amount to 1.1% in 1995 and 1.9% in 2001 of the total country's energy whereas combustible renewable and waste account for 78.7% in 1995 and 79.0% in 2001. The total CO2 emission in 1995 and 2000 was 4,232 kilo tones whereas organic water pollutant (BOD) emission was 12,180 kg per day in 1995.

5.2.5b Forest depletion

In Cameroon, the supply of fuel wood from forests accounts for over 60% of the energy consumed and has been increasing at a rate of 2.5% per year since 1974-1976 (Cleaver, !992, P.65: Gbetnkom, 2001). The forestry sector occupies the first place in export tonnage and third place in foreign earnings. It accounts for about 4% of the GDP and offer about 40,000 jobs (Besong, 1992: Gbetnkom, 2001). Cameroon's forests contain an estimated 300 different tree species and the country can be said to have a forest-based economy. Forest serves as a habitat for primitive population (Pygmy). The live in and near tropical forests and are for the most part very poor. It is then clear that the immediate survival of these people is threatened and their poverty trend is aggravated when and where forests are damaged through inappropriate development.

Cameroon has some of the greatest biodiversity in Africa, and also has the highest percentage of logged forest of any African nation with substantial rain forest (Ndoye and Kaimowitz, 2000, Gbetnkom, 2001). Cameroon is also one of the Sudano-Sahelian countries in Africa that show signs of some desertification (Cleaver, 1992: Gbetnkom, 2001). It appears therefore that deforestation in Cameroon should be the preoccupation of environmental and human resource economists, ecologists as well as policy makers because of its threat to ecological sustainability and socio-economic development in the long run (Gbetnkom, 2001).

In Cameroon, the high speed of actual forest exploitation accelerates degradation of forestry resources and the environment. In a total surface area of 475, 10^5 ha, forest covered an area of 280.25, 10^5 ha in 1965. This forest area dropped to 233,10^5 ha in 1980, of which about 165,10^5 ha of exploitable dense forest was for woodwork (World Bank, 1992; Gbetnkom, 2001). In 1995, the extent of Cameroon forestland came down to 195.98,10^5 ha, that is a disappearance of 37.02,10^5 ha of forest compared to 1980. This forest clearing process was at different rates from one period to another. Thus, between 1980 and 1985, the World Bank (1992) estimated an annual forest disappearance rate of 110,10^3 ha. The rate rose to 122,10^3 ha during 1980-1990 to 190,10^3 ha from 1990 to 1995 and finally to 205,10^3 ha between 1990 and 2000 (World Bank, 1995; FAO 2001; Gbetnkom, 2001).

The country forest area in 2002 was estimated to be 51.3% against 56% in 1992, with deforestation rate in 2000 being 2,218 km2 per year. This drop is due to commercial logging, agriculture, and fuel wood (Environment at a Glance, 2004). Commercial exploitation has increased since about 1985, but harvesting methods are frequently wasteful and primitive, rates being often less than 5 cubic meters per hectare. Many species are felled and left on the ground, since research and marketing have not been carried out to exploit more than a small number of species. In addition, other vegetation and the topsoil are frequently damaged, so that natural regeneration of the forest is slow. Only 15% of logging is carried out by national companies. Levels of processing in the country remain low (Blaikie and Simo, 1998).

Poverty in the rural zone, cash and food crop prices, agricultural input prices, agricultural wages and credit availability of farmers are the sole causes of deforestation in the Cameroon (Daniel Gbetnkom, 2001).

5.2.6b Biodiversity

The country based its biodiversity on nationally protected areas, mammal species, bird species, and flowering plant species. It was estimated that in 2003, 4.5% of it total land areas was used as national protected area. Within this area, there were 409 mammal species in 2003 with 32 and 40 threatened in 1996 and 2003 respectively. Bird species in 2003 were 165 with 14 and 15 species threatened in 1996 and 2003 respectively. Fish species was 138 in 2003 with 26 and 27species threatened in 1996 and 2003 respectively. Flowering plant species in 1996 was 8,000 with 155 been threatened in 2003 (Environment at a Glance, 2004). This show a drop in the bird and plant species when compared with 297 species of mammals, 848 species of birds, 300 species of anurans, and 9,000 species of plants identified by Blaikie and Simo study in 1998.

5.3b Development and main characteristics of Environmental policy

5.3.1b The general political context of Cameroon since independence

Cameroon attained independence in 1960 (for areas formerly ruled by France) and1961 (for territory formerly ruled by British), and a constitution was drawn up in 1961 when the English-speaking state joined the new federated state of Cameroon. The constitution was adapted in 1972 but today, the country is governed under the amended constitution

of1996, with strong central government dominated by president who headed the executive branch of the government. The amendments was done following government pledges to reform the strongly centralised 1972 constitution. The change was to establish a 100-member Senate as part of a bicameral legislature, the creation of regional councils, and the fixing of the presidential term from 5 to 7 years, renewable once. One-third of senators are to be appointed by the president, and the remaining two-third is to be chosen by indirect elections.

Multiparty democracy which ceased to exist in French specking East Cameroon in 1962 was officially suspended in English-speaking West Cameroon in 1966. Multiparty democracy was officially restored in 1990, and presidential elections by universal suffrage were held in 1992 that were, according to official sources, narrowly won by the incumbent president, Paul Biya, who ran against John Fru of the Social Democratic Front (SDF) and a few other candidates. The SDF claimed fraud, and these claims were supported by independent international observers. This was mainly due to the ruling party's vote-buying and the manipulation of the results before they were released. In spite of both international pressure and considerable unrest at home, the president refused to allow another election.

The president is empowered to name and dismiss cabinet members, judges, generals, provincial governors, prefects, sub-prefects, and heads of Cameroon's parastatal (about 100 state-controlled) firms, obligate or disburse expenditures, approve or veto regulations, declare states of emergency, and appropriate and spend profits of parastatal firms. (Sandbrook, 1986: Blaikie and Simo, 2000).

The legislative arm of the government is a unicameral National Assembly with 180 members popularly elected for five year terms. Laws are adopted by majority vote of members present or, if the president demands a second reading, of a total membership. The judiciary is subordinate to the executive branch's Ministry of Justice. The Supreme Court may review the constitutionality of a law only at the president's request (Cameroon, 2007).

5.3.2b Cameroon Economy

For a quarter-century following independence, Cameroon was one of the most prosperous countries in Africa. The drop in commodity prices for its principal exports-oil, cocoa, coffee, and cotton- in the mid-1980s, combined with an overvalued currency and economic mismanagement, led to a decade-long recession. Real per capita gross domestic product (GDP) fell by more than 60% from 1986 to 1994. The current account and fiscal deficits widened and foreign debt grew. During the period 1977-1987, real GDP per capita rose from $410 to $920 (World Bank, 1992; Blaikie and Simo, 2000). This was mainly due to oil exports, but also to timber and other agricultural products. Since 1987, the economy has deteriorated sharply. GDP has declined by 18%, and GDP per capita fell by 50% between 1985 and 1991.

Cameroon to solve this problem, embarked upon a series of economic reform programs supported by the World Bank and International Monetary Fund (IMF) beginning in the late 1980s. Many of these measures have been painful; the government slashed civil service salaries by 65% in 1993. The CFA franc- the common currency of Cameroon and 13 other African states- was devalued by 50% in 1994. The government failed to meet the conditions of the first four IMF programs. In the year 2000, the IMF approved a 3-year Enhanced Structural Adjustment Facility (ESAF) program worth $133.7 million to reduce poverty and improve social services. The successful completion of the program was to allow Cameroon to receive $2 billion in debt relief under the Heavily Indebted Poor Countries (HIPC) Initiative. But Pursuant to the initiative, the IMF required the Cameroonian Government to enhance its macro-economic planning and financial accountability; continue efforts to privatize the remaining non-financial parastatal enterprises; increase price competition in the banking sector; improve the judicial system; and implement good governance practices.

In August 2003, the Board of Directors of both the IMF and World Bank approved Cameroon's Poverty Reduction Strategy Paper (PRSP) with high marks. The paper integrated the main points of the Millennium Development Goal, which outlined Cameroon's priorities in alleviating poverty in the short and long-term. By late summer 2004, Cameroon had not met most of its PRGF targets. A lacklustre performance in the

fiscal arena, however, led the country off track and resulted in Cameroon not achieving the HIPC completion point. Negotiation is currently underway to create a new program so Cameroon can eventually qualify for HIPC debt forgiveness. The privatisation program has lagged because of legal and political obstacles; difficult negotiations with the government on issue such as sale price, financial disclosure, tax arrears, and overlapping debts; and in some cases, a lack of willing buyers (Blaikie and Simo, 2000).

5.3.3b The Starting phase of Environmental Policy

Cameroon environmental management policy, like the attendant legal and institutional framework did not have well-defined objectives and strategies. Environmental protection concerns were merely incidental in the activities carried out within the general development policy.

However, it is important to note that concern for environmental protection dates as far back as the colonial period. Before 1960, there already existed a law on the management of forests and wildlife which inspired western laws at that time, and defined politics of national exploitation of the natural heritage. Measures were also formulated and recommended for the enrichment and /or reforestation of exploited forests and for the conservation of soils to sustain human economic activity. The order to lay down hygiene and sanitation rules applicable to the Cameroonian territory was implemented in 1937 (UNDP/UNEP/GEF, 2001).

After independence, the socio-political changes which followed brought about some modifications to the management of environment issues due to the need to adapt to a new context and to find a universal solution. Thus, the need to protect biodiversity and soils became one of the priorities of the government which, in the first five-year plan (1961-1965), made provision for a series of projects for research on biodiversity and soil conservation. (MINEF/UNIDO, 2001).

From 1964 on, the need to protect the environment was made official in all the sectors of the national economy, especially in the industrial and related sectors.
This is proven as the law to protect public health was established in December 1964 (MINEF/UNIDO, 2001). The Penal Code (Law No 65-LF-24 of 1965) and Law No 67-LF-1

of 1967). It was one of the earliest laws criminalising environmentally wrongful activities. It punishes air and water pollution, adulteration of food stuffs, trespass to land, cruelty to animals, arson, obstruction of the use of public highways or waterways etc (Sama, 2003). In 1968, the Ministry of Agriculture in East Cameroon transformed a number of the game reserves into national parks and it was established in 1972 (Blaikie and Simo, 1998).

Hence, the state, through institutional and legal provisions, showed a firm desire to protect the environment. Even though this desire was hazy at first, it became clearer and more determined with time.
In this regards, the decree laying down the procedure for granting incentives under the investment code of 1990 requires that any assessment of the benefits of productive investments should also examine the environmental impact assessment of such an investment on the environment.

Furthermore, the ministry of industrial and commercial development was required, among others, to "initiate and supervise preventive studies on pollution". In this same light, the agreement between the state and the Industrial Zones Development and Management Authority (MAGZI) specifies, in the list of specification upon the lease of MAGZI land to industrial concerns, the norms that would have to be respected with regard to hygiene (nuisances and pollution).

As regards to regional development, it was in the third five-year plan that environmental protection was made official. One of the duties assigned to the ministry of regional development was the promotion of the environmental protection policy of the country. In line with this duty, certain changes were required in human settlements resulting in the need to assess the impact of and sensitise people on environmental protection. The text reorganising the ministry of regional development in 1984 entrusted it with the task of formulating and coordinating the policy of the organisation and management of its environment.

However, this concern for environmental protection became more pronounced after Cameroon participated in the Earth Summit in Rio de Janeiro in 1992, and resulted in the

setting up of the ministry in charge of the environment. It is in this new context that Cameroon drew up a National Environmental Management Plan (NEMP) to define policies, objectives and strategies for a more sustainable development in general and an ecologically sustainable industrial development (MINEF, 2001).

In 2004, following the failure of the Ministry of Environment and Forestry to achieved the implementation of the country's National Biodiversity Strategy and Action Plan (NBSAP), the ministry was decentralised by the government into Ministry of Environment and Nature Protection and the Ministry of Forest and Wildlife. The ministry of environment and nature protection paid more attention to biodiversity as revealed by various road maps of the ministry in 2006 and meeting the various resolutions of international multilateral agreements in the field of environment, relating to biodiversity conservation and sustainable use. While the ministry of forest and wildlife attention is paid on illegal logging of timber and wildlife conservation (MIENP, 2005).

5.3.4b Basic Institutions and Regulations

Cameroon environmental protection up till 1992 was governed by a series of scanty and ill adapted texts. The industrial, Wildlife, Biodiversity, Fishery etc activities were governed by the following instruments:

- Law No. 86/008 of 5th July 1986 on gas and water vapour pressure equipment
- Law No. 89/027 of 27 December 1989 on toxic wastes
- Decree No. 76/372 of 2nd September 1979 to regulate establishment classified as dangerous, unhygienic obnoxious

These texts, for the most part, were designed to protect and provide security for workers on one hand and protect the immediate environment on the other. Because of these shortcomings and in accordance with Agenda 21 of the 1992 Summit in Rio de Janeiro, the Cameroon government decided to completely overhaul the regulatory and legal framework governing environmental management. Its aim was to promote sustainable development, in order to reconcile economic, social and cultural development with environmental protection. Consequently, the government adopted a global approach underpinned by sectorial preoccupation (MINEF/UNIDO, 2001).

It was in the regard that law No. 96/12 of 5 August 1996 to lay down condition for environmental management was voted and promulgated. This law has several provisions aimed specifically at mitigating industrial, wildlife, forestry, fishery etc.

In this respect, several instruments have been signed to enable the effective implementation of this law in the industrial sector. These are:

- the law No 94/01 of 20th January 1994 setting out the law on Forests, wildlife and Fishing and the associated decrees 95/531 (forest), 95/466 (fauna), and 95/414 (fishing)
- the law 96/12 of 5 August 1996 containing the relative framework law for the management of the environment.
- Law No. 98/005 of 4 April 1998 to institute a water regime and its enabling instruments which specify the conditions and restrictions concerning the use of water resources for industrial purposes as well as the conditions for the dumping of industrial waste in aquatic milieux.
- Law No. 98/015 of 14 July 1998 on establishment classified as dangerous, in hygienic and obnoxious and its enabling decree which calls for a study on the dangerous nature of the establishment as well as impact on the environment
- Law No. 99/013 of 22 July 1999 to institute the petroleum code and its enabling instrument which has several provisions on environmental impact assessment as well as a provision for the monitoring the production of wastes from hydrocarbon
- The Law to institute the mining code which makes it obligation for the miner to restore the site to its original state after his activities and require the mining industry to protect the carious milieux in which they are operating
- The law No 2003/006 of 21 April 2003 to law down regulations governing modern biotechnology in Cameroon (the Bio=safety Law), is a recent law enacted to give effect to the Cartagena Protocol on Bio-Safety.(Sama, 2003)

The strategy placed in these sectors by the Cameroon government was to develop the economic, social and ecological functions in frameworks which has an integrated and participatory management approaches, which assures in a supportive and sustainable

ways, the conservation and utilization of natural resources and ecosystems (UNDP/UNEP/, 2001).

It could be conclude that, the new legal framework in theory provides the ideal conditions for a country that can take proper care of its environment. But this can only be possible through the effective implementation of all the legislative and regulatory instruments mentioned above.

5.3.5b The Cameroon Environmental Policy Style

The Cameroon environmental policy relates mostly to biodiversity conservation and industrial pollution. Policy style shows some how ambivalence. The government before independence and up till the end of the 70s under the leadership of President Amadou Ahidjo with his social and economic system “planned liberalism” did shows some on one hand a strong propensity to enact stringent environmental laws. But when President Paul Biya took power in the 80s and change the “planned liberalism ”to ”communal liberalism”, there was absolutely lag on environment issues. More focus was paid on improving the country’s economy, because of the economic crisis that breaks out in the 80s. However, the shortcoming of the Biya regime in the 90s to embark on improving the economy through World Bank loans and international monetary Fund to finance most of country’s projects was forced to show some aspects of environmental performance before the loans could be granted. To reorganise the environmental sector of the country, IMF came in with the structure adjustment program as an instrument of reorganisation. In this regards, the UNEP committed herself and played a leading organisational role in creating the Ministry of Environment and Forest in April 1992.

Although this forest and wildlife law was created, it was far from sufficient measures as regards it linked to the World Bank new founded environmentally friendly criteria for conditionality of loans, as well as no pressures from leading bilateral aid agencies and from individuals within UNEP. In this respect, the Cameroon National Environmental Action Plan (NEAP) was setup my UNEP, for the unified ministry to plan and implement. (Blaikie and Sino, 1998).

5.4b The main Actors

5.4.1b Environmental Policy Institutions

It was only after the sixth five-year national action plan and prior to the 1992 Earth summit in Rio de Janeiro which was devoted to the environment and development. But the institutional framework for the protection of the environment was not well defined because there was no clear focus, and issues such as biodiversity, pollution control and monitoring, and desertification were still overlooked. Although the Ministry of Environment and Forest is the main environmental institution of the country, multilateral and bilateral institution such UNEP, UNDP, World Bank, U.S. Agency for International Development (UNAID), Canadian International Development Agency (CIDA), Official Development Assistance (ODA) and commercial logging companies still play a vital role in guiding, formulating of instruments and setting of strategies for the country environmental sector (Bliakie and Simo, 1998).

But when the MINEF was created in April 1992, decentralised environmental institutions were created in several administrative services and agencies with structures whose mission was to protect a certain part or sector of the environment based on the activity performed by the sector. Some of these administrative structures (MINEF/UNIDO, 2001) were;

In the Ministry of Mines Water and Energy which had and still has a department in charge of water and urban drainage systems, and the department in charge of rural hydraulics. These two departments played an important role in the protection of aquatic ecosystems and water resources. The department of Mines also has a sub-department of technical activities and industrial nuisance.

The Ministry of Transport (MINTRANS) has a department of maritime affairs and navigable ways. This department has a sub-department of navigation, safety and environmental protection in charge of protecting the marine, fluvian and lacustrian environment. In this regard, the said sub-department is responsible for the systematic inspection and the location of pollution and where necessary, takes action against any infringement of environmental protection laws. This ministry also has a department of land transport and a department of civil aviation. These two means of transport contribute

significantly to the pollution of the environment. However, these ministries do not have any specific environmental protection mission.

The Ministry of Justice has a department in charge of criminal laws. This department has sub-departments that deal with environmental criminal laws with prosecutors existing in varying categories. For instance the state counsel, the technical staff of the administration in charge of environment, mines, cadastral survey, town planning and public works, forestry wildlife, labour and tourism, etc are all environmental prosecutors.

The Ministry of Public Investments and Regional Development has a sub-department under the department of regional development whichis responsible, among others, for the formulation and coordination of the policy on the organisation and management of the environment.

The Ministry of Industrial and Commercial Development (MINDIC) has a department of industry one whose mission is regulation and control in matters relating to industrial nuisances, pollution, and classified establishment in conjunction with the other technical services. The industrial zones development and management authority (MAGZI) whose mission is to develop and manage industrial zones

The Ministry of Livestock, Fisheries and Animal Industries (MINEPIA) which has a department of animal industries responsible, among others, for the drawing up and implementation of quality norms for animal industry products. The ministry also has a department of fisheries responsible for the protection of sea and river resources.

The Ministry of Scientific and Technical Research has a national technology development centre and research institutes such as the IRAD (the agronomic research institute) and the IRGM (the geological and mineral research institute). These structures play a significant role in improving the management of environmental protection. The Ministry of Higher Education, through its environment related research and training programmes also plays a vital role in the building of national capacity in environmental management.

The period following the Rio Summit has witnessed a decisive change in the institutional framework for environmental management in Cameroon. The following structures were set up in the wake of this summit.

The National Advisory Commission for the Environment and Sustainable Development, whose mission is to assist and advise the government in the drawing up and implementation of sustainable development polices and strategies. The Environment inter-ministerial Committee charged with assisting the government in the formulation and implementation of environmental protection policies

The National Environment and Sustainable Development Fund provide financial support to the various programmes and activities for a more efficient management of the environment. The National Water Commission whose principal duty is to assist government in the formulation and implementation of water and drainage policies. The National Fund for Water-and drainage in relation to sustainable development charged with providing financial assistance to government policies on issues related to water and drainage related issues.

In addition, the Ministry of Environment and Forestry was reorganised to make it more adapted to environmental and sustainable development concerns. For this reason, the department of the environmental was replaced with a permanent secretariat. This much bigger structure comprises:

- A programmes and Sustainable Development Division
- An Environmental Standards and Inspection Division
- An Information and Environmental Documentation Centre, entrusted, among others with formulating, executing and following up the implementation of the national environmental policy; drawing up sustainable management strategies; developing policies and strategies for the use of clean technologies in the industrial set up (MINEF/UNIDO, 2001).

The court plays a vital role as far as environmental protection is concerned in Cameroon. Through environmental criminal law, environmental wrongful activities are punishable. These range from fines, suspensions, banned, to penalties ranges up to imprisonments

(Sama, 2003). The local municipality around the country take cares of environmental matters in its own jurisdictional sector.

5.4.2b Green Organisations

There are private environmental organisations set up by individuals to pursue specific objectives. Although today, there are a number of non-profit environmental pressure groups working towards a better sustainable development throughout Cameroon, they are mostly international Non-governmental organisations with sub-branches working on environmental conservation and sustainability (Blaikie and Simo, 1998). Donor international organisations have aided many local NGOs in Cameroon who are working against the target groups of industrial polluters and conservation of biodiversity. Some of these green organisations includes; Global Village Cameroon, the Wildlife Conservation Society (WCS), GEED-Foundation Cameroon, WWF Cameroon, Living Earth Cameroon (LEC), CARE international, Greenpeace Cameroon, the World Resource Institute (WRI) etc.

Due to lack of data, it is very difficult to know how many local, National and international NGOs exist or are working on environmental issue in Cameroon, but the ones mentioned above are the most potential whose activities are more visible as concerns industrial pollution and biodiversity conservation in the country.

5.4.3b The Media

There has been a long historical involvement of the media in environmental protection in Cameroon. But as far as environmental protection is concerns, only the national/provincial radio and TV stations have been very active in dissimilating the need for environmental protection. The private radios and TV stations are concerns with commercials rather than environmental aspect. The provincial radio stations and TV has at least a programme on environmental issues. The national newspapers (official and private press) also play a vital role in dissimulating environmental information to the general public. The other forms of news publication have some limitations and lack the necessary capacity for its publications.

5.4.4b The Economic Actors

In regards to green economic environmental companies, very limited companies are involved in taking care of waste management, incineration, consulting and contracting in Cameroon. Mostly the municipalities around the country are responsible for waste collection and disposal, which are mostly done by open burning. Some industrial waste like waste aluminum materials are recycled by an aluminum smelting company located at the economic capital Douala. Waste cardboards and newsprints are exported to a recycling company in Nigeria. Some companies tried to make themselves green like the brewing companies by recycling their beer bottles. Scrap iron are recycled by most motor and welding firms but not necessarily with the knowledge of saving the environment for their disposals. It is very difficult to know how this sector works due to lack of available data.

5.5b Target Groups of Environmental Policy

There is no direct target group of environmental policy in Cameroon. Although the parastatal institutions are the most prominent target groups since the government still plays the major role in the economy, it could be said that the Cameroon government itself, its administrative divisions and the communities are still regarded as the main target groups of environmental policy. Very little is achieved as far as; agricultural degradation, industrial pollution, urban sewage, traffic, contaminated sites, illegal logging of forest, pressure on wildlife etc are concern

Chapter 6 Presentation of case Companies

The first part of this chapter gives the general presentation of the Danish case companies as well as their environmental impacts from their product production processes, their environmental performances and relationship with stakeholders. The second part also gives a general presentation of Cameroon case companies as well as their environmental impacts from their product production processes, their environmental performances and relationship with stakeholders.

Part A: Denmark case Companies

6.1a Presentation of Danish Crown Aalborg slaughterhouse

Danish Crown Denmark is the largest pig slaughterhouse company in Europe. It annually slaughters approximately 22 million pigs which correspond to 2% of the world's pork and 8.2% of all EU pork. The majority of this meat is sold abroad. Danish crown is also Denmark's largest producer of beef, an increasing share of which consists of special productions which are subject to stricter requirements with regards to animal welfare and meat quality. Danish Crown's subsidiaries handle a large share of Danish Crown group's turnover.

6.1.1a Organisational structure of Danish Crown

The Danish Crown organizational structure consists of Danish Crown board of Directors, which oversees two committees namely the pork producer committee and the beef producer committee. The board consists of twenty members headed by the CEO and the Vice CEO, and other executives, which include the Chairman, Vice Chairman, two Deputy Chairmen and the other members as represented in Figure 6.1a below.

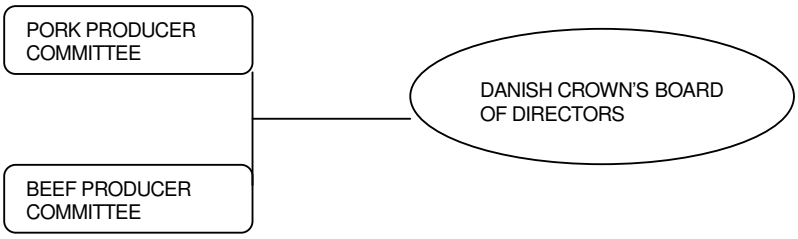

Figure 6.1a: *Danish Crown Organisational chart Pre 2000 (www.danishcrown.com)*

The Pork Producer Committee monitors and deals with members issues in the pork division and have between 8-11 members (Danish Crown Annual report 1999/2000) while

the beef producer committee monitors and deals with issues relevant to the cattle supplying members and the beef divisions has between 14-17 members.

By the year 2000/01 probably due to the merger with Steff-Houlberg there was a change in the structure with the election of the first ever Board of Representative which is regarded as the supreme authority and consists of 288 members of which 225 are elected by the pig and sow supplying members, 25 by cattle supplying members and 38 by employees. There was also the election of a new Board of Directors similar in structure to the former board and is charged with the general management of the company with 12 members elected by the pig suppliers and 2 by the cattle suppliers, 4 by employees and one employed as an observer with no voting rights. The previous committees namely the pork and the beef committees were also retained. The year also witnessed the creation of an enlarged Executive Board with the CEO, Vice CEO and the creation of the post of Division Director and the Executive Director. This structure has largely being maintained until now with little or no change and is represented by figure 6.2a

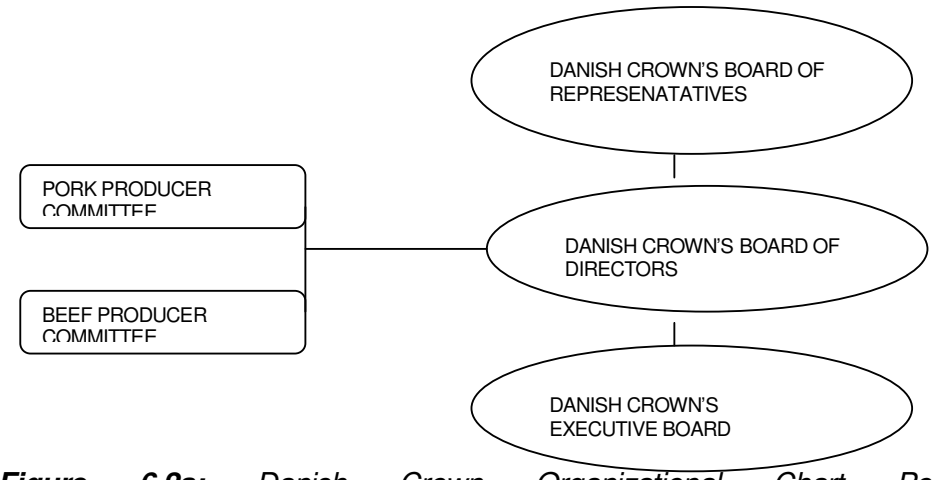

Figure 6.2a: *Danish Crown Organizational Chart Post 2000 (www.danishcrown.com)*

6.1.2a Key Features of the Company

Table 6.1a below gives a general picture of the company in terms of, turnover, number of employees and departments/subsidiaries:

Turnover	
Parent Company Danish Crown AmbA	Approx. 3.3 bn EUR
Danish Crown Group	Approx. 6.5 bn EUR
Employees	
Parent company Danish Crown AmbA	Approx. 11,000
Danish Crown Group	Approx. 28,500
Parent Company:	
- 26 pig slaughterhouses and cutting plants	
- 8 cattle slaughterhouses and cutting plants(including one in Germany)	
- 3 departments for retail-packed meat	
- 2 distribution departments/fresh food terminals	
- ESS-FOOD with 3 sales offices and subsidiaries world wide	
Subsidiaries	**Ownership**
Tulip Food Company	100%
Tulip Ltd.	100%
Plumrose USA	100%
Dat-Schaub	94.4%
Dat-Schaub International	100%
Scan-Hide	69.8%

Table 6.1a: *Key figures of Danish Crown (www.danishcrown.dk)*

Danish Crown Parent Company is subdivided into two divisions: the Pork and Beef divisions with their various departments located all over Denmark as shown in figure 6.3a.

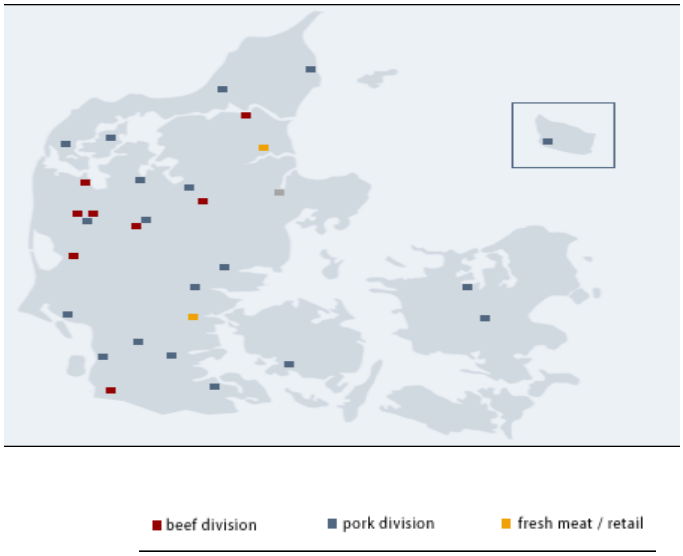

***Figure 6.3a**: Danish Crown's Danish Departments* (www.danishcrown.dk)

6.1.3a Company Strategy

Except mentioned, all information below has been obtained from the Danish Crown website: www.danishcrown.com

Danish crown has adopted a strategy plan for the next 3-5 years. The strategy plan is what the company uses to respond to developments in the years ahead as well as to prioritize tasks and objectives most relevant to the company and its owners, that is members. Some of the headlines in the strategy plan include:

- ***Increased processing in own companies***

The Danish pork division that is, slaughtering and cutting is Danish Crown's largest business unit and this will remain the case over the coming strategy period. The slaughtering and fresh meat area (Pork and Beef division) is the company's core base in terms of ownership and raw material supply. The processing area (subsidiaries) is the Group's strategic growth area.

- ***Increased internationalisation***

There is an increased focus on the international side of the business as well as non-sale areas –most important difference between the new and the previous strategic plan. The strategic plan emphasises that Danish Crown must operate on international terms with keen focus on international opportunities. This applies both to the fresh meat sector (pork and beef divisions) and the processing sector (subsidiaries). As a result of rising international competition, Danish Crown needs to strengthen its international market

position through local companies, strategic main markets to generate revenue as well as to secure the future sales of co-operative member's products.

- ***Innovation and Partnership***

The strategy plan also creates an overview of the resources for market and product development within the Danish Crown group. This is managed decentrally in close contact with market and customers. Some development initiatives take place under the guidance of sector organizations. Danish Crown also has a tradition for development of partnerships.

- ***3-5 yearly plans every 3 years***

The company's strategy plan is reviewed every three years in order to assess world market developments and the group's opportunities for sales of co-operative member's raw materials and thus set the course for the company's future direction. The strategy plan has a 5 year horizon although detailed planning covers a three year period; this is because, from experience, planning further ahead gives rise to a lot of uncertainties.

- ***Financial Targets***

Ten years ago, comparisons with Denmark's other meat companies were a primary benchmark for the co-operative's members, for the company's financial performance. However, the comparison has become meaningless today partly because there are only two companies left and partly/particularly because Danish Crown is now an international company whose potential and profits must be seen within an international perspective to provide a proper indication of Danish pork production's position-and thus the co-operative members' own opportunities with regard to international competition.

- ***Code of Practice for more areas***

Danish crown launched a Code of practise for pig-breeding co-operative members, during the previous strategy period, which sets out requirements for production conditions which farmers must follow in order to qualify for Danish Crown's highest prices. This initiative proved beneficial for the company's sales and the concept will be further developed during the coming strategy period. The Beef division is considering introducing a Code of Practice for cattle-breeding co-operative members.

6.1.4a Environmental policy

As leading food producer, Danish Crown acknowledges responsibility regarding the environment and stated on their webpage "*we will endeavour to protect the environment*

in relation to the operation and the future development of the company, by taking systematic measures and by employing resources carefully."

The above environmental goal is translated into objectives where the national environmental laws and regulations form the basis. According to the objectives, Danish Crown group will:

- Focus on minimizing energy and resource consumption in their operations as well as the environmental impacts.
- Motivate and train relevant employees in environmental protection and actively involve them in the everyday environmental protection work,
- Design management tools to optimise and document resource consumption, environmental protection activities and environmental performance in order to ensure continuous environmental improvements. These systems are selected and optimised based on the particular requirement s of the individual business units.
- Actively participate in a dialogue with customers and suppliers about reduction of unnecessary packaging materials and auxiliary substances with the aim of applying only those materials and substances which are least damaging to the environment, taking into consideration the competitive situation of the company.
- Make an active and targeted effort to influence the industry's initiatives within research and development with the aim of reducing the environmental impacts which cannot be avoided during production.
- Work towards conformity with the future environmental legislation within the EU.
- Participate in an open and constructive dialogue with the public as concerns relevant environmental issues, for example, issues that are of concern to the local neighbourhoods of the individual sites.

6.1.5a Danish Crown Environmental Performances from 1999 to 2005

Danish Crown as a production company is faced with potential environmental problems. These problems are mostly related to energy and water consumption, smell and noise as well as emissions. Her past years have been characterised by activities geared towards reducing these environmental impacts and these have been summarised in table 6.2a.

In the 2003/04 financial year, Danish Crown embarked on its largest environmental project, the environmental and working environment certification of all the Pork and the

Beef divisions' factories (slaughterhouses). This project named "Environment at work" would be crucial to future environment and working environment certification at their slaughtering and cutting plants. The certification is based on the requirements of ISO 14001 for the external environment and equivalent international standards within the working environment (OHSAS 18001). Also, the certification contains a commitment to improvements. The certification is expected to provide the individual companies with management systems that represent a major step forward compared to the current systems (Danish Crown Annual report 2003/04)

According to Claus (environmental technician at Danish Crown headquarter, Randers), five of the pig slaughterhouses have already been certified according to ISO 14001 and by the year 2008, all the pig slaughterhouses would be certified. Contrary to this, the cattle division has not yet embarked on the certification of its slaughterhouses which, according to Claus, is the company's strategy. Although Danish Crown Aalborg has not implemented an EMS and lacks certification, it operates based on an internal management system (informal EMS), which as Claus asserts, is about the same as ISO 14001, though the difference is that, it is not fully implemented. Danish Crown Aalborg works with this system and makes sure it stays below the limits (energy/water consumption set by headquarters). See appendices 6A and 6B for the company's self policy system/self-checking and environmental conditions for 2004/2005.

According to Appendix 6B, from 2000 to 2005, there has been a steady increase in the amount of electricity/ heat and water consumption per cattle. However there has been an overall reduction in environmental impacts in terms of energy, waste and greenhouse gases which is an indication of the efficiency of the present internal management system (informal EMS)

Years	Environmental Activities	
1999/2000	Reduction of energy and water consumption, smell and noise.	-Systematic recording of energy and water consumption with a weekly report prepared from individual plants. - Energy committee for individual plants was created to examine their consumption and to eliminate excess water and energy consumption as well as proposed investment to enhance improvement. - Introduction of robots in killing line to eliminate strenuous work for employees.
2000/2001	Reduction of energy and water consumption, noise.	-The energy committee continued work inline with the previous year's action e.g. In Grinsted the old steam boiler was replaced with a more economical hot water boiler which recycles heat from flue gases, this has positively reduced energy consumption by 6%. -Automation programmes continued inline with the previous year's action.
2001/2002	Reduction of odour, noise	-Danish Crown constructed some new buildings for storing animal by-product and to receive air from the slaughterhouse and emit through tall chimney which have been designed to ensure that emission complies with air emission requirement. -In the division at Blans, flue oil was substituted for animal fat (which is CO2 neutral) to cut CO2 emission. This move has saved CO2 emission of about 6100 ton per year.
2002/2003	Reduction of emission, complains from neighbours	- Environmental specialists were employed for each plant to ensure that emissions comply with requirements; meet up with action plan and continuous environmental reduction. -EMS was expanded in this year which has contributed to better management of environmental issues at individual plant. - A central environmental department was created with responsibility for environmental approval, preparation of technical projects as well as cleaner technological projects. -Where Danish Crown's activities impact on neighbours, neighbourhood meetings are organized to maintain constructive dialogue. -Trail project concerning accreditation was carried on three Danish Crown slaughterhouses. Following their positive results, it was decided that 10 other slaughterhouses were to be accredited in accordance with the new standard. - There was continued enhancement of automation and robot in production line as from previous years to reduce strenuous work on workers.
2003/2004	Reduction of Noise and smell.	- neighbourhood meetings were continually held in line with previous years with an introduction of a system where the environmental staffs frequently go around the local area to check smell and noise level. - Danish Crown embarked on it largest environmental project i.e. the environment and working environment certification of both the Pig and Beef divisions named "Environment at Work". The certification is based upon the requirement of ISO 14001 for the external environment and ISO 18001(and directive 923) for the internal environment. -Neighbourhood audit was created for the evaluation of environmental

		performance for Danish Crown's units. By this audit method, a slaughterhouse and a deboning department audit each other twice a year i.e. a slaughterhouse invites a colleague from another slaughterhouse to examine their environmental and working environment condition.
2004/2005	Enhancement of animal welfare and environment	-This was handled through the construction of new lairage designed to separate clean and unclean transport so that, pig lorries and refrigerated lorries have separate access to the slaughterhouse. This has improved the animal's welfare as well as improved environment for pigs. -Noise problems are continually being handled in line with the previous years actions.

Table 6.2a: *Danish Crown's environmental activities from 1999-2005(Danish Crown Annual Reports)*

6.1.6a Cattle (Beef) Division

Danish cattle are of high standard and the meat quality is the best according to the Danish Crown company. The entire process from rearing of cattle on the farms to the inspection of the animals at the slaughterhouse is covered by the Danish veterinary legislation (which is among the strictest in the world). This is to make sure that Danish beef complies with health requirements thus ensuring a high meat quality of beef from Danish Crown.

The beef division of Danish Crown embodies the following characteristics;

- Slaughtering is carried out according to modern principles, to ensure a high hygiene standard
- The employees are well trained to handle carcasses in a professional way.
- The cattle are subject to independent veterinary inspection during and after slaughtering.
- The carcasses are classified according to EUROP system, which provides accurate information on the meat quality of each individual animal.
- The meat is free of hormones and the animals are tested through BSE testing of animals slaughtered less than 30 months old. Thus Danish crown practises BSE-safe method of slaughtering which ensures that all risk material is removed.

6.1.7a Danish Crown Cattle Slaughterhouse Aalborg

Unless otherwise mentioned, the report below is obtained from the interview with Lars Thygsen, environmental technician at Danish Crown Aalborg cattle slaughterhouse in a field survey in October 2006.

Danish Crown Aalborg is a cooperative formed from a merger of three companies and is solely owned by farmers unlike those of its competitors which are privately owned. According to Lars Thygsen, environmental technician at Danish Crown, Aalborg, the slaughterhouse in Svanningevej, Aalborg is thirty one years old and is said to be the first cattle slaughterhouse in Denmark. Its location in Aalborg is advantageous because it is situated away from the city (unlike the other slaughterhouses) and near their source of material which comes from Northern Jutland.

The slaughterhouse is specialised only for the slaughter of cattle because since these animals weigh a lot, it becomes practical to have only cattle. Cattle coming from Northern Jutland are transported in trucks and the cattle are supplied depending on the species specified by the company. Quality of meat slaughtered is determined by a computing system which ascribes how much a farmer gets for specie of cattle supplied. 605 of the cattle are sold at home (Denmark) while the rest is exported to Italy and Spain.

Major decisions on activities occurring in the slaughterhouse (setting of targets, rules to be followed, types of equipment to buy, which cleaning company to employ) are made at the Danish Crown headquarters in Randers. The headquarter allocates the required budget for the slaughterhouses, rules guiding the production chain as well as limits to environmental impacts but it is up to the slaughterhouse to come with solutions on how to meet up with the goals set by the headquarters. The slaughterhouse is thus concerned mainly with making daily decisions and when faced with problems, it seeks help from other slaughterhouses engineers.

Though not every slaughterhouse is the same, 80% of the technology and working conditions in Danish Crown Aalborg cattle slaughterhouse, is design to get a certain slaughter quality of meat. Danish Crown headquarter (in Randers) checks Danish Crown Aalborg cattle slaughterhouse's account both monthly and yearly and has a form of

system which checks all what is taking place in the slaughterhouses. There is a high level of independence from the headquarters but this is limited to the amount of budget allocated to the slaughterhouse. There exists a form of Communication between the management and the workers at the Danish Crown Aalborg, where worker and staff meet daily and discuss problems encountered in the running of the factory and during these discussions; ideas are shared so as to come up with solutions to the problems.

Furthermore, every procedure in the production process is very important. All gear used must be sterilised and knives are disinfected with hot water. The cooling room for meat storage has to be kept at constant low temperatures to avoid bacterial growth. Also, wastewater produced during this process has to be directed into the right tanks to avoid contamination. The slaughterhouse tries at most to work with the best available technology, and when buying machines, certain rules are followed to ensure that the company supplying the machines has made sure they are safe for use. Using the best available equipments depends on the availability of finances. It is not always that the board of directors at the headquarters sees eye to eye with the management at the slaughterhouse, when it comes to allocation of resources.

Since the farmers-owners of the company hardly are in the slaughterhouse to see the day to day activities, a lot of debate takes place when the management at the slaughterhouse makes demands for better equipment or solutions for environmental impacts. In addition, workers are well trained in the slaughter business and are all required to wear safety gear when working, and according to Lars, they are environmentally conscious and usually make comments/complaints on the amount of water used, working equipment, as well as working environment which is conveyed to the management during meetings.

At the time of the interview, Danish Crown Aalborg was receiving pressure from the neighbours on the problem of noise (resulting from the condenser used for cooling stored meat) and odour. Recently, this problem has been solved following replacement of the condenser with a new one and a wall was constructed around the slaughterhouse. So little or no pressure has come from the consumers who are mainly concerned with the price of meat. According to Lars, the company tells its customers that it’s take the

environment into consideration during production, and since Danish Crown is very popular, consumers just assume it is true and do not bother a lot about the environmental performance of the company. Lars says if they have to take into consideration the environmental costs of producing meat, then the price of meat would be high. Since environmental costs are too high, if translated and added to price of meat, customers would not buy the meat.

The municipality is mostly concerned with solid waste and waste water produced from the slaughterhouse. Danish Crown Aalborg has not got a waste treatment plant but have equipment which carries out pre-separation of waste before it is sent to the public treatment plant. They measure amount of pollution in water six times a year and the more polluted the water is, the more they pay for its purification. Hence this pre-treatment is essential to reduce amount of pollution in the waste water and consequently, amount paid to public treatment plant is lower.

6.1.8a Production process of Danish Crown Aalborg cattle slaughterhouse

Slaughtering and processing of cattle

The basic slaughtering procedure for beef cattle has become more automated and efficient over the past few decades. Most improvements have occurred in stunning, hide removal, evisceration and splitting techniques. Most importantly the stunning using a bolt pistol or electric shock to avoiding suffering the cattle during slaughtering in accordance with animal welfare procedures. Danish crown Aalborg operate a modern cattle slaughterhouse which operate on industrial line with a wide range of services featuring cold storage, processing, by-product utilization and waste recycling activities. It exports products frozen meat and some for the purpose of chill production.

Environmental Impacts resulting from Slaughtering and Processing

The Production processes of most companies varied according to the product manufactured. According to Danish Crown environmental report 2003/2004, the company production process is based on seven stages with each unit stage showing the input material and the output environmental impacts. The process is uniform for all Danish Crown sites, thus Danish Crown Aalborg production process follows the same production process. This is illustrated on table 6.4a below.

Pre-handling of cattle: The cattle are delivered to the slaughterhouse in trucks and unloaded into holding pens, where they are rested for one or two days before slaughter. At this first stage, any cattle classed as “dirty” are washed.

Stunning and bleeding: In this unit, the cattle are led to the slaughter area where they are stunned using a bolt pistol. They are then shackled by a hind leg and hoisted onto an overhead rail or dressing trolley. Bleeding, or sticking, then takes place, with the blood collected in containers for disposal or further processing.

Dressing and hide removal: Here, the carcasses are conveyed to the slaughter hall where dressing and evisceration take place. Dressing which is the first stage in this unit can be performed as the carcass hangs from the overhead rail, or the animal can be unshackled and laid in a cradle. The head and hoofs are removed, the head is cleaned with water, and the tongue and brain are recovered. Hides are then removed and conveyed to the hide processing area, where they are preserved by salting or chilled on ice.

Evisceration: The carcasses are then opened to remove the viscera. The stomach (paunch) and intestines are emptied of manure and cleaned in preparation for further processing. Edible offal (tongue, lungs, heart and liver) is separated, washed and chilled. The carcasses are then split, rinsed and then conveyed for inspection and further to a cold storage area for rapid chilling.

Inspection: The carcass and viscera are inspected to determine if they are suitable for human consumption. Each carcass and its components are identified and kept together wherever possible until inspection is complete. This is the most important unit that needs more attention, as the veterinary inspectors has to be objective in their duty and for the health and safety of the consumers.

Cutting and boning: Carcass cutting and boning takes place after the chilling and the carcass can then be easier to handle and cut when it is well chilled. Recent developments in processing technology have made it possible to undertake boning while the carcass is still warm, eliminating the need to chill the carcass at this stage in the process.

By-Products: At various stages in the process, inedible by-products such as bone, fat, heads, hair and condemned offal are generated. Danish Crown is a large supplier to local biogas plants. All stomach intestine contents, manure from transport vehicles and flotation slurry from the slaughterhouse are supplied to local biogas plants. The remainder is

manure with higher nutrient content and reduced smell (material obtained from interview, 2007)

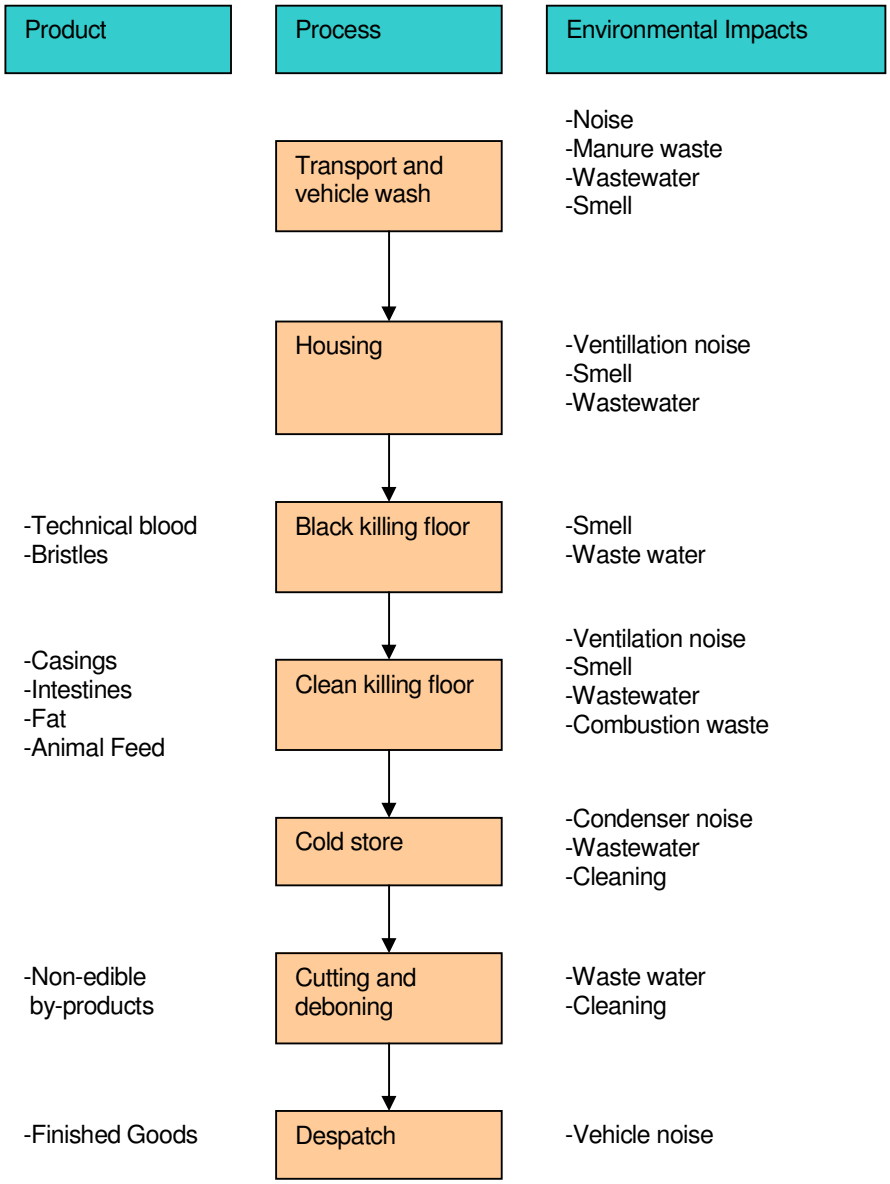

Figure 6.4a: *The input material and output environmental impacts (adapted from field survey, 2007)*

From figure 6.4a, Noise, waste water, smell, water and energy consumption were identified as the company's significant environmental impacts.

6.2a Presentation of Nordjyske Medier

How Nordjyske Medier is today

Nordjyske Medier is a commercial regional news production company with over 1000 employees and a turnover of about one billion Danish kroners and has a market share of over 90% of Nordjyske holding company in northern Denmark. The company has a history of Nordjyske stiftstidende newspaper production, but has recently expanded or merged with other media platforms, including a free newspaper, two radio channels, a 24-hour news TV-channel, mobile phone services, Tele-text, an online newspaper and other web services in 2001. In September 2003, the production for all platforms was physically united in the former newspaper building, now modernized for the multiple platform production. According to management, their decision to transform the newspaper into a multiple platform company was primarily due to decreasing newspaper sales. The reporters were therefore forced to think not only in terms of newspapers, but of several platforms – in the management's own words this meant a focus on *'stories instead of channels'*. The management introduced new physical facilities with the capability of producing for all media types in different content groups (for example, sports), and the centre of the building was arranged to contain a so-called 'Super-Desk', where each media platform was represented by a media editor (Bechmann Petersen, 2006).

6.2.1a The organisational structure of Nordjyske Medier

The structure is design to show Nordjyske stiftstidende newspaper production sector further that the Media platforms because the focus of this report is within the fence of the newspaper production, as illustrated with the green colour fills in figure 6.5a below.

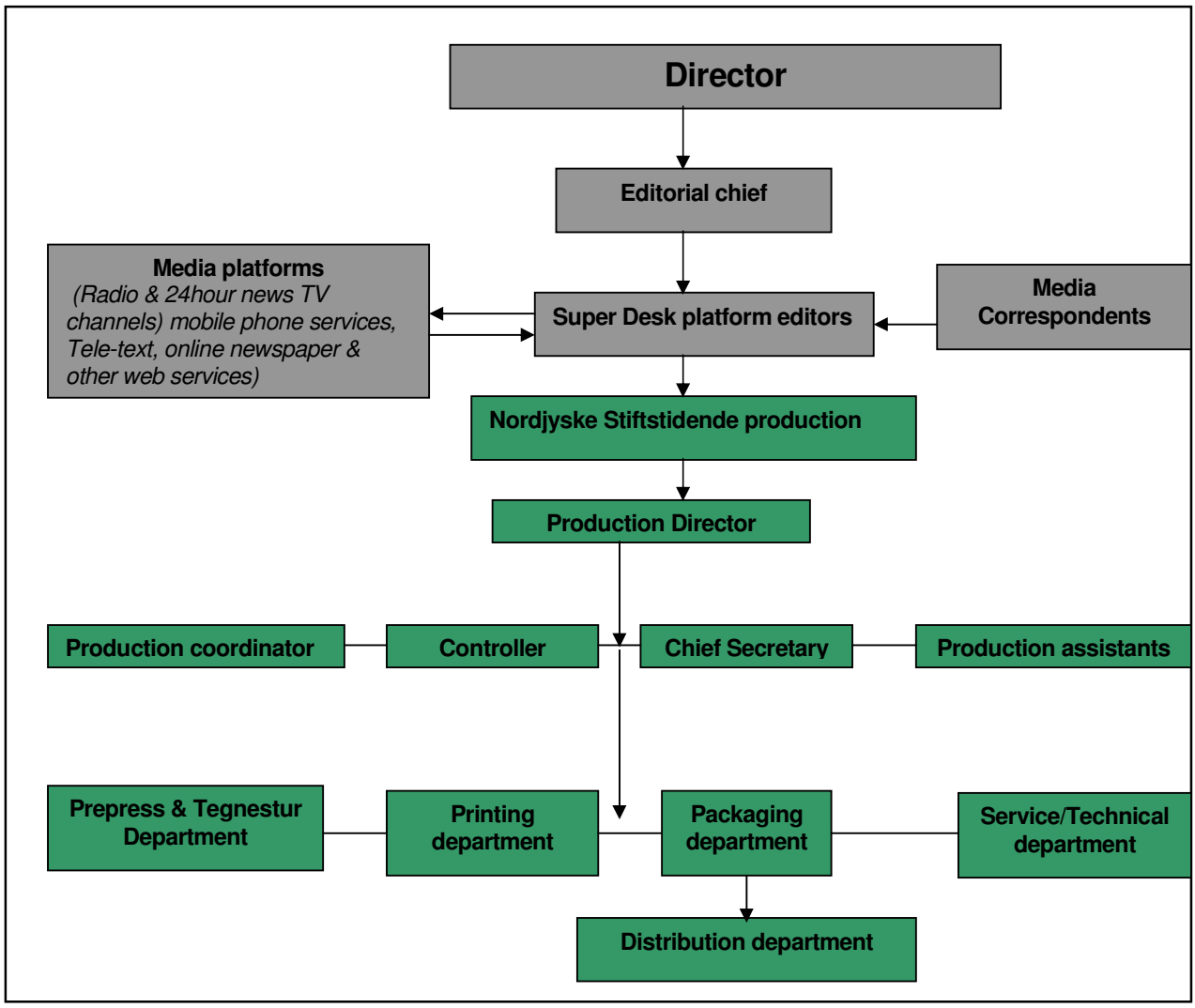

Figure 6.5a: *Organisational structure of Nordjyske Medier (Adapted from field survey, 2007).*

From figure 6.5a, the director oversees the activities of the whole company while the editorial chief coordinates and confirms the works of the super desk platform editors. The news is picked up by the various correspondents of the company around the cities of Denmark and abroad, develops and forwarded to the super desk for editing. There is a mutual relationship between the media platforms and the super desk editors whereby, the media platform pick up their news from the different channels, radios, internet, advertisers, etc, forwarded it to the super desk editors for editing. The super desk editors thus return the edited news to both Nordjyske Stiftstidende newspaper production sector as well as the media platform for publication as newsprint, internet news, radio, TV etc.

In the production chain of Nordjyske Stifstidende, the news is forwarded to the prepress and made available by developing it on aluminium plates. It is send on to the printing department where it is tested for quality and newsprint is obtained. The newsprint is directed to the packaging department through mechanically design WIFAG and FERAG rollers technology. The newspapers are then packaged and send out to the distribution channel to be picked up by distribution companies.

6.2.2a Key features of Nordjyske Medier

Company mission*:* "*To help and please"* has been the company's mission for over three centuries. Nordjyske medier still work with this mission today to enable the people of northern Jutland to get fun and useful information out of the company, by providing them with the day to day activities and information around Denmark and the world at large. According to management, the company mission is also to avoid politic within the news published which was not the goal of Nordjyske stiftstidende since its formation in 1767.

Company Vision: The company vision has been, *"to be Northern Jutland natural partners for people when they need information, experiences and entertainment or communication solutions".* According to management, it has always been the company duty to publish the news to the public everyday. Today information is made available to everyone even those who could not afford to buy a newspaper through the introduction of the three centrums in August 2006, which are free newspapers around Aalborg. The company has also added different newspaper sections within the Nordjyske stiftstidende like the Thisted Dagblad newspaper brought by the company last year October 2006. Thus the company has introduced many societal activities which were not part of Nordjyske stiftstidende in the 90s. Today the population of Northern Jutland can have various entertainment and communication solution through the company's introduction of media integration in 2001. The radio channels, a 24-hour news TV-channel, mobile phone services, Tele-text, an online newspaper and other web services are now services offered by the company to the population of Aalborg and the world at large today. People could now have entertainment through different radio and TV programmes and have easy solutions to their communication problems and more so, get their news when they switched to the internet.

Company Goal: *"Self freedom and independence through profitable operation based on innovation and dynamics"* has been the goal of Nordjyske Medier. Nordjyske medier is independent of political parties, individuals and interest organisations. The fact means for instance that, also perceptions that are not in harmony with the editorial staff's get room in the newspaper. All businesses are aimed at making profit as their primarily goal, thus innovation and dynamics is the ultimate objectives to achieved this goal. According to management, there has been a lot of innovation both at the newspaper product production and the media coverage. Most of the techniques use for the newspaper production has been recent printing recommended equipments and the chemicals supplied. More so, the company has reduced its energy consumption through production efficiency management. On the other hand, the media sector today has new communication and news coverage innovations with the integration of new media companies that involves different communication services.

Company Strategy

- Each single activity is to be optimized compared with the market's varying need.
- To be able to adjust to changing business environment and develop products, processes, organization and human resources, so as to act aggressive at a rising competition.
- To invest in business areas that support, expand and develop the company

6.2.3a Nordjyske medier health and safety organisation scheme

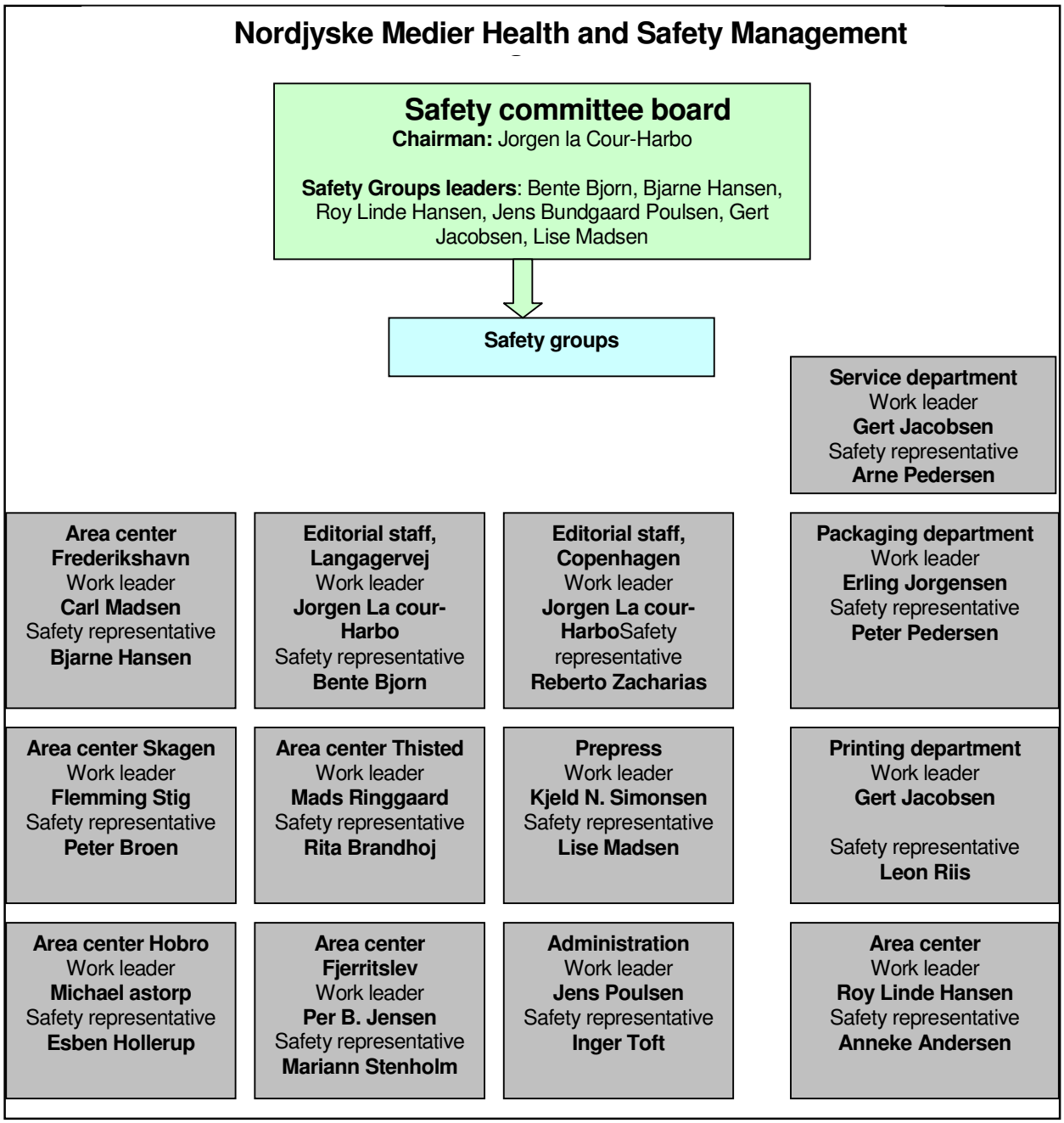

Table 6.3a.: *Nordjyske medier health and safety management organisation (adapted from field survey, 2007).*

Nordjyske Medier health and safety committee includes: the safety committee board, departmental safety groups, and area centre safety groups. The safety committee board comprises of each departmental or area centre representative. These representatives of

different groups and area centres bring into the board, health and safety problems. These problems are discussed and possible preventive measures are taken in view of the problems. Board meetings are held after every three months. The board is headed by Jorgen la Cour-Harbo the company assisting editor in chief. Decisions taken at the meetings about health and safety issues are implemented only with approval of the company's director.

At the various departmental safety groups, the department leader is also the health and safety chairman. He or she is assisted by another employee, who represents the department during board meeting. Within each department, there are a set of health and safety rules binding the activities performed, which are stipulated in the law new incoming employees into the company are introduced with thee health and safety rules, either by the department leader or team leader. Team leaders report health and safety issues either to the departmental leader/board representative, if they needs immediate measures, or tabled the problems in their departmental health and safety meetings which are held twice a month. The departmental meetings involve all the workers in the said department. During these meetings, the workers are free to discuss about health and safety problems as well as what they think should be done. The departmental leader share out routine health and safety work task to the employees to follow alerting them of the heath and safety of the task as well as the overall company goal. At this level, problems that could be solved within the reached of the department leader are done. Unsolved problems as well as solved problems are both taken down by the departmental board representative as departmental health and safety report. He or she presents the report at the board meetings where measures are taken for unsolved problems as well as new health and safety ideas are taken back to the departmental group.

At the area centres, the formal of health and safety principles/activities are the same as the departmental groups. What makes different is that, area centres meetings are held twice a year, but board representative attend board meetings and presents health and safety problems as well as take new health and safety ideas back to their area centres.

Although, Nordjyske Medier runs a health and safety management scheme which governed its internal operational activities, it thus incorporates environmental issues when carrying out its daily activities. The scheme could be regarded as an informal environmental management scheme since it carryout environmental management activities. Some of these environmental management aspects which are not necessarily health and safety regulations could be seen from the fact that; the company purchases its newsprint paper from companies with ISO 14001 EMS certification, sustainable forestry certification, totally chlorine-free, recycled waste newsprint and with bio fuel and renewable energy as sources of energy; It reduces it energy consumption through a temperature and ventilation regulator, and machines suppliers usually come in from time to time to give training courses to the employees for malfunctioning purposes. As concerns heating during the winter periods, the doors of the press room as well as the offices are always close to keep the heat circulation and employees in offices are advice to turn off their radiators while the windows are open. The pipes are well insulated to reduced water and energy losses. In 2001, the company installs a digital computer-to-plate and a digital printing machine which is a cleaner production strategy recommended for energy and production efficiency. Its employees collect and store waste water at hazardous waste storage section, with labels indicating the type of waste and it source, which is further sent to silver recovery treatment plant. The press room is well ventilated with outlets for VOC not captured to evaporate to the atmosphere. Waste newsprint, misprint and waste paper are sold to recycling company. Used aluminium plates are sold to H.T Hansen for silver extraction and for other aluminium related activities. Electronics and other waste are sold to UNI-SCRAP where cables and plastic are recovered and further process to produce new products.

6.2.4a The printing technique/process of Nordjyske Medier, Aalborg

Nordjyske medier operate the cold set printing technique, specifically the lithography printing, which combines water/alcohol-based fountain solutions with petroleum-based inks on a printing plate/cylinder. Most interesting about cold set offset printing is the fact that no waste water is generated during the printing process but the water evaporation during the drying of the dampened newsprint. Nordjyske medier cold set offset printing technique is characterised by the following processes.

Prepress interface: the preparation of a newspaper production up to pre-setting the press requires three operations; scheduling production, product planning, and production preparation. According to the company management, these activities are performed by different groups at different locations. Products are frequently planned, for example, by the prepress group because it is close to the editorial and advertising staffs, while the printing room is responsible for scheduling and production preparation. With this kind of organisation, only those products that are planned are capable of being (economically) printed. The production computer provides production variant catalogues containing rules (structure and colour scheme) defined by the printing room, which have to be observed by the prepress staff when designing a product (Field survey, 2007).

Prepress and image formation on plates: Nordjyske medier utilize *Computer-to Plate (CTP) Technology* at the prepress room. Computer- To- Plate (CTP) Technology involves the laser-imaging of printing plates. The laser is driven by digital data from a computer. Image setters and plate setters are typically used to expose the plates. Images are form using Aluminium or polyester plates.

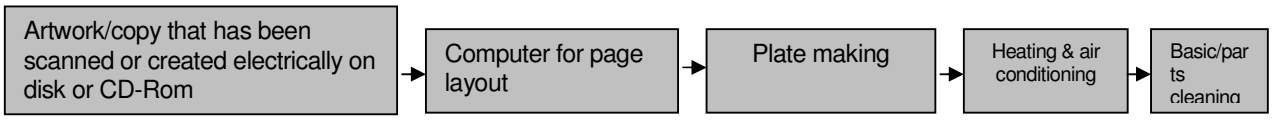

Figure 6.6a: *Typical main parts of a Computer-to-Plate process (adapted from Field survey, 2007).*

Nordjyske medier uses the aluminium plates for image formation and the chemical use for developing images on the plates are photopolymer PL 10 and photopolymer replenishes improved while a gum called RC 795 is applied at the edges of the plates to enhance handling as shown in figure 6.7a below.

Figure 6.7a: *Nordjyske medier Computer-to-Plate prepress showing digital computer-to-plates setup and the chemical used (Adapted from field survey, 2007).*

The printing press: Nordjyske Medier utilize the rotary Digital Printing Technology, specifically the Electro-photographic printing system which is a high speed copier system. It uses an aluminum plate which is charged, exposed by laser driven by digital data from a PostScript-based digital imaging system (computer-to-plate prepress), imaged with liquid toners, transferred to the paper and fixed by heat.

Newsprint process: immediately the developed imaged plates are ready, the printers in the printing room set up the system for printing. According to Bo and Palle, printers at Nordjyske Medier, the following steps are necessary to be performing as illustrated below in figure 6.8a.

The paper rolls are set up in the reel stands at the ground level as shown below. The paper sheet is connect to pass in between the four blanket-to-blanket units (one pair print the front page and the other does the back side of a single page newsprint) carrying the plates, the blankets and the ink toner on the electro-photographic printing system machine set up on the first floor. The paper sheet moves through the sheet path from the feeder and move to the web path to delivery section with the help of the roll fuser. Along the sheet path the newsprint is separate to the front and back pages size with a slitter knife. This process is done mechanically with the guidance of the printers. The plates from the previous newspaper production are then removed and new imaged plates mounted on cylinder carrying the toner hopper.

After the setting up of the paper and the imaged plates, the printers in the production computers select the colours of the ink to be use in each production and the rate of water flow for the dampening of the blankets. The product is run for misprint to check the printing quality of the images. The quality is check and confirmed by the production coordinator alongside the printers. Once quality newsprint is recommended, the production is run depending on the number of sheets set for the production. The newsprints are passed over to the packaging department through carrier roller lined overhead the printing room to the packaging section.

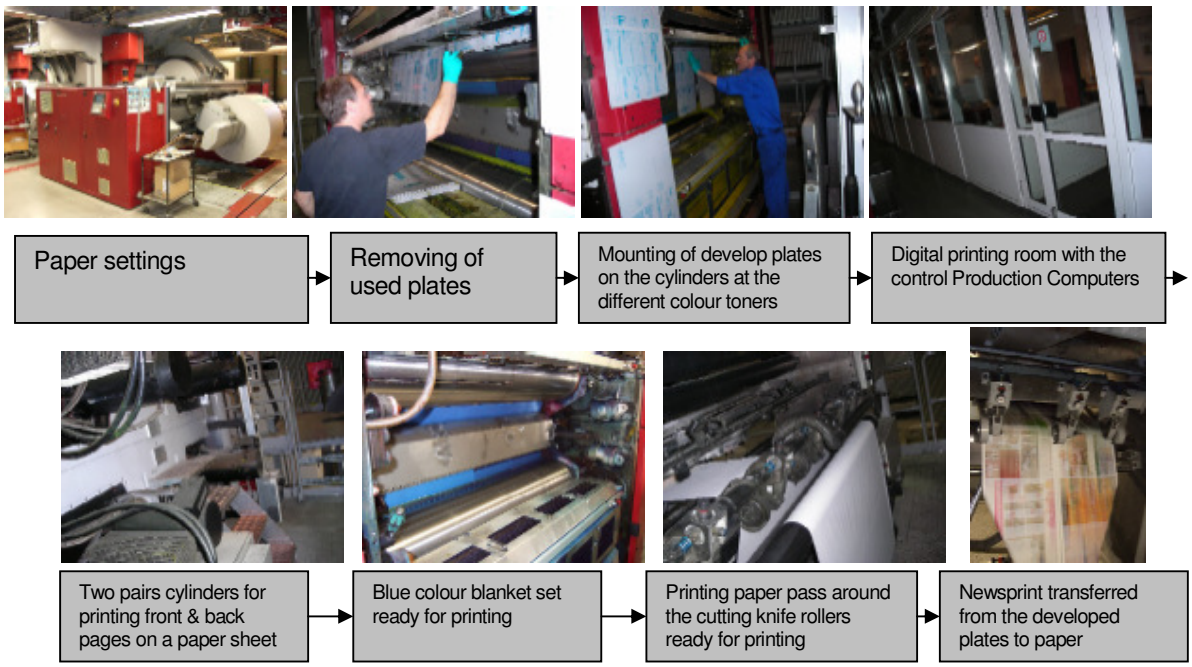

***Figure 6.8a**: Nordjyske Medier newsprint production at the printing room showing the various steps necessary for newsprint to be obtained (Field survey, 2007).*

Packaging department: Nordjyske medier employed the WIRAG and FERAG packaging technique where by the incoming newsprints from the printing room are collected through a computerized control system. The newspapers are programmed to pack in 20 or 30 depending on the distributions days or the thickness of the newsprint. Normally, weekly newsprints are packed in 20 copies per pack, while weekend's newspapers are packed in 30 copies per pack. The packaging employees thus arranged them according to the various distribution channels. The packed newspapers are sent out to the distribution room, where distributing companies collect them and redistributed to the districts depots for redistribution by newspaper deliverers.

***Figure 6.9a**: the packaging and distribution department (Field survey, 2007).*

The production processes of most newspaper companies vary according to the technology employed. According to field survey 2007, Nordjyske medier production process is based on seven stages with each unit stage showing the input material and the output environmental impacts. This is illustrated in table 6.4a below.

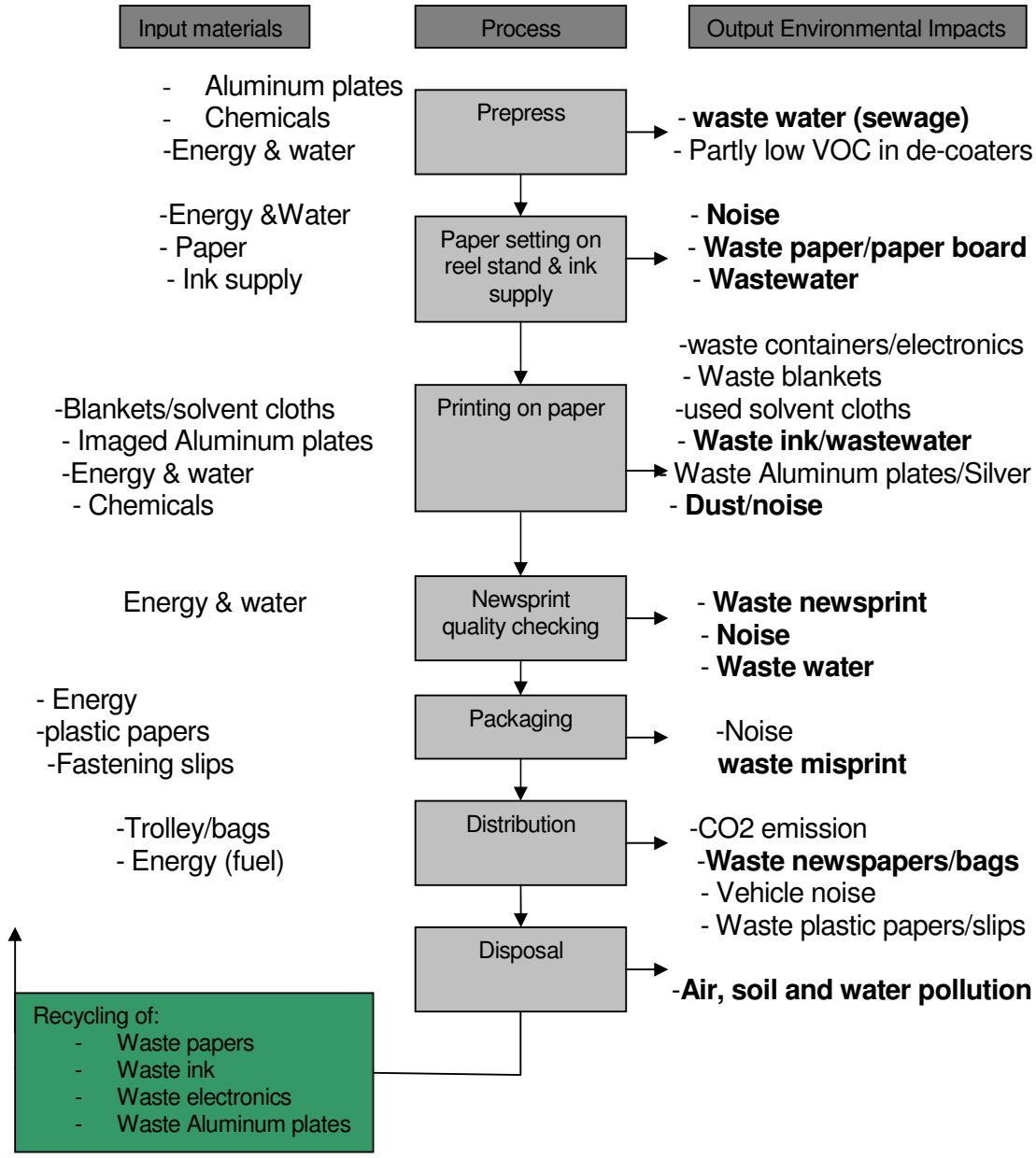

Table 6.4a: The input material and output environmental impacts from newspaper production (Adapted from field survey, 2007).

From table 6.4a above, energy, dust, noise, silver as part of wastewater in the prepress, waste newsprint and VOC emissions from ink and solvent were identified as the company's significant environmental impacts.

Part B: Cameroon case Companies

6.1b Presentation of Bamenda Cattle Slaughterhouse

The Bamenda cattle slaughterhouse was formerly located in the urban area, but due to fast growing urban development, it was transferred to the Knew rural area. The slaughterhouse which is said to be the most modern abattoir in Cameroon was built by the French government as a support scheme for the Bamenda town in 1999. It was governed by the Ministry of Livestock, Fisheries and Animal Industries (MINEPIA) and controlled by the Bamenda Urban Council (BUC). But after two years, it was privatized due to poor management. The slaughterhouse is currently owned by Cameroon Sustainable Food Group (CAMSUS), a non-governmental organization that slaughtered an average of 25 cattle a day, with an annual turn over of approximately 22 million FCFA (approximately DKK 275,000), with 20 employees and 7 supportive staff.

6.1.1b Organisational structure of CAMSUS

CAMSUS organisational structure consists of a board of Directors, headed by a president of Board of Director. The board consists of seven members headed by the general manager and the Vice (plant manager), and other executives which includes the Revenue collector, veterinary inspector/Muslim inspector and chief of sanitation and environment control as represented by the Figure 6.1b

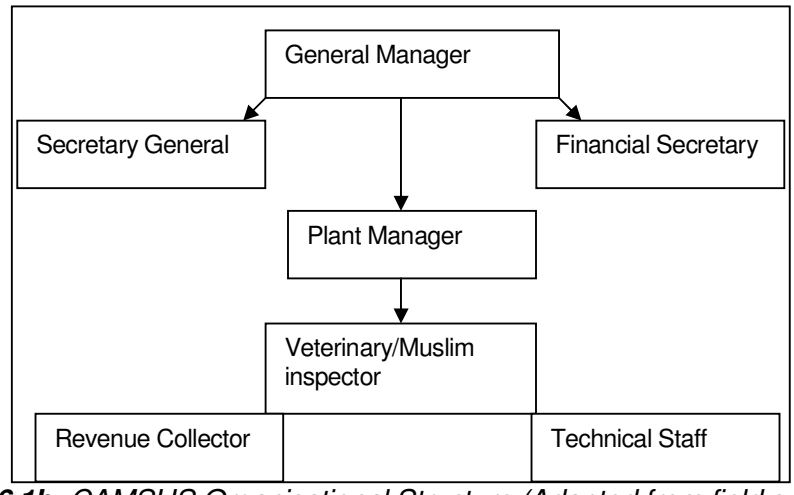

Figure 6.1b: *CAMSUS Organisational Structure (Adapted from field survey, 2008).*

From figure 6.1b, the general manager oversees the activities of the company, but the plant manager is responsible for the slaughterhouse day-to-day management. The general manager (retailer veterinary inspector) only involved in some plant management activities if the plant manager can't handled. The revenue collector is responsible for collecting slaughtered fees from the butchers. The veterinary inspectors inspect the cattle for ill health and disease infections and issued a stamp to indicate it is safe for human consumption while the Muslim inspector offer a spiritual prayer in the Muslim language before bloodshed is performed. The chief in charge of sanitation take cares of hygienic and environmental activities (field survey, 2008).

6.1.2b CAMSUS key features

Company mission: to make sure that animals slaughtered are of good health and good quality meat is supply to the general public.

Company Strategy: to invest in business areas that support, expand and develop the company.

Company vision: to be Bamenda natural partner for people when they need good quality meat. According to the plant manager, it has always been CAMSUS duty to supply the general Bamenda public with good quality meat everyday. Today, CAMSUS owed a pig and fowl farm, which in the near future, the slaughterhouse would not only be for cattle slaughtering alone but for both slaughtering of pigs and fowls. This is to meet the buying power of some consumers who do not have the financial capacity to afford the cattle meat. Be an environmentally friendly company through the implementation of the environmental policies governing the company's production activities.

Company goal: self respect and independence through profitable operation based on innovation has been the company's goal. According to the plant manager, the company cannot make a profit if it failed to take into consideration the importance of its stakeholders. Thus, the company try as much as possible to respect its neighbours, butchers, the veterinary inspectors and the BUC hygienic and sanitation department rules and environmental laws from the government authorities.

Company sanitation and environmental control policy

- To make sure that all cattle are above three and half years old and in good health before been slaughtered.
- That all slaughtered meat is inspected by the veterinary inspectors and endorse with an official stamp before taken to the markets. This is to prove that it is safe for consumption and to avoid illegal and stolen slaughtered cattle which are not inspected for health safety from reaching the markets. .
- To make sure wastewater is disposed off in a suck away tank.
- To make sure the noise and odour levels do not affect the company's neighbours butchers and employees.
- To make sure the slaughtering floor is thoroughly cleaned after every production
- To be sure that butchers and traders are professional with well trained slaughtering skills and sanitation knowledge with licenses from the BUC sanitation and hygienic department.

6.1.3b Production process of CAMSUS Bamenda

Slaughtering and processing of cattle

Although, CAMSUS cattle slaughterhouse (figure 6.2b below) is regarded as a modern one, it is in a sense an old form of slaughterhouse/slaughter slabs technique, which principally handles the bulk of public slaughtered cattle meat.

Figure 6.2b: the general outlook of CAMSUS slaughterhouse

CAMSUS slaughterhouse is used by licensed butchers and traders for the slaughter of cattle at stipulated fees, and in accordance with public health inspection and marketing regulations. This form of slaughterhouse/slaughter slabs is thus operated as service establishment under the management of Bemenda municipal and local authorities. Its activity is thus limited to the Bamenda town and built-up areas. CAMSUS slaughterhouse is however modern when compare with the Bamenda old slaughterhouse which was a

makeshift converted building located at the urban area. Although it was controlled by the BUC, there was no formal licensing by butchers and it premise and product were not inspected, quantified nor subjected to trade and health regulations. Thus, CAMSUS operate a simple slaughterhouse-plant that slaughters cattle and does a very limited amount of by-product processing. Its main product been fresh meat in the form of whole, half or quarter carcasses or in smaller meat cuts. The basic process for the slaughtering and processing of CAMSUS cattle slaughterhouse is shown in figure 6.9b below.

Pre-handling of cattle: the cattle are reared, fattened and transported to a cattle market located some 4km from the slaughterhouse by cattle owners. Most cattle owners in Bamenda are the Fulani (a group of Muslims) and said to be their primarily occupation. Most of the cattle come from Fudong and Wum, towns located some 100km from the cattle slaughterhouse. The cattle are transported on foot on the Bamenda Fudong and Wum main highway roads and this usually takes weeks or a month for them to arrive at the cattle market. During this transition, there are always incident of car and human accidents caused by most of the cattle. More so, destructions on cultivated agricultural land and mostly leave the road with urine and manure which dirty and create bad odour to inhabitants living nearby. Most of these wastes are washed away after a rained shower into nearby stream resulting to water pollution.

In most of the times, when the cattle reached the cattle market they are kept for one or two days before been taken to the slaughterhouse for slaughtering. During this period, some owner could decide to take their cattle around the market for grazing. It is during this time that the buyers do the trading with the owners. How ever, the cattle market is located out of residential area, but still waste urine and manure are washed into nearby streams. Once a butcher purchases a cow, it is inspected by a veterinary inspector for age limit and healthy reasons. The butcher pays an inspection fee to the veterinary inspector and a cattle market management tax fee to the BUC.

Usually, a butcher has a worker commonly called “cow boy” who is responsible for the transportation of the cattle from the cattle market to the slaughterhouse. This is done on public road because there is no road constructed just for the purpose of transportation of cattle. A rope is fastened on one leg of the cattle and another on the hogs. One of the

cow boys lead the way by controlling the cattle on the hogs while the other with the rope on the leg stop the cattle by pulling in case of in disciplines from the cattle. According to the slaughterhouse chief butcher, it is a period where most cars and human accidents are recorded because if the cow is indiscipline, then the cow boy behind will not be able to control his movement. Each of the cow boy is paid in the process, usually the one in front earn lesser than the one behind. At the slaughterhouse, the cattle rest in different compartment in the rest house ready for slaughter the next day. Usually each of the butchers owns a compartment (figure 6.3b).

Figure 6.3b: CAMSUS cattle rest apartment

Stunning and bleeding: following the Muslim faith, some ritual are perform before a cattle could be slaughtered. Thus, before each cattle is slaughtered, it is fastened with ropes on the legs and the slaughterhouse Muslim ritual professional know as “Malai” does the first blood shed after a brief prayer. Bleeding then takes place with the blood collected in containers which are further sold to pig farmers to be mixed with pig feeds, by the plant management. The cattle do not go through the pen cleaning before been slaughtered. The butchers are then free to take the cattle to their various slaughter slabs, where dressing, hide removal and evisceration are carryout manually with slaughter knives. In this case the fresh meat is separated in quarter carcasses or in smaller meat cuts.

Figure 6.4b: Manual hides removal and evisceration by a butcher

Dressing and hide removal: Dressing is carryout with the carcass on the slaughter slab as shown in figure 6.4b above. The head and hoofs are removed; the head is cleaned with water in whole (with no removal of the tongue and brain). Hides are then removed

and further sold in whole mostly to the restaurants and bars owners or individuals for smoking and preparing as part of a food dish know as “pepper soup canda”. It also saved as meat for some village traditional meals.

Evisceration: the carcasses are opened to remove the viscera. The paunch and intestines are emptied of manure and cleaned ready to be sold out to the consumers at the market. Edible offal (lungs, heart and liver) are separated, washed ready to be taken to the market. The carcasses are then split, rinsed and conveyed for inspection and further to be taken to the market.

Figure 6.5b: Butchers emptying of manure from paunch and intestines/method of transportation to the markets and selling of edible offal at the slaughterhouse respectively.

Inspection: the carcass and viscera are hangs to an overhead rail to be inspected if they are suitable for human consumption (figure 6.6b below). Mostly each butcher’s carcass and viscera is inspected at a time. This is the most important unit that needs more attention, as the veterinary inspector has to be objective in their duty and for the health and safety of the general public. According to the plant manager, this is important because before the carcasses are removed from the rail, the butchers have to pay their fees for inspecting and using the slaughterhouse. Also according to the chief in charge of hygienic and sanitation activities, if the carcass are found to be infected by a disease, it is discarded and dispose off in the slaughterhouse waste dumping landfill.

Figure 6.6b: carcasses hang over a rail ready for inspection

By-Products: Carcass cutting and boning takes place at the butcher’s shop in the market since most of the by-products are consumable. Manure from the fence pole areas and

paunch from the stomach and floating manure from plant cleaning are collected by the slaughterhouse management. The manure is dry and packed in bags and later sold to farmers as substitute for fertilizer because of the higher nutrient content, hence reducing the smell around the plant (figure 6.7b below). Waste water from plant cleaning and blood splits during slaughtering are all disposed into a river located about 200 meters behind the slaughterhouse. Part of this waste water is collected by vegetable farmers along the river a better crop yield due to the high nutrient content in the waste water.

Removal of cow hogs by a butcher	Cow hogs dry to be process as traditional drinking cups	Wet manure collected from paunch	Dried damped manure to be packed for selling

Figure 6.7b: Different methods of collection and disposal of waste manure and by-products.

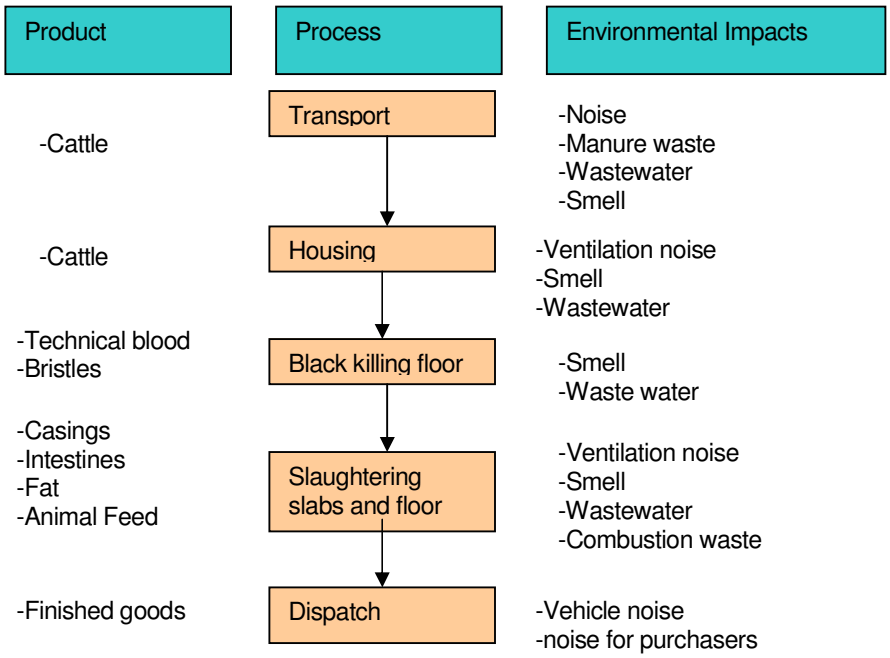

Figure 6.8b: *CAMSUS Cattle slaughterhouse input material and output environmental impacts (Adapted from field survey, 2008).*

From figure 6.8b, waste water, smell, noise and water consumption were identified as the company's significant environmental impacts.

6.1.4b CAMSUS Sanitation/ Environmental Controls Activities and Performance

If not mentioned the information is gotten from an interview conducted with the CAMSUS plant manager, the chief of butcher and the chief of sanitation and hygenic control in January 2008.

CAMSUS is under the supervision of three regulative institutions namely; the Bamenda MIENP sub-department, Bamenda Sub-Ministry of Livestock, Fishery and Animal Industry and the BUC hygienic and sanitation department. These institutions issue their procedures on how CAMSUS has to carryout its environmental and sanitation activities and applied the comman and control marketing instrument for inplementations. According to the hygenic and sanitation coordinator, an unexpected routine supervision is carryout by these institutions as far as implementations of these environmental and saniation policies are concerned. Each time these institutions carryout inspections in the slaughterhouse, CAMSUS pay a fixed amount of tax fee for the inspections.

The BUC is responsible for collecting and disposing off the slaughterhouse municipal solid waste and monitors hygienic and safety issues and levy taxes if the company do not obey the required specification, and intend advice the company on how to meet its demands. Under the hygienic and safety issue, each butcher is lienced as been competent to avoid industrial accidents and carryout effective hygienic precautions while slaughtering and selling in the market. According to the chief slaugher butcher, the butcher association enbodies only lienced butchers and unlienced butcher caught either selling stolen or slaughered meat is punisherable by law. There have been few cases of unscruablous butchers caught selling stolen meat in the markets. They were handed over the police after confirmation by the veteninary inspectors that there was no stamp on the meat. The BUC's waste container at the slaughterhouse premise is routinely collected and disposed off the waste by department incharge of collecting waste around the bamenda town. BUC operate an open dumping site where all waste of all kinds are dumped and open burning is carryout out. It is located at out of the town in an unhabitated area.

The MINEP sub-department Bamenda, monitor the company's wastewater disposal, noise and odour/smell orginating from the slaughterhouse. According to the plant

manager, most problems have been with waste water disposal, noise and odour/smell. Although the environmental requirements states that CAMSUS have to disposal off its waste water into a suck away tank, it is very expensive to implement such a project. More so, the suck away tank may become full and a need to construct again, which the company do not have enough land space for such activities. How ever, the disposal of the waste water to the river has some benefits. The fishes in the streams benefits from the by-products in the waste water and the vegetable farmers from the high nutrients in the waste water. But the plant management has a plan to construct a suck away once there is an available fund. In this regards, there is absolutely lack of consideration if the wastewater from the suck away would affect the ground water or other biodiversity species.

There are about 50 houses located around the slaughterhouse; the odour/smell from the plant affects this population. According to the management, there has been a lot of complains from the neighbours from bad odour and noise from the plant. In intend, the management has fenced the plant to reduce the difussion of the odour and the manure. There is lot of noise at the plant during the slaughered time from 4 a.m to 7 a.m. In this case, some of the neighbours are still sleeping. In this regards, there is a deciplinarian who make sure the butchers and traders keep a low tune while slaughtering. The management organised meetings with its neighhours occasionally as concerns noise and odour problems.

The sub-department of the ministry of Livestock, Fishery and Animal Industry is charged with monitoring and advising the company on animal safety/welfare and industrial accidents through the veteninary inspection department. According to the chief slaughter butcher, cattle are inspected for age limits and safety reasons at the cattle market and after slaughter have taken place. But it is very difficult for the inspectors to determine the three and a half years age limits for cattle to slaughter because of lack of technological instrument. Thus in most cases, they seek help from most old butchers and the cattle owners because of observation experiences to identified cattle which are below the required age. More so, the veteninary inspectors do not carryout atom inortem and post mortem to identified if a cattle is prenant or not. Hence there are cases of slaughtered

prenant cattle which are totally unacceptable with animal welfare system. Also the collected blood during bleeding are not checked for mad cow disease, which on the other hand could form a chain and affect the other animals. Although, the veteniary inspectors have the educational experiences in these areas, they totally lack the instructments to carryout their duties. There exist minor injuries as regards slaughtering at the plant, but there is significant car and human accidents caused by the cattle during transportation from the farm through the cattle market to slaughterhouse. According to the chief butcher, the have been a constant pressure to identified a particular road track and specific time when cattle could be transported without the interferences with human and car traffit. But the have been total lags on the regulatiive institutions to implement.

The relationship between the butcher's association and the slaughterhouse management is currently blurred due to some unscrublous butchers that boycott the association. According to the chief butcher, the plant management do not corporate with the butcher's association demands on marketing strategies and complains are regards odour/smell in the slaughtering premises. The association was dissolved when it asked the plant management to limit the number of cattle slaughtered per day, due to the buying power of the Bamenda public. In this light, each butcher was to slaughter only three or four days per week with the comfident to sale his meat completely at the market. About one-third of cattle slaughtered per day are not sold which is a lost on the butcher's part. But since CAMSUS profit can only increased if more cattle are slaughtered, she went ahead and organised a group of butchers to be in line that every butcher has the right to slaughter every day. With these differences some butchers turn to take a personal stand and dialogue is still to re-unite them together.

Conclusively, CAMSUS cattle slaughterhouse is basically a simple slaughterhouse with limited slaughter processes and activities. Its sanitation and environmental policy are implemented only through pressure from the regulative institutions. Comman and control is the instrument used by these regulative institutions to enforce the implementation. CAMUS has no internal environmental management policies governing its activities. But how ever, following it activities, it could be said that, there is some formal aspect of environmental management. The dilution of the waste water using end of pipe technique

and the supply of the farmers with the blood and manure from the slaugherhouse limits the company's environmental pollution, although the BOD content are high in the manure since no pre-treatment takes place before been packed. There is absolutely lack of technological instruments available for the veteniary inspectors to identified cattle age limits to be slaughtered and prenant cattle.

6.2b Presentation of Presbyterian Printing Press Limbe

The Presbyterian Printing Press (PPP) or briefly Presprint is located in Limbe, a coastal city in the south west province of Cameroon. It was founded in 1991 under the Swiss mission 21 whose mission was to support poor initiative countries in areas like: poverty reduction, health promotion, and improvement of the position of women, peaceful resolution of conflicts and education in theology and the church. With the cooperation of mission 21 and the Presbyterian Church of Cameroon (PCC), the most modern printing plant of the region was setup under the leadership of Mr. W. Steidle, a print expert from Switzerland who is the general manager of the company. Preprint products are mostly schools text books, colored magazines, letterheads, calendars and calling cards. Apart from these books, preprint also produces brochures, diaries and act as a computer training center. Today, Presprint employs about 60 permanent workers, 25 apprentices, and approximately 150 temporal staffs and the machines work round-the-clock. Presprint is operated with a capital of 10 million CFA francs and yield an average turn over of 700 million CFA francs (approximately DKK 8.4 million).

6.2.1b Organisational Structure of Presprint

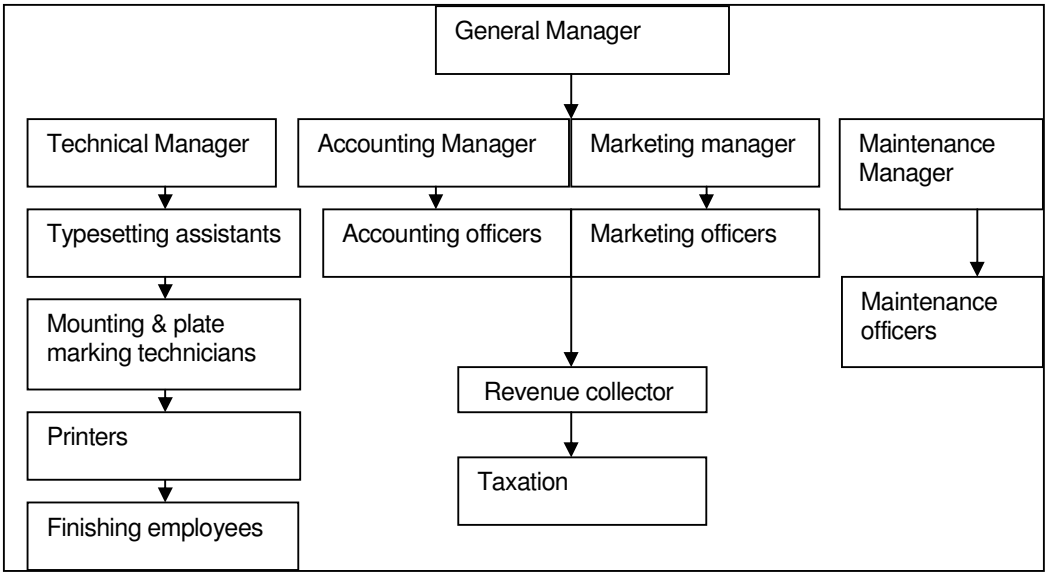

Figure 6.9b: *The Presprint organisation structure (Adapted from field survey, 2008).*

From figure 6.2b, the general manager oversees the activities of the company. The marketing section is responsible for preparing the estimates to ascertain the cost of production from the information received from the customers, while in the typesetting section, pictures are scanned or delivered data converted into text and film are exposed and developed. The mounting section mounts the developed film and offset printing plates are produced while the printing section prints out the products. At the finishing section, folding, gluing, perforating, and numbering of the printed product is carryout. The revenue section is responsible for receiving the payment for all printed products from the customers before dispatch is done. The taxation department pays out the taxes posed on the company by the government (field survey, 2008).

Figure 6.10b: *the general outlook of the Presprint Limbe*

6.2.2b Presprint key features

Company mission: Presprint is operated under the Swiss mission 21 as mention above.

Company Strategy: to invest in business areas that support, expand and develop the Christians of the presbyterian church of Cameroon.

Company goal: To change the behaviour of the Limbe community and the Christians of the presbyterian church of Cameroon though the services the offer to become good Christians. Presprint workers are Christians of Presbyterian Church of Cameroon. According to Presprint general manager, this is to fight poverty and to avoid conflicts among each other

Company sanitation and environmental control policy: The general manager and his managers act as the company's environmental coodinators, but the maintenance manager is in charge of the company's hygienic conditions. The printing industry in Cameroon is regulated under the MINEP, Ministry of wildlife and forestry. But according to the general manager, "there are no state environmental rules governing the company which are provided by the Cameroon government. But however, the company operates in accordance with the Limbe Urban Council (LUC), sanitation rules. The company is environmetally conscious and has set up it own internal environmental policy, which are yet to be revised. But almost all the measures mentioned below are implemented. These include:

- To make sure that toxic waste or hazardous waste produced from the plant are separated from non-toxic waste and dispose of in according to environmental regulations
- To make sure that waste water containing toxic chemicals is extracted and dispose of according to environmental regulations
- To make sure that waste aluminum plates and some other waste deem necessary are recycled
- To make sure that all technical workers are protected from harmful chemicals and hearing lost from the noise in the printing press.
- To make sure the noise from the plant does not distrub the company's neighbours
- To involve all the workers in environmental management aspects

6.2.3b Production process of Presprint Limbe

Marketing section: the marketing section is responsible for collecting jobs from customers, prepared the estimate amount it got cost the company to exert and a job sheet for the job is prepared. The job sheet is then taken to the typesetting unit where the job is typed and films for the job are sent to the mounting section.

Figure 6.11b: *Presprint typesetting room and the film developed*

Mounting section: at the mounting section, the films from the typesetting are being developed using very poisonous chemicals like Developer and Fixer. During this process, wastewater containing chemicals are sent out through pipes to a bio-plant. The bio-plant helps to soak all the poisonous chemicals to avoid ground water pollution. Other waste generated also includes waste films and fixers. After the films are developed, they are made available on aluminum plates ready for printing.

Figure 6.12b: *Presprint fixer and different colour vanish and glue employed*

Printing section: here, the developed aluminum plates carrying the job information are mounted on the printing machine and printing is carryout. In this section mostly waste aluminum plates, noise, wastewater, waste ink and misprints are generated.

Figure 6.13b: *pipes from the film developer to the bio-plant treatment plant*

Finishing section: After the printing of the information on the papers, the finished job is sent to the finishing section where the papers are being folded accordingly. The folded sheets are complied and stitched together and further sent to the gluing section. Gluing is

carryout on a hot gluing machine. Most of the job at the finishing section is carryout manually. At the finishing section waste papers are the only significant waste generated.

The input materials and the output environmental impacts from the production processes of Presprint Limbe is shown in figure 6.5b below.

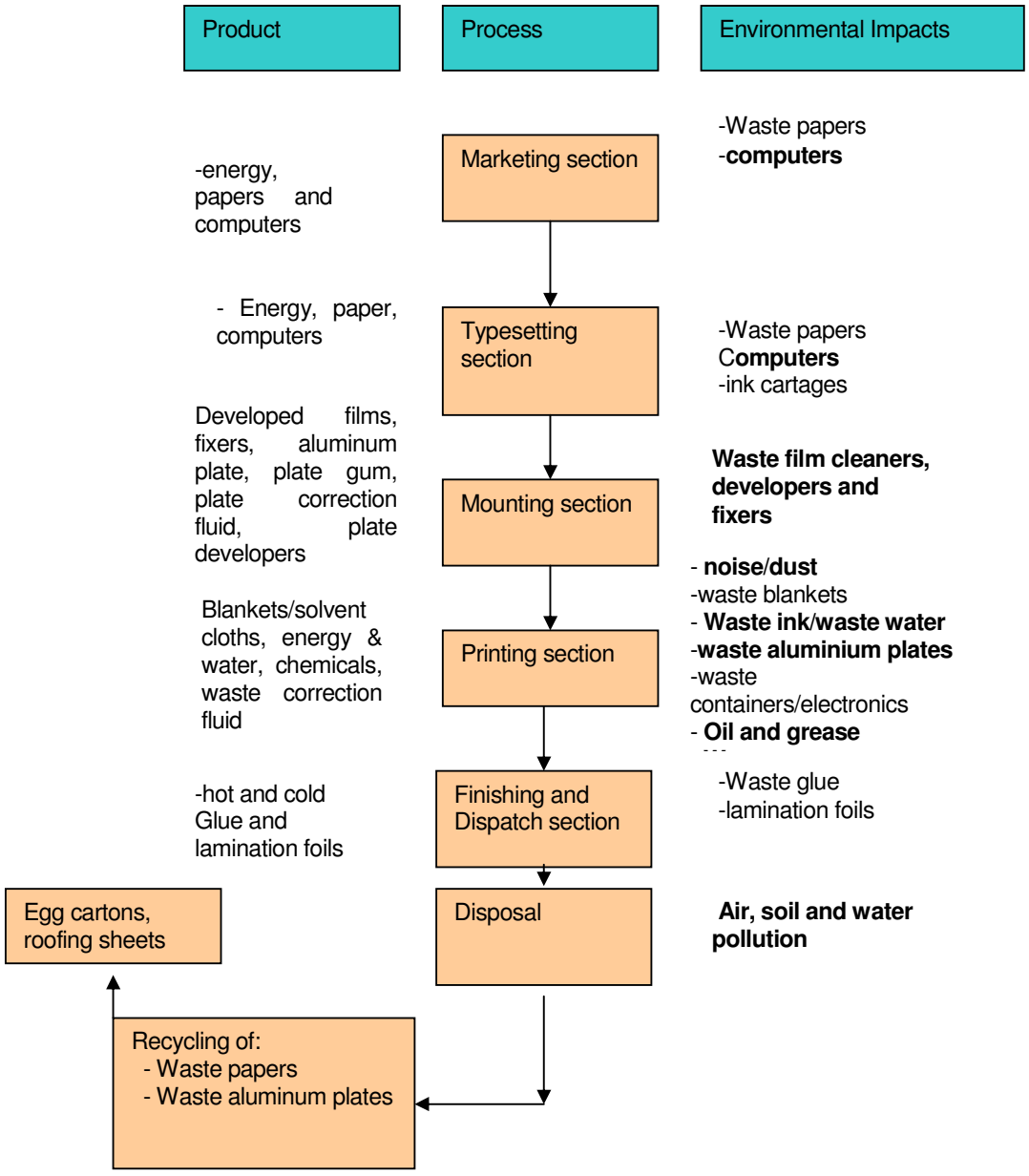

Figure 6.14b: *Presprint Limbe input materials and output environmental impacts (Adapted from field survey, 2008).*

From table 6.8b above, the significant environmental impacts from the entire production process include: waste water, waste papers and misprints, waste aluminum plates, oil and grease, waste ink, waste computers, waste developers and fixers. These waste materials at the disposal stage result to air, soil and water pollution.

6.2.4b Presprint Sanitation/ Environmental Controls Activities and Performance

If not mentioned, the information is gotten from an interview conducted with the Presprint general manager, who is also among the managers responsible for coordinating on envrionmental activities, the hygenic coordinator and some observation carryout within the presprint premises.

Presprint is under the supervision of three regulative institutions namely: the LUC hygienic and sanitation department, the Buea sub-departments of MINEP and wildlife and Forestry. These institutions issue their environmental guideline policies on how Presprint has to carryout its environmental and sanitation activities and applied the comman and control marketing instrument for inplementations. According to the presprint hygienic coordinator, an unexpected routine supervision is carryout by the LUC as far as inplementations of their hygienic and sanitation policies are concerned. But according to the presprint general manager, the sub-departments of MINEP and Wildlife and Forestry has never provided any environmental guidelines on how Presprint have to managed it environmental impacts.

The LUC is responsible for collecting and disposing off the Presprint muncipal solid waste and monitors hygienic and safety issues and levy taxes if the company do not comply with the required specifications, and intend advice the company on how to meet up with its hygienic and safety demands. Under the sanitation and hygienic rules, the Presprint has to separate it waste according to the different waste categories such as composed waste, hazardous waste, recycling waste etc. According to the Presprint hygienic and sanitation coordinator, the company do acknowlege that the activities of the company do affect man and the environment and Presprint have been working on reducing their environmental impacts through, involving the entired staffs and employees of presprint in environemntal works. Routine training is given to any new employee on how to management the waste general around his or her working section. But this involvement is

not sufficient due to time constrainsts because Presprint is operating in a very harsh economical environment. But a number of successes have been recording in the areas of waste management and disposal of waste water and hazardous waste. Presprint separate its waste from toxic and recyclable. For instance presprint waste aluminum plates are are handed sold out to the population. They are used as roof cover. This in turn help presprint to invest to improve the ecological situation of it plant.

Figure 6.15b: *Presprint waste aluminum plates*

Also, presprint waste papers is sold to a recycling company in Nigeria for the production of egg cartons while dirty papers soaked with ink and glue are collected by a government contracted company for disposal. According to the coordinator, the method of disposal of waste paper by the contracted company is not satifactory because they still used the LUC unprotected, mixed landfill dump. Once in a while, the dump is burned down to reduce the waste volume. In this landfill, printing inks and varnish which would have to be treated as a hazardous waste are disposed of, too. In the direct neighbourhood of the landfill there are extensive plantations of oil palm *(Elaeis guineensis)* and plantation *(Musa paradisiaca normalis)*. It is unclear whether the emssions from the landfill influence the quality of the plantation products. This environmental economic company is solely the recommendation of the LUC and it works with the LUC waste disposal procedures.

Figure 6.16b: *the LUC waste disposal landfill*

The sub-department MINEP and the Wildlife and Forestry Buea, monitor the company's wastewater disposal, noise, the source of paper production, technology employed and water pollution because Presprint is located along the Limbe beach line. As mentioned above, presprint managed it environemental impacts without the help or support of these governmental regulative institutions and they do not come in from time to time to find out

how the company is doing as far as environmental activities are concerned. But according to the presprint general manager, the company has always tried to be environmental friendly through the implementation of some environmental measures in the areas of wastewater, noise, and dust from the plant, toxic chemicals and pollution of the Limbe beach with waste materials. More so, the company also consults with mission 21 from Switzerland and they assisted the company by sending two of its environmental resource specialist who helped the company to implement a bio-plant which soaks all toxic and poisonous chemicals generated from the plant.

Figure 6.17b: *Open burning of waste films along the Limbe coast line*

The bio-plant compose of *Typha,* a plant usually used in Europe, but does not grow in Cameroon. But a similar plant with the same potentials *Pennisetum purpureum* (Elephant grass) which belongs to the family of grasses (Poaceae). It has a bamboo-like appearance, with its stout, "woody" older stems. It grows as weed along dikes and ditches. This alternative plant is normally used for the construction of wetland for wastewater treatment. All waste chemicals from the plant are collected in drums and empty through a pipe to the treatment bio-plant constructed some 30meters behind the plant. All waste water collected is empty into a sink link with pipes to the treatment bio-plant. In return, the bio-plant soaks all the poisonous chemicals to avoid groundwater pollution.

Construction of the bio-plant

Elephant grass within the bio-plant

Pipes from the plant to the bio-plant treatment site

A sink which drains all waste water into the treatment plant

Figure 6.18b: *Presprint waste treatment bio-plant*

According to the general manager, the company does not have any special source of paper or paper supplier since any paper can be imported into Cameroon. The company

also tries to choose environmental friendly chemicals which are not toxic for the workers and the environment. In the area of technology, Presprint production is done with old technology as compared to the printing technology in Europe today. But Presprint machine are used ones purchase in Europe, but technology is modern when compared with other printing plants in Cameroon. This gives Presprint an advantage over its competitors although Presprint could also have well trained staffs with environmental knowledge. The noise level in the plant is low and Presprint has never received any unaccepted sound complains from its neighbours. But the printers used the ear protector during operational periods to avoid hearing lost. Further more, the company has never received any complains or advice from non-governmental green organization including the media.

***Figure 6.19b**: Presprint offset printing technology*

As regards the relationship of the Presprint management with the employees, a worker is elected in each production section and the worker represent the said section in all board meetings and this elected staff has access to the general manager's office as far as complains from the employees are concerns. The employees participate in the company's environmental activities. Some of these activities include: sorting of waste, ``keep the beach clean` and during the construction of the bio-treatment plant.

Chapter 7 Comparison Capacity analysis for Environmental policy and Management between Denmark and Cameroon

In this chapter, the differences between Denmark and Cameroon capacity for environmental policy and management since 1970 are outlined with focus on Janicke and Weider capacity for environmental policy and management concept.

7.1a Capacities of Proponents

According to Janicke and Weider (1996), the first step for the outcome of an environmental policy and management of a country is to identify the actors (proponents and opponents) of environmental issues. They refer to proponents of environmental policy and management as specialized governmental environmental protection institutions such as environmental ministries and non-governmental green interest organization. In this regards, the next step is the institutionalization of the new policy area to prove the country's capacity development and that if there is necessary growth of staff, budget and scientific competency, then these policy institutions would be differentiated and integrated throughout the dispersed jurisdiction and in close cooperation with polluting policy areas. The final step is then to spread out decentralized institutions for cooperative environmental planning in cities and enterprises.

Hence, the strength, competence and configuration of organized governmental and non-governmental proponents of environmental protection of Denmark and Cameroon were traced as far back as 1970 following the awake of environment concerns set forward by the Stockholm Conference on the "Human Environment" in 1972 as show in table 7.1 to 7.3 below.

The Differences between Denmark and Cameroon Environmental policy institutions

Environmental policy Institutions	**Denmark**	**Cameroon**
Environmental protection institutions	Ministry of Environment, 1971, and Ministry of Energy in 1974 but merge to Ministry of Environmental and Energy in 1994	Central Ministry of Environment and Forestry in 1992, but decentralized to Ministry of Environment and nature Protection and Ministry of Wildlife and Forest in 2004
Environmental Protection Agency	The Danish Environmental Protection Agency in 1973	No Agency for Environmental Protection policy implementation

Strength of Ministry and Agency	Strong but weak and isolated environmental ministry and Agency	weak and Centralized environmental ministry
Establishment of environmental institutions at all levels of Jurisdictions	Local Authorities in all municipalities and counties, the courts	Municipal Councils in all the 10 provinces, the courts
Establishment of Environmental division in other ministries	Only specific ministries with particular area of environmental responsibility	All ministries had at least one or two departments with environmental responsibilities 1992
Establishment of integrated environmental planning institutions	Danish Energy Agency, Geological Surveys of Denmark and Greenland, National Environmental Research Institute, Mineral Resource Administration for Greenland, Spatial Planning Department at the Ministry	Department of regional development at the Ministry of Public Investment and Regional Development Agronomic Research Institute and Geological and Mineral Research Institute. Ministry of Town Planning and housing, National Advisory Commission for the Environment and Sustainable Development

Table 7.1: *Denmark and Cameroon established environmental institutions since 1970 (survey, 2008).*

From table 7.1, it could be seen that both countries established environmental institutions after the Stockholm conference. On the other hand, only Denmark founded an EPA in 1973, as a central agency responsible for the implementation of its policies. The Danish Ministry of Environment and Energy was further differentiated following the growth of staff, budget and scientific competence into seven agencies with over 3000 staff. It could be said that the establishment of the Danish Environmental ministry and its EPA is a sign of strength and necessary capacity on the part of the Danish government. Whereas the Cameroon ministries virtually set the policies and follow-up the implementations, which show some form of a close system. In both countries, it could be seen that there was available capacity to empower the environmental ministries for policy integration throughout dispersed jurisdictions and cooperation with the polluting policy ministries. On the other hand, Cameroon have established municipal councils in all its 10 provinces, which management each city waste collection and lastly, both countries have showed the commitment for short and long-term planning through the embellishment of environmental planning institutions as shown in table 7.1. It could be concluded in the section that

Denmark has shown an immediate proactive action after the Stockholm Conference in 1972 by setting up its environmental institutions whereas following the economic crises that heat Cameroon during the 80s hinder it environmental performance until early 90s when it established its environmental institutions.

Non-Governmental Institutions

Environmental policy Institutions	**Denmark**	**Cameroon**
Environmental protection institutions	Ministry of Environment, 1971, and Ministry of Energy in 1974 but merge to Ministry of Environmental and Energy in 1994	Central Ministry of Environment and Forestry in 1992, but decentralized to Ministry of Environment and nature Protection and Ministry of Wildlife and Forest in 2004
Environmental Protection Agency	The Danish Environmental Protection Agency in 1973	No Agency for Environmental Protection policy implementation
Strength of Ministry and Agency	Strong but weak and isolated environmental ministry and Agency	weak and Centralized environmental ministry
Establishment of environmental institutions at all levels of Jurisdictions	Local Authorities in all municipalities and counties, the courts	Municipal Councils in all the 10 provinces, the courts
Establishment of Environmental division in other ministries	Only specific ministries with particular area of environmental responsibility	All ministries had at least one or two departments with environmental responsibilities 1992
Establishment of integrated environmental planning institutions	Danish Energy Agency, Geological Surveys of Denmark and Greenland, National Environmental Research Institute, Mineral Resource Administration for Greenland, Spatial Planning Department at the Ministry	Department of regional development at the Ministry of Public Investment and Regional Development Agronomic Research Institute and Geological and Mineral Research Institute. Ministry of Town Planning and housing, National Advisory Commission for the Environment and Sustainable Development

***Table 7.2**: The involvement of Denmark and Cameroon media and green organization in environmental issues (field survey, 2008)*

From table 7.2, it could be said that, both countries had had some form of green environmental institutional since the awake of environmental concerns in the 70s. There exist strong Danish green organizations which could lobby in political debate on

environmental issues, which on the other hand are purely Danish organizations meanwhile those of Cameroon are totally international interest green organization. This is due to lack of necessary institutional capacity building for Cameroon local and national green organizations. It is therefore difficult for these environmental lobbyists to participate in political debate on environmental policy and management. There is no weak or non-professional national green organizational in Denmark but at least we could find that in Cameroon. This indicates that even citizens without environmental expertise care about the environment. It could also be seen that in both countries, there exist local and national green interest organizations with no clear autonomous national interest whereas there exist mostly international green organization playing consultation role in the environmental arena in both countries.

The involvement of the media in dissimilating environmental information on the country's state of the environment and opponents of environmental policy has been an old traditional for both countries. But this differs in some aspects in each country. In Denmark, the Danish and EU environmental law on Access to Information has proven Denmark as better media coverage than Cameroon because every citizen can know exactly what a company or government is doing as concerns environmental issue, through access to companies' website, green accounts, newspapers and agencies/ministries websites. This law is some how not established in Cameroon due to its centralized political system and limitations of private media into companies' affairs. In Cameroon the state radio, TV and newspapers are the main media through which environmental information is dished out to the public. However, the influence of the Cameroon press on government environmental policy cannot be denied, despite the strict state laws, especially since 1986. A case in point is the discovery of the health and environmental impacts of the Cameron Chad Oil Pipeline project in 1990, which has been credited by the Cameroon press. On the other hand, the media participated actively in the environmental education of the country by providing detailed and in-depth information on Cameroon environmental issues. For example, "Debate between the students of the Environmental department of the University Buea against Lectures in 2003 on the impact of the Chad Cameroon Oil Pipeline to Cameroon". Environmental awareness on disasters areas, sanitation rules, and impact of human activity on the environment is dissimilated through; church news

time, local communities' meetings groups, radio forum and through the established secondary school Environmental Clubs.

Because of Cameroon central political system, private media are mostly afraid to be seized or suspended when trying to question the environmental activities of companies, because in most cases the shareholders of these companies are all state personnel.

In Denmark, lecturers in university environmental department published articles, journals and text on the Danish environmental aspects and suggested innovations aspects in some polluting technologies and alternative cleaner production. Meanwhile environmental agencies like the Danish EPA published firms' environmental activities and how such firms could go about it without breaking the rules. Most consultation NGOs make available articles and journals for a better waste management techniques and alternative cleaner production through project implementation in their websites. On the other hand, only few University lecturers in Cameroon could published environmental texts, journals and articles due to lack of available project funding. The Cameroon research institutes are only institutes with special area of environmental concern.

In Denmark because of the law on access to information, industries are indirectly attack on their environmental performance mostly by the municipalities due to their autonomous right over each jurisdiction. Whereas in Cameroon, there is absolutely limits as concerns direct attack of polluting companies by the press due to centralized government and limitation of some press by the state laws. In Denmark one might visit a company only if he or she needs some first hand materials and observations. It is easy to stay at home and know exactly what a company is doing with its environmental activities in Denmark. But in Cameroon it is very obvious that you need to visit the company for all detail information on the company's state of environmental activities. This is due to the lack of the necessary capacity as regards technological aspects like the internet networks which is still to be fully established by firms in Cameroon. This can be seen in regards to the difficulties encountered in obtaining materials for the Cameroon case companies selected for this report.

Ecological Innovation Firms within Industry and	**Denmark**	**Cameroon**

other areas		
Environmental interests are scarcely articulated within the economic system	No, it is totally articulated within the economic system	Yes
Environmental interests are articulated mainly by the eco-industry (producers of clean-up technology)	No, not only producers of clean-up technology, but all the industries	No
Environmental interests are articulated by particular green business organization	Yes	Yes
Ecological pioneer enterprises (such as trade or insurance companies having a strong impact on the whole economy)	Yes	No

Table 7.3*: Denmark and Cameroon statistic on economic innovation firms (field survey, 2008)*

In Cameroon, it could be seen that in most developmental projects, concerns to management the environmental impacts of the activities are mostly ignore. Such concerns could only come from the international bodies responsible for funding the project such as UNDP, UNEP and the World Bank. In most situations, the Cameroon government is always pressurized by these organizations to set up or implement a particular environmental plan. On the other hand, most economic firms in Cameroon are only concerns with the out come of their products and ignoring environmental impacts created from producing the product. This could be seen from the list of polluting companies at the Douala industrial area zones and the case companies for this report. There exist no state or municipal waste treatment plants, but open dumped sites for the disposal of waste of all kinds. There exist few, but waste disposal is solely the responsibility of the municipals councils. But there exist environmental economic firms with direct activities as to clean-up industrial waste but not shifting to technological or product innovations. This could be asserted with the fact that, developing countries are mostly parties that depends on transferred technology. This is quite opposite in the case of Denmark, which principle economy is powered mostly by economic firms. There exist environmental economic firms in Denmark responsible for various waste treatment techniques and recycling. More so, the municipalities have waste treatment plants at the disposal of companies. Firms in Denmark always turn to research on technological

innovations, setting up their own waste treatment plants and carryout lifecycle assessment of their products for waste, energy and materials reductions, thus reducing the pressure of the state regulations and laws on them.

Indicators of Denmark and Cameroon

Indicators	Denmark	Cameroon
General condition	Denmark is among the ten richest countries in the world. Everyone has enough to eat and 100% have access to safe drinking water	Cameroon is one the poorest and least developed nations in the world. An average Cameroonian lives on less than $2 per day. He or she does not have safe drinking water and dies before age 55
Population	About 5.5million people (2007 est.)	About 18million people (2007 est.)
Ethnic groups	Danish 97%; other (incl. Scandinavian) 2%; Faroese & Inuit 1%	About 250
Religious	Evangelical Lutheran 87,4%; Roman Catholic 1%; non religious 9,6%	Christian 53%, Muslim 22%, indigenous African 25%
Language	Danish and Faroese	French and English (both official) and about 270 African languages and dialects, including pidgin, Fulfulde, and Ewondo
Education	Compulsory between ages 6 and 16, attendance 100%	compulsory between ages 6 and 14 attendance is 65%
Literacy rate	Virtually 100% for men and women	80% for men and 67% for women
Infant mortality rate	4-8 per 1000 births	77 per 1,000 births
Life expectancy	76 to 77years	52.86years
Work force	Agriculture-5%, Industry-20%, Services-75%	Agricuture-70%. Industry and commerce- 13%, others 17%
GNP	$29,890 per capita	$610 per capita
Annual real GDP growth rate	2.0%	4.1%
National resources	Natural gas and oil, salt, energy etc	Oil, timber, hydroelectric power, natural gas, cobalt, nicket etc
GDP	Agriculture 6%, Industry 28%, Services 68% (est 2002)	Agriculture 45.2%, Industry 16.1%, Services 38.7% (est 2006)
Unemployment rate	2-3% (est 2007)	30% (est 2001)
Government	Democratic Monarchy, headed by a Prime minister	Democratic, with centralised government headed by a president.
Constitution	Amended over 5 times	Amended over 3 times

Party system	Multiparty	Multiparty

Table 7.4: *Indicators of Denmark and Cameroon (Adapted from www.denmark.dk and http://www.infoplease.com/ipa/A0107382.html)*

7.2 The Structural Framework of Action

7.2.1 Denmark and Cameroon Strategy for Environmental Management

Indicators	***Denmark***	***Cameroon***
Situative problem	To protect nature and environment	To protect biodiversity, forest and environment
Strategy	Target, Long-term approach	Target, Long-term approach
Principle employed	Prevention	protection
Economic instrument apply	Taxes, charges etc	Fines and taxes
Available capacity	Funding, Knowledge and coordination action	Knowledge, coordination but Lack of institutional capacity building

Table 7.5: *Denmark and Cameroon strategy for environmental management (Adapted from field survey, 2008)*

Janicke and Weider, (1996) assert that "strategy is the purposeful use of instrument, capacities, and situative opportunities to achieve long-term goals by a country and that strategy depend on capacities such as available knowledge or the possibility of strategic and coordinated action for an environmental problem". Denmark revised the objectives and methods of implementing environmental policies continually, and the evolution of society and the growing perception of the scope of the environmental problems, both nationally and internationally. This could be seen through the implementation of a number of major legislation reforms which were intended to give higher priority to protecting nature and the environment at the national and local levels by the Danish Environmental ministry. In the 70s and the 80s there were favourable results in many environmental areas, but because of Denmark's concern to nature and the environment, a stronger

target, long-term and holistic environmental approach was setup in which solutions to environmental problems were integrated into all activities of society in 1993.

In this light, it could be seen that the Danish strategy to solve environmental problems was also change from the principle of curing to prevention. Recycling and the promotion of technology that pollutes less and is more resource-efficient were also emphasized. Economic instrument such are charges, taxes etc were employed to influence the behaviour of companies and households in an environmentally sound direction and businesses in Denmark were subjected to the carbon dioxide emission tax caused by the energy they use. It could also be seen that part of the revenue from tax was used to finance various subsidy schemes in order to promote energy conservation and to increase the efficiency of energy supply systems. More so, scientific and administrative monitoring, reporting on the state of the environment, and environmental forecasting was used as a strategic environmental planning.

On the other hand, before independent, it could be seen that Cameroon had a strategy to manage its forest and wildlife which was mostly inspired by western laws. Measures were formulated and recommended for the enrichment and/or reforestation of exploited forests and for the conservation of soils to sustain human economic activity. But it could also be seen that, after independent, Cameroon embarks on a five-year plan to protect biodiversity and soils. More so, the need to protect the environment was made official in all the sectors of the national economy in 1964 and provisions were made for a series of research projects on biodiversity and soil conservation.

In this light, it could be said that Cameroon Penal Code was the only law used to criminalised environmentally wrongful activities with fines of different magnitudes as the only economic instrument. In this regards, the Ministry of Agriculture in 1972 was therefore able to transform some game reserves into national parks. But this trench for strategic environmental planning could not continue because of the economic crisis that affects the country in the mid 80s. But it could be seen that in 1992 Cameroon reform it environmental strategic planning with the support of the international communities by setting up an environmental ministry with the responsibility to setup and to implement the

country's Environmental Management Plan (EMP) and National Biodiversity Strategic and Action Plan (NBSAP) whose targets were to fully protect and conserve biodiversity in Cameroon by 2010 and to meet the Millennium Development goals.

7.2.2 Denmark and Cameroon Cognitive-Information Framework Conditions

It could be seen that both countries were aware about the effects of human activities on the environment and they had the knowledge to development some economic instrument and enacted legislative and regulative policies to control human activities on the environment before their independents. In Cameroon, most of the legislations and regulations enacted were merely to secure forest, biodiversity and agricultural products. These were the main ecological areas that support the Cameroon economy. Thus, to enable these sectors be in line with the country's GDP per capita, more stringent environmental policies were implemented. During this period the only ministry organising environmental aspects was the agricultural ministry. But, due to the economic crises that break out in the 80s, which result in income drop in agricultural products, environmental policy and management were not of priority, but more focus was how to rebuild a better economy. Cameroon could only turn to the environment following the IMF and World Bank structural adjustment program in 1992. In this regards, Cameroon had to implement the World Bank loan environmental policies conditions before obtaining a loan for any development projects. The ministry of Environment and Forestry was founded in 1992 but later decentralised to two ministries still with the aim to strengthen environmental policies and implementation for a better economic and environmental successes. In a sense, Cameroon is aware and has knowledge about the environment, but due to the poverty level of the country, environmental management is hard to accomplish.

There exist quite cultural differences between Denmark and Cameroon. Cameroon been a country that is made up of French and English zones with over 250 ethical languages has quite diverse culture. Consensus is hardly accomplished when an environmental policy is to be formulated or implemented. Formulating environmental policies in Cameroon could be an easy task, but implementing it will depends on who, where and how the budget for the implementation is manage due to the centralised and corrupt nature of the country.

On the other hand, Denmark formulated and implemented legislation and regulation policies as far back before independent mostly in the agricultural sector which was the principle economic income of the country at that time. But later in 1971, Denmark founded the ministry of Energy, following its high wind speed which was advantageous for its economy. Wind mills contribute considerable amount of energy for the Danish energy sector and has not only cut Denmark's CO_2 emission levels but also reduced the country's demand for nuclear and power plants installations. Since these sectors could support the Danish economy, there was absolutely interest for the government to formulate its own environmental policies and implement them alongside the EU regulations in regards to the activities performed within the various sectors. But later in 1973, due to the closed cultural tradition between Denmark and Sweden, and its outstanding growth in economy, Denmark copies from Sweden the technique to regulate its industry and founded the ministry of Environment and Energy. Denmark been a monarchy with a single ethical language has had a long cultural tradition of working in groups. Consensus is easy to achieve because the various parties for the formulation of environmental policy are involved. More so, the structure of the Danish social system made the country a welfare state. In a way, it could be said that, Denmark could afford to formulate and implement any environmental policy which it deem necessary for the better outcome of the country's environment, due to the availability of capacity. See table 7.4a for more statistical indicators of Denmark and Cameroon.

7.3 Denmark and Cameroon Political-Institutional Framework Conditions

7.3.1 Demark and Cameroon Participative Capacity

Denmark political system could be regarded as an environmental interests system. The system is decentralised with strong communities that take part in environmental issues. Denmark has a long tradition of actively involving individual, non-governmental organisation and association and businesses formally or informally in formulating and implementing environmental policies. The involvement of the Danish parliament in the formulation of environmental policies has proven Denmark as an environmental conscious country. On the one hand the pressure from environmental movement groups such NALAD, the Confederation of Danish Industries, Danish society for the conservation and the Danish Anglers Federation prove the general openness and modernization of the

Danish political system. In regards to resources, the Danish court play a vital role with its economic instruments against the opponents or target groups of environmental policy as far as criminal environmental law is concerned.

On the other hand, Cameroon political system is open to environmental policy process. There is totally a lag for environmental interests. There exist centralised and strong local communities for the formulation and implementation of environmental policies. A political system with central power on the hands of the president could be seen as unfavourable conditions for participation of local communities. There is absolutely no pressure from environmental movements, although it could exist but the centralised nature of the political system hindered the outcome in most cases. Environmental issues are not debated or incorporated in the parliament. Pressure groups are mostly the international communities such as the UNEP, IMF, UNDP, World Bank and international NGOs because of their financial and materials support for the formulation and funding of the country's projects. Thus, Cameroon could formulate or implement a policy if it believed there is a benefit in return. In regards to resources, the courts play a vital role in prosecuting environmental opponents through criminal environmental laws, although the constitution still hinder their freedom for implementations, due to the vested powers on the president to dismiss or change laws.

7.3.2 Denmark and Cameroon Integrative Capacity

In Cameroon there is lack of consensual capacity within the environmental institutions for a successful environmental policy formulation. Looking at co-operation at the different environmental institutions, it could be said that each jurisdiction has shown concerns by creating a department responsible for its environmental aspects. On the other hand, corporation with other environmental institutions for the formulation and implementation of policy is regarded as interfering. This could be asserted with high rate of unemployment in Cameroon. Thus, there is absolutely competing between environmental and development policy. Where as in Denmark, there exist co-operation within environmental institutions following their technological and product innovation. On the other hand, corporation with environmental institution could be seen through the involvement of the parliament, the industries in the formulation of environmental policies.

In another light, both countries have shown a strong stand as far as intra-policy cooperation is concerns. This could be asserted through the integration of the different environmental policies at the different jurisdiction levels of the political system. On the other hand, there is lack of coordination in Cameroon as far as cross-sectional integration of conflicting policies is concern. But in Denmark, there exist coordination of conflicting policies. Lastly, Cameroon is able to involve mostly environmental policy institutions and non-governmental actors when looking at external integration for policy formulations. For example during the setting up of Cameroon National Biodiversity Action Plan, only the Ministry of Environmental and Forestry and some non-governmental actors which were mostly international actors were involved. What made different with that in Denmark is that they also involve the polluters during the setting up of the Danish EPA in 1973.

7.3.3 Capacity for Strategic Action within the Political context

The capacity at this level could be regarded as the highest stage of institutional capacity-building necessary to empower the environmental institutions to developed and implement the various environmental policies. There exist a great different in capacity for strategic action within the two countries.

Cameroon being one of the poorest countries in the world with poverty and corruption at their peaks may have the necessary capacity to fuel these environmental institutions, but these factors are more important to solve rather than environmental problems. It could also be seen from table 7.4a that the unemployment rate in Cameroon is 30 per cent and an average Cameroonian live on less $2 per day. With these conditions, the country's strategic action has been to embark on projects that could improve on these conditions. Thus, in a way these factors could be said to overshadow environmental policies issues at the parliament.

But on the other hand, Denmark is a developed country and stands among the first 15 richest countries in the world today with only 2-3 per cent rate of unemployment. This show that Denmark has the necessary institutional capacity building to support environmental institutions during the formulation and implementations process of the various policies. This could be seen through the involvement of the parliament in environmental policy formulation.

7.4 Denmark and Cameroon Economic-Technological Framework Conditions

Janicke and Weider (1996) assert that “the per capita GDP is mostly closely connected with environmental policy outcome”, consequently Denmark stand a better chance for environmental improvements than Cameroon (see table 7.4a). They also mention that, “the probability of improvement is highest in rich countries where the standard technological solution such as clean-up technological, substitutes, higher efficiency, or recycling is available”. This point could be explained with a look at the slaughter house case companies. CAMSUS operate just a simple slaughterhouse, where slaughtering is performed by butchers and there is no pre-treatment of waste water before disposal, but Danish Crown Aalborg slaughterhouse slaughtering is totally with the help of advanced technological techniques and waste water is pre-treated using the flotation slurry technique before disposing. Another point that Janicke and Weider (1996) prove out is that, “wealthier countries can both demand and afford stronger environmental measures in the field of air protection and recycling”. In Denmark the deposit and return recycling technique of bottles in supermarkets is performed by an automatic machines. But in Cameroon, bottles, glasses or plastics recycling is done with no particular principle like one has to deposit some money and return the container before getting money. It is basically the initiative of individual to recycle these materials depending on what they are going to gain from them.

Another point Janicke and Weider (1996) draw the researcher attention to is that “high research and development expenditure could show some successful air pollution control”. Although Cameroon has established research institutions, looking at the GDP per capita, its population size and poverty level, the country cannot afford to spend on high research and development in the area of air pollution control. On the other hand, Denmark been a wealthier country could afford to spend in high research and development for a better technology that could control air pollution. For example, there exist incineration plants in Denmark with very high smoke stacks for controlling air pollution whereas in Cameroon, open burning is the method for waste disposal.

Lastly, Janicke and Weider emphases that, “the technological standard of a country’s economy may be influenced more easily and directly with situation like transfer of

technology and expertise". Cameroon depends on transfer technology for example, the technology employed by the Cameroon prebyterian printing press is a transfer technology from Switzerland and CAMSUS slaughterhouse which is assumed to be a modern one in Cameroon is an old slaughter technique used in Denmark long ago. The technological standard of Denmark is high. For example Nordjyske medier printing press operates a computer-to-plate digital and printing technique with little energy consumption and wastewater, which is the most recent available printing technique today. Danish Crown Aalborg slaughtering procedures are mostly automatic and stunning of cattle is performed with a bolt pistol for animal welfare reasons, whereas in Cameroon, CAMSUS slaughtering procedure are performed manually with knives. Further more; the prices of environmentally sensitive goods are another economic factor that can be influenced by policy (Janicke and Weider, 1996). A close look at the presentation of Cameroon prove it out, that most environmental policies formulated and well implemented involves mostly areas like biodiversity and forest, because these sectors are the primarily sources of income to the country. Although the Danish energy sector and services sectors could be said to be backbone of the country's economy, environmental policies are also formulated and implemented in other sectors.

7.5 Situative Context of Denmark and Cameroon

According to Janicke and Weider (1996), "there could be some situations which could change the opportunities of actors to implement environmental policy and management". The public debate on climate change for countries to cut down their CO_2 emission gave Denmark the opportunity to formulate economic instruments to influence the behaviour of companies and household in an environmentally sound direction with tax on the carbon dioxide emissions caused by the energy they use. On the other hand, it could be said that the energy crises that affect Denmark in 1973 and 1979 enable the country to research for alternative energy sources. On the other hand, the economic crises that affect Cameroon economy during the 80s could be said to have hinder their outcome of environmental policy and management. Janicke and Weider (1996) also assert that "another situation change could be a discovery of win-win constellations, where not only environmental but also economic interests are supported by the implementation of an environmental management tools". It was only prior to the Stockholm Conference on the state of Human Environment in 1972 that Denmark had to set up an EPA because it was

mandatory for the conference. Also because Denmark is an EU member state it therefore incorporate and implemented all EU regulations. More so, stringent environmental policies were implemented to restore the Danish landscape due to extensive agricultural activities because the agricultural sector account for a greater income for the country. It could also be said that the surplus energy generation from windmill and the advantage that Denmark had to export part of it to raise it economic standard, gave the country the power to establish stringent energy policies in the areas of coal fire plants. Whereas in Cameroon, the economic crisis in the 80s enable Cameroon to set up a National Environmental Action Plan for the country as World Bank and IMF environmental conditions for granting financial support in the form of loan. The Earth summit in 1992, enable Cameroon to set up an environmental ministry which was mandatory for the summit. It is also due to the important of Cameroon rich biodiversity for its economy that stringent environmental policy and management were implemented.

7.6 The character of the environmental problem

Here Janicke and Weider talk of "how easy the environmental problem is to be solved and that it would make a difference if the problem is urgent and experienced by the public or only threatening future generation". It could be said that all environmental problems are important to be solved no matter how easier or difficult they are, but it could be said that Cameroon classified environmental problems in terms of if the problem is depleting a natural resources which support the country's economy rather than problems experienced by the public. Although Cameroon is working towards the goals of sustainability, more priorities is given to biodiversity conservation rather than urbanization, water pollution or waste management which are problems experienced by the public. On the other hand, Denmark focuses on changes on the landscape with the aim that its might threatened future generation. Thus Denmark works not only with environmental problem experienced by the public but also on problems that could urgent or threatened future generation. This could be seen from the Danish environmental motto which is based on the principle of sustainable development.

Chapter 8 Comparison institutional capacity building for environmental management between Denmark and Cameroon case companies

In this chapter, the differences between the cases companies' environmental management approach are also done with focus on available institutional capacity building, cooperation and implementation of the case country environmental policies. The Scott institutional theory is employed for the analysis of the case companies

---

Although the theoretical framework of the case companies is based on Scott institutional theory, institutional theory is beyond the scope of this report, but this thesis report seeks to establish its links and relevance to the case companies capacity to implement environmental permits. Thus Scott institutional theory is used to identify if the regulative, cultural-cognitive or normative institutions do exist under the case companies' sphere, reflecting on the case countries various frameworks conditions outlined in the Janicke and Weider comparison capacity for environmental policy and management for the case countries in chapter seven. This is due to fact that, the case companies' environmental performance cannot be taken out of the institutional framework within which it is embedded. Based on findings the relevant regulative, cultural-cognitive and normative institutions as well as the case companies framework conditions indicated in table 8.1 to 8.4 below were identified as the main institutions and conditions that directly or indirectly influence the environmental activities of the case companies. The assessment was based on the case companies' framework conditions and collaboration of the three institutional pillars with the case companies in handling environmental issues as well as their capacity building in terms of resources to; inspect, advice, assist and sanctions the environmental activities of these case companies. This available institutional capacity building could in a way enable the case companies to take proper responsibility for the environmental impacts they create during their daily activities.

In the presentation of Denmark, it was found out that, the Aalborg municipal authority is the main regulative institution responsible for assessing the environmental activities of the case companies (Danish Crown slaughterhouse and Nordjyske Medier newspaper production), whereas in Cameroon the municipal authority is responsible only in the case

companies hygienic and waste management. Other aspects of environmental impacts are handled by the MINEP and the institutions which the case company's product is directly link with such as the Sub-department of the ministry of Livestock, Fishery and Animal Industry (for the CAMSUS cattle slaughterhouse Bamenda) and Wildlife and Forestry (for the Presprint Limbe). In both cases, the case countries has shown a strong commitment and available institutional capacity building for the setting up of these regulative institutions (refer to national level analysis). But it is left to find out if these regulative institutions have the necessary capacity to act upon the environmental activities of the case companies. This is assessed under the regulative institutions and capacity to act below.

On the other hand, the institutional capacities necessary for the case companies to implement and management the regulative institution environmental permits were also assessed. Danish Crown slaughterhouse is a firm owed by a cooperative farmer group and Nordjyske medier is a share holding company. This show the available capacity for the Danish citizens to established economic institutions. On the other hand, the Bamenda slaughterhouse is an established institution donated to the Bamenda Public by a French government and is operated by an NGO whereas Presprint Limbe is a Swiss mission 21 support scheme to the Presbyterian Church of Cameroon and is operated by the Presbyterian Church of Cameroon. This show the lack of the necessary capacity for the Cameroon citizens to established economic institutions.

In both cases, this is in connection with both countries level of economic development. Denmark is a rich and developed country, thus it citizens should therefore be able to set up a business enterprise with their own resources whereas, citizens of a poor country like Cameroon can only depend on capacity support from donor countries and bilateral funding organizations. It is left to find out if these companies are able to set up their own internal environmental policies for the implementation of the regulative institutions environmental permits. Also, the involvement of the regulative, normative and cultural-cognitive institutions in the case companies' environmental activities could in a way determine the environmental performance of both the case companies and the institutions. Further more, the capacity to act or participate in the case companies

environmental activities by the cultural-Cognitive and normative institutions were also assessed. The findings are outlined under the three institutional pillars below.

Scott Institutional Pillars

Institutions	**Denmark case companies**	**Cameroon case companies**
Regulative institutions	**Danish Crown Aalborg slaughterhouse**	**CAMSUS slaughterhouse Amanda**
Environmental ministries	No necessary because of the autonomy power vested to Danish municipalities	MINEP and Ministry of Livestock, Fishery & Animal Industry
Local Municipality	Aalborg municipal authority (Local Council)	Bamenda Municipal authority (Bamenda Urban Council)
Regulative institutions	**Nordjyske Medier Aalborg (Nordjyske Stiftidende)**	**Presbyterian Printing Press Limbe (Presprint)**
Environmental Ministries	No necessary because of the autonomy power vested to Danish municipalities	MINEP and Ministry of Wildlife and Forestry
Local Municipality	Aalborg municipality (Local Council)	Limbe Municipality (Limbe Urban Council)

Table 8.1: *Denmark and Cameroon case companies regulative institutions (adapted from field survey, 2008)*

Cultural-Cognitive Institutions	**Danish Crown Aalborg slaughterhouse**	**CAMSUS slaughterhouse Amanda**
Host Community	Aalborg community	Bamenda community
Neighbours	Although located out of the residential area, the company activities still affect the Svanningevej community. Has raised complaints of noise, odour and smell	Yes, the Nkwen Community. Little pressure on smell and noise
Cultural-Cognitive Institutions	**Nordjyske Medier Aalborg (Nordjyske Stiftidende)**	**Presbyterian Printing Press Limbe (Presprint)**
Host Community	Aalborg Community	Limbe Community
Neighbours	Although located on the highway, but also close to Langagervej. Raised complaint about the noise level from the printing machines	Although located along the highway, but is directly along the Limbe beach, thus the beach as neighbours. No pressure but company radical commitment for cleaning the beach from the slogan "keep the beach clean"

Table 8.2: *Denmark and Cameroon case companies cultural-cognitive institutions (adapted from field survey, 2008)*

Normative Institutions	**Danish Crown Aalborg slaughterhouse**	**CAMSUS slaughterhouse Amanda**
Local, national or international NGOs	Not quite, the act mostly as consultants because of the strong commitment of the municipal council in the company environmental activities	Local and national exist but no pressure due to lack of capacity building. International NGOs mostly focus on natural resources
The Media	Yes because of the Danish law on access to company environmental information, has raised a complaint on BSE disease found in cattle meat in 1999	Exist but mostly focus on community sanitation and hygienic activities. Not aware or lack the knowledge for the company environmental impacts
Universities, research institutes or training programs	Yes, but mostly internal training courses from machine supplier	Yes, BUC butcher's training courses
Normative Institutions	**Nordjyske Medier Aalborg (Nordjyske Stiftidende)**	**Presbyterian Printing Press Limbe (Presprint)**
Local, national or international NGOs	No, the act mostly as consultants because of the strong commitment of the municipal council in the company environmental activities	Local and national exist but no pressure due to lack of capacity building. International NGOs mostly focus on natural resources
The Media	Yes, because of the Danish law on access to company environmental information, but there exist no pressure	Exist but mostly focus on community sanitation and hygienic activities. No awareness or lack of knowledge for the company environmental impacts
Universities, research institutes or training programs	Yes, short training courses in Aalborg Tekniskole and with experts from machines suppliers	Yes, but mostly internal training course on the company's environmental activities

Table 8.3: *Denmark and Cameroon case companies normative institutions (adapted from field survey, 2008)*

Institutional framework conditions

Framework conditions	Denmark case companies	Cameroon case companies
Situative context	-It is due to the limit impose on Denmark to cut down its CO2 emission by the Kyoto protocol, that Denmark set stringent energy permits on the companies. The high taxes on energy consumption push the companies to seek alternative energy sources as well as technological innovations such as Nordjyske cleaner printing machine installed in 2001. -it is also due to international competitors in the beef and pork that Danish Crown have to certified for ISO 14001 and OHSA on its products	-it is due to Presprint management connection with the Swiss mission 21 that environmental protection is included in the company goals (which in a sense shows a bottle-up proactive pressure for environmental protection). -it is also due to CAMSUS's win-win constellations for manure, where not only environment but also economic interest is considered that could said to supported the company proper alternative disposal
Strategy	Mostly long-term strategy, e.g Danish Crown double loop learning strategy of 2-3 setting of targets and strategies	CAMSUS focus on short-term possible benefits to keep the organization in business whereas Presprint focus on long-term strategy e.g the construction of the wastewater bio-plant (western world concept)
Character of environmental problem	Environmental problems are known and cannot be hidden. Subjected to immediate action and lack of indiscriminate space for disposal. The carrying capacity of the environment is limited	Environmental impacts are not considered to have adverse effect on man and the environment as it could be in Denmark. The carrying capacity of the environment is not limited. Enough space for disposal because of their level of production. e.g CO2 emission is very less such that no one complains about source of alternative energy. there exist watersheds and streams such that dumping of waste cannot be notice or is felt by the population due to many alternative sources
Economic-technological conditions	-It is due to both companies financial capacity that they	-It is due to CAMSUS financial capacity that the

	could allocate budget for environmental works. More so, there is available municipal waste and incinerating plants for waste and wastewater disposal. Because these companies cannot afford to construct their own waste treatment plants -But Danish Crown has wastewater pre-treatment plant where the BOD content is reduced before sending to municipal treatment plant. This is to reduce the municipal tax on BOD	company could not construct a soak away tank for wastewater disposal or lack of municipal waste and wastewater treatment plants -Although there is no municipal waste treatment plant in Limbe, Presprint could still carryout research on alternative method for a treatment plant. Again this is due to the company's link with the Swiss mission 21
Cognitive-informational conditions	These companies are aware of the environmental impacts of their products, through the active involvement of companies in environmental works. There is available environmental knowledge through the companies' environmental coordinator who carryout research and development on how the companies can improve or solved their environmental impacts such as recycling of waste, product innovation etc. This is due to available financial resources	CAMSUS management is not properly aware of the adverse effect of its product environmental impacts on the environment. Lack of environmental knowledge or coordinator. This is due to the CAMSUS financial resources Although Presprint does not have an environmental coordinator, it is aware of its products environmental issues. There exist available knowledge and material resources to manage the products environmental issues. This is due to the company's ties with Swiss mission 21
Political-institutional conditions	A cultural habit from the state government: a way in which the danes usually behave by actively involving in environmental issues. Cooperation ithin companies through access to all information	Cultural habit copy from the state government. Centralized and corrupt, a way the Cameroonians behaves. Less concerns for the environment. thinking only on the living standard due to the poverty level

Table 8.4: *Denmark and Cameroon Case Companies institutional framework conditions (Adapted from field survey, 2008)*

8.1: Regulative institutions and their capacity to act upon the case companies environmental activities

Both Denmark case companies are located in Aalborg. They are regulated under the Aalborg municipal council environmental permits. But the Aalborg municipal council environmental permits are in line with the Danish EPA environmental guidelines, although the municipal council may alter some aspects of the guidelines depending on a company's environmental status. Thus the Aalborg municipal council set and supervises the implementation of permits. In both Danish Crown slaughterhouse and Nordjyske printing house, it could be seen that both companies are subjected to procedures on how to manage their environmental impacts. Different ways of waste disposal and treatment are recommended, sources of energy and limits for usage, limits to CO_2 emission and water consumption, noise levels are set, health and safety regulations are recommended, prove of an EM plan etc. In both cases, the municipal authority applies the command and control marketing instrument for implementation of these different environmental permits. In return, Aalborg municipal authority could monitor, assist and sanctions the companies because there is available resources such as; municipal waste treatment/incineration plant, environmental economic waste disposal companies, routine inspections for implementations and control of limits to pollute, environmental sensitive community that occasional report on wrongful acts of companies, law on access to information of the company environmental activities, obligation to prepare an annual environmental account etc. Aalborg municipality has environmental working groups with well trained employees in these areas of environmental issues. The have the available instruments to detect, measure and quantify the environmental impacts of these companies. In return, they sanctions and advice the companies if they deem it necessary.

As concerns the implementation of these policies by the case companies, it was found out that, both companies have set up an internal environmental management scheme. Danish Crown Aalborg operates under the Plan-Do-Check-ACT environmental management methodology, whereas Nordjyske Medier operation is based on a health and safety management scheme which was also found to incorporate other aspects of environmental issues. This shows their active involvement in environmental issues ot necessary because of their available resources but due to the stringent economic instrument in which they are subjected. In this respect, it could also be seen that most of

their internal environmental policies are in line with the Danish EPA environmental procedures. Nordjyske medier separate it waste into hazardous and recyclable and are disposed off by recommended company. Waste newspapers are recycled. Waste water is send to treatment plant before disposal. Nordjyske Medier switched to newer printing technology to reduced energy consumption, involvement of employees in environmental activities, regulate its temperature during cold and hot climate for energy saving. Nordjyske Medier cooperate with other printing houses in Denmark for malfunctioning of machine and alternatives. It chooses suppliers of machine, chemical and paper whose products are recommended as save for the environment. On the other hand, Danish Crown is proactive when compare with Nordjyske because of it environmental performance outlined in the previous chapter. Nordjyske Medier switching to cleaner production could in a way not necessarily to fulfill the Danish environmental permits but meet the high rate of demand for newspapers by its customers because the old machines could not print thousands of copies as it does today. Danish Crown goes beyond the Danish EPA environmental policies. This could be seen from the implementation of an ISO 14001 EMS and occupational health and safety management schemes, which are EU and international environmental policies. Danish Crown does these in order to meet up with the competition in the beef and pork markets not necessarily because of the Danish environmental permits.

In regards to the Cameroon case companies, they are regulated under separate regulative institutions based on their products. CAMSUS slaughterhouse is supervised by BUC, sub-department of MINEP and Ministry of Livestock, Fishery and Animal Industry Bamenda. As mentioned under the sanitation/environmental control activities and performance of CAMSUS slaughterhouse, each of these institutions regulates a portion of the company's environmental activities. They provide CAMSUS with their environmental permits and only monitor the implementation through routine inspections. In each case, the company is subject to pay an inspection fee, of which no inspection is carryout. On the other hand, Presprint Limbe, is also regulate by LUC, Sub-department of MINEP and Wildlife and Forestry Buea. As mentioned by the Presprint general manager, these institutions do not provide any procedures on how Presprint has to manage and control its environmental activities. Although the LUC disposed off Presprint wastes, the method

was found to be insufficient because it is just a method of transferring pollution from area to another. More so, in both Cameroon case companies, the exist no provision for limits to pollute, obligation on how to handled toxic and hazardous waste, insufficient waste disposal method, lack of sewage treatment plants, lack of instruments to measure, detect or quantify environmental/health and safety issues. This shows lack of institutional capacity building in order for the regulative institutions to follow-up the environmental activities of the companies. This is in connection with Cameroon weak environmental concerns at the company levels. Cameroon focus more on the environmental impacts of natural resources like oil extraction, forest logging, wildlife conservation or projects which could enhance the country's poverty and economic standard. When compare with the Danish EPA environmental procedures, inspection of a company's environmental activities are also subjected to inspection fee but the inspection is thoroughly carryout. But this inspection fee is also required of from few and big industries with huge environmental impacts whereas in Cameroon, all companies/industries are subjected to the inspection fee. More so, there exist financial, material, knowledge and skills for the Danish municipal councils to carryout their activities. Again this is based on the economic and development level of Denmark.

Based on the implementation of these state policies, CAMSUS has no internal environmental plan but depends solely on the procedures provided by governmental environmental institutions. The management is willing to be environmentally friendly but lack the necessary capacity support to implement the state policies. The company could not construct a soak away tank for waste water disposal, lack of modern slaughtering machines and tools to detect pregnant cattle. On the other hand, the levels of technological development could contrast this idea in the sense that, CAMSUS is just a simple slaughterhouse which slaughtered just an average of 25 cattle per day and slaughtering is perform manually with less energy consumption and waste generation. More so, most of its by-products are consumable. On like Danish Crown which operates the most modern slaughterhouse with machines and mechanical tools and its by-products are subjected to disposal. But still CAMSUS environmental/hygienic and sanitation aspects are insufficient, when compared with Danish Crown slaughterhouse Aalborg. This could be reflected in the two case country's technological advancement, where

Cameroon is simply a country that depends on transferred technology. But a close look at the area which CAMSUS has done some environmental management like the drying and selling of manure to farmers, it could be said that it is due to the win-win constellation where not only the environment was considered but the economic benefits to the company as well.

On the other hand, Presprint Limbe has set up an internal environmental plan and has proven to be active in areas of waste sorting and recycling. The design of an innovative sewage treatment plant for it waste water disposal. The involvement of Presprint in environmental activities could be judge from the source of the company. The company general manager is a printing expert with broad knowledge on environmental impacts of the company's products. More so, the company consults with Switzerland mission 21 on how to handle its environmental impacts. The cultural traditions of the European countries in handling environmental issues could be reflected in this case. A company that could detect a wrongful way of waste disposal by a municipal council is regarded as one with environmental knowledge. Since Presprint is located in a country where the enforcement of environmental activities is weak, the management do just what it think it is enough for the company's environmental works due to lack of pressure from environmental organizations

8.2: Cultural-Cognitive institutions and their capacity to act upon the case companies environmental activities

According to Scott (2001), "relevant cultural-cognitive institutions at the company level could be the affected community within which the case companies are located". the outcome of a company's environmental performance would depends on the communities' behaviour, their willingness to participate in the companies environmental activities and how their culture shapes the way the whole environmental management is perceived and what values they place on the environment. In both Denmark case companies, the target group is Aalborg community, but the neighbours within the vicinity of the companies are the immediate group which the activities of the companies affect them. In the case of Cameroon case companies, the Nkwen village is the affected community as regards to the CAMSUS cattle slaughterhouse in Bamenda whereas the Limbe community is the affected community for the Presbyterian Printing Press Limbe.

Binder (1996a) also assert that, “the most important task regarding the involvement of the affect communities in the case companies environmental activities should not be to change their cultural traditions but rather to improve informational and communicative capacities with them and this should be exhibits from the way the community has always interacted through community based discourse frameworks like; village meetings, elders meetings or routine meetings with neighbours on the company’s environmental activities. Based on the presentation of Danish Crown slaughterhouse Aalborg, it was found out that, the neighbours were not involved in the company’s environmental activities until they raised a complaint on noise, smell and odour. But as ascertain by the company’s environmental coordinator, the neighbours were hence fore consulted from time to time if the activities of the company do affect them. This shows an end-of-pipe technique for solving environmental issues, because Danish Crown could only react to these problems when the effect has already been felt by the neighbours. On the other hand, the CAMSUS slaughterhouse in Nkwen routinely consults with its neighbours for noise, smell and odour resulting from the company’s activities. Through these routine meetings, the neighbours were able to beneficial from the slaughterhouse waste water. This is ascertained in the fact that, the company’s waste water was used by the neighbours as substitute for fertilizer for their crop yield.

As concerns the printing companies, it was also found out that, Nordjyske Medier’s neighbours had raised complaints about the noise level from the printing house. But the complain was channel to the Aalborg municipal council, which in return contact the company before measures were taken. This shows the lack of involvement or concerns on the part of the company’s management for the community, whereas, the Presbyterian Printing Press Limbe neighbour is the Limbe beach. But from the company’s slogan “keep the beach clean” it shows that there is routine cleaning of the beach.

Binder (1999a) also asserts that, “the most important thing is the discourse among the affected community about environmental protection as this goes a long way towards environmental capacity and their willingness to participate especially in identifying unaccepted methods of waste disposal, level of noise produced by production machines,

dumping of waste to nearly streams etc, by these product production companies'. In this light, it could be said that the Danish affected communities are aware of the case companies environmental activities based on the Danish law on access to companies environmental accounts, but they could only raised a complain when a problem arises and affects them. On the other hand, it could be seen that, the Cameroon affected community particularly the Nkwen community is not aware and do not have concerns for the company's environmental impacts. This could be agreed in cases where CAMSUS directly disposed off its waste water in the nearby water body and the unhygienic conditions of handling fresh meat by the butchers (refer to picture showing method of transportation of meat to the market). Again this is ascertained with the poverty level of the Cameroon people and the centralized political system. Citizens could only think how the company's activities could be beneficial to them rather than spending time to follow-up on the company's environmental impacts. Their time is devoted on their farms activities.

8.3: Normative institutions and their capacity to act upon the case companies environmental activities

According to Scott (2001), "normative institutions may include: local, national or international non-governmental organization with concerns on a particular environmental issue". These institutions may not be affected by the activities of the case companies, but they will still be interested in the case company's environmental activities that affect man and the environment. It was found out that, both Danish case companies have never received any pressure from the above mentioned normative institutions. This could be account for with the fact that, the local, national and international non-governmental organizations in Denmark are instead consulted by these companies when faced with some environmental problems. The lack of involvement of these NGOs is due to the autonomy right of the municipal authorities over Danish companies. The municipal authorities constantly monitor the environmental activities of the case companies. As concerns available capacity, these non-governmental organizations are well stable in terms of resources. They concentrate on research in areas of technological innovation, cleaner production, Life Cycle Assessment of products, eco-design of product etc, which could be economically and environmentally beneficial to the case companies.

On the other hand, the CAMSUS slaughterhouse is operated by CAMSUS which is itself a sustainable food NGO. CAMSUS has not considered the goals of sustainability, during the daily activities of the slaughterhouse. The Company do not take any measure when pregnant cattle are slaughtered, which in this case is against animal welfare situations. More so, the company did not considered the life of the living organisms in the water body in terms of oxygen depletion before disposing its waste water. But as mentioned in the presentation of CAMSUS slaughterhouse, the management is against the slaughtering of pregnant cattle, but it's up to the veterinary inspector to detect pregnant cattle. On the other hand, there is lack of detective instrument for the veterinarians although they have available knowledge and skills. Whereas Danish Crown veterinarians conduct cattle pregnant test before they are convey to the slaughter line. CAMSUS could not construct a soak away tank for waste water disposal because of lack of financial capacity as ascertained by the company's management. This is due to the technological level of Cameroon when compare with Denmark. In regards to the Presbyterian printing press; the company has never got any advice or pressure from non-governmental organizations as ascertained by the plant general manager: This could be due to their non-existence because of the stringent state law for the formation of such organizations in Cameroon or the lack of capacity support from the state and international communities (also see presentation of Cameroon).

Scott (2001) assert that "other relevant normative institutions may also include: universities, research institutes, or training programs which may have expertise with general interest or knowledge in the use of environmental management tools in solving the case companies environmental issues. He also added that it could be a scientists or experts in a particular field, whose knowledge could contribute to improving the environmental performance of the case companies". In this respect, it was found out that Nordjyske Medier employees routinely attend training programs in Aalborg Tekniskole in some operational and maintenance skills of the printing machines. Nordjyske Medier machine suppliers also sent in their experts from time to time to enlightened the employees on how to detect malfunctioning of machines. In both Danish case companies, these normative institutions do not involve in their environmental activities. This is due to the fact that, most of the case companies employees are professional and experts who

have specialized in each area of the company's operational activities. These companies employed environmental coordinators, printing experts, maintenance experts, slaughtered experts, which made it not necessary for the normative institutions to interfered or be consulted by the management. This is due to the companies available financial capacity to employ these experts rather than waiting for them to mount pressure on their environmental issues.

This is quite contrasting as regards the Cameroon case companies. CAMSUS slaughterhouse butchers do undertakes training to be classified as well slaughtered butchers; Cameroon normative institutions do not have sufficient institutional capacity building to carryout their duties. The Presbyterian Printing Press Limbe, do routinely sent their employees for training in some aspect of the company's environmental activities. More so, there exist maintenance departments with well trained experts that constantly check malfunctioning of the printing machine. But there is lack of pressure from these normative institutions in Presprint environmental activities due to the non-existence of these institutions or lack of institutional capacity building.

There has been a form of pressure from the Danish media on the case companies' environmental activities. This could be seen from the media radical action toward the detection of BSE **(**Bovine spongiform Encephalopathy) disease in Danish Crown cattle meat in 1999. But this pressure is not enough because the media only take action after the effect has been felt by the society. In another sense, the Danish case companies actively take cares of their environmental impacts such that no complains could be raised by the media. On the other hand, the Cameroon media mostly focus on cities clean-up campaigns rather than the wrongful environmental activities of the case companies. In this case, it is due to lack of journalists with well environmental knowledge or the involvement of the Cameroon media in company's environmental activities.
There has been no sign of pressure from both Denmark and Cameroon consumers in terms of the case companies' environmental activities. In most cases, the consumers are not either aware or lack the basic environmental knowledge as regards the activities of the case companies.

Chapter 9 Conclusion and Recommendations

9.1: Introduction

The focus of this thesis report has been on why the environmental management of Denmark and Cameroon different. This was in an attempt to answer the author initial question

> ***"Why is the Environmental Management in Companies in Denmark and Cameroon Different?"***

In carrying out this research, several methods, tools and theories were employed, for example the capacity building concept and the institutional theory were used as frameworks for comparative analysis. The research question is divided into two segments, where the first segment which is "why is the Environmental Policy and Management of Denmark and Cameroon different" is answered using Janicke and Weider capacity model for a country capacity for environmental policy and management, while the second part which is "why is the Environmental Management in Companies in Denmark and Cameroon different" is answered using the Scott institutional theory while reflecting on capacity model.

As discussed earlier, the comparative analysis of Denmark and Cameroon using Janicke and Weider capacity model for environmental policy and management portrayed Denmark as a country that exhibits the attributes of the various frameworks for environmental policy and management.

On one hand, Denmark as a whole can be assumed to be proactive based on its stated environmental performances especially since the Stockholm Conference in 1972. But in spite of all these actions at the national level, there are still some weaknesses at the Danish company's level for the implementation of the environmental permits. On the other hand, Cameroon is aware of its environmental issues, but the performance of its environmental duties is in a way influence by many factors as outlined in the previous chapters. These same factors also affect or influence the companies' implementation of the Cameroon environmental permits.

Based on the results from the analysis at both national and company levels carried, the following reasons and differences were found out to have contributed to effectiveness or ineffectiveness for the formulation of environmental policy and management at national level and efficient or inefficient implementation of the countries' environmental permits by the case companies.

- ***The socio-economic development of Denmark and Cameroon-*** Denmark stand a better chance to formulate environmental policies as well as its implementation both at country and company levels due to its high economic development standards as compare to an unstable economic development status of Cameroon. More so, Cameroon is interested in environmental issues that affect only its potential natural resources, which increase its GDP or a project that could employ most of its citizens in order to alleviate poverty.
- ***The commitment of Denmark and Cameroon political system in environmental policy and management-*** environmental issues are not totally a priority to the Cameroon government, as the parliament focus more on how to increase its economic standards in order to reduce poverty and unemployment. The present situation of Cameroon could justify this. But, as seen in the presentation of Denmark, the involvement of the Danish parliament in environmental issues gives Denmark that concerns to incorporate environmental aspects into its overall strategic plans.
- ***The cultural traditions of Denmark and Cameroon-*** the Danes has a long tradition of actively working in groups, copying from other close cooperative countries on how to management their environmental issues. The involvement of industries and other organizations in the formulation of environmental policies and the active cooperation of companies with municipal authorities in solving environmental issues has been a prominent factor to say that Denmark is proactive in environmental issues than Cameroon that has a diverse ethical cultures where consensus is difficult to meet or no proper cooperation among industries and environmental organizations.
- ***The level of environmental awareness of Denmark and Cameroon society***- in general speaking, Cameroon still believe that their level of environmental pollution is

low due to their development level as well as their available large space which could handled the waste generated or their rich diversity standards. Thus, their focus on a single loop learning aspect rather than the combination with a double loop learning principle. Whereas the pressure on Denmark landscape could be seen as a prominent factor for sensitization of the general public on the future effects of their activities on the landscape.

- ***Insufficient pressure from local, national and international communities on the case companies as regards environmental management-*** In both Denmark and Cameroon there is absolutely lack of pressure from these organizations to reinforce the implementation of the country's environmental permits by the various companies
- ***Situational context of both the case countries and companies-*** Both countries are active mostly in environmental issues which in one way or the other has an impact on the overall country economic. At the company level, the Danish companies react on some environmental regulations or permits because they want to keep a better image of the company or to face their competitors. Whereas the Cameroon case companies are searching for opportunities to make more profits rather than focusing on solving their products environmental impacts.

9.2: How useful the capacity model is for countries and companies

Although Scott institutional theory is used as part of the analysis for this report, it was just to enable the researcher to identify the main institutions within which the case companies are embedded because knowing these institutions facilitate the understanding of the various framework conditions and obviously the outcome of the capacity model.

The usefulness of Janicke and Weider capacity model in this report or for comparative environmental policy and management between countries or companies' environmental management could be summarized as follow:

a) The concept stresses the importance of objective limitations on successful intervention. They stressed that failure in environmental policy cannot be explained just by the wrong choice of instruments or other kinds of "intervention failure" (OECD, 1992), nor the only kind of action, but also its structural characteristics which matter. They added that the availability of other options has

to be considered if a specific policy outcome has to be explained not the only choice. In this regards, it could be seen that, Denmark and Cameroon uses economic instruments to enforce the case companies to implement their environmental permits. But it was found out that, the outcome of these companies' environmental performance does not necessarily improve or depends on these economic instruments, but on other factors such as product competition, a better company image, economic enhancement, the availability of resources, situative context, technological development, cognitive institutional aspects etc. In this light, this capacity model could act as a stepping stone for countries wishing to find out why some companies are able and some not able to meet up with their environmental permits, rather than increasing or prosecuting companies on environmental wrongful acts with the use economic instruments. If this is done, there will be the possibility of both countries to either change their environmental strategy or some environmental budget could be allocated to support these companies and this will ultimately reduce the country's overall environmental burden.

b) ***Secondly, its relationship to the concept of development. Here they described the process of capacity building as an outcome of political development or modernization with the view that political development or modernization lead to institutionalization and internalization of new stages of problem-solving capacities in reaction to societal challenges or crises.*** **Thus, this point should not be limited just to the developing nations but also to the industrialized world**- the political system of Cameroon review can be seen as a very long existing close system where norms and rules are difficult to change. In this regards, there is lack of modernization and hence weak political development in the field of environmental policy and management. Hence, employing this capacity model by the Cameroon government could be a very good strategy not only in regards to the openness of the political system but will also favour the outcome of economic, cultural and environmental issues. If this process is implemented at the country level, it will obviously reflect in the companies since they are embedded within the political system. On the other hand, the capacity model favours Denmark in the sense that, there is constant political development and modernization. There is constant institutionalization and internalization of new stages of capacity enhancement for solving environmental problems that are due to societal challenges. The companies are constantly reacting to new techniques of changes environmental problems

not only due to the openness of the Danish political system on environmental issues but also due to marketing forces.

c) ***Thirdly, its provides a tool for comparison between the different abilities of different countries as well as the degrees of development of these abilities within a country***- this could be found in this report, where the different abilities of Denmark and Cameroon in formulating environmental policies as well as management the environmental issues were found not to be solely the duty of the environmental institution, but a broad inter and intra coordination and cooperation of the various state institutions. In most researches, it is always assumed that failure in handling environmental matters are solely due to the inabilities of environmental institutions neglecting other institutional influences such as the political system, economic development and cultural aspect of a country or company which are the backbones of the outcome of successful environmental issues. Thus, with Janicke and Weider capacity model, a country or a company can easily figured out its strength, weaknesses as well as threats and opportunities. Thus if a company needs to knows its SWOT components using the double loop learning principle, it should therefore employed the capacity model with the focus that not only the environmental units is responsible for the overall company's environmental management but other departments and stakeholders have to be incorporated for a better outstanding result on environmental matters.

d) ***Lastly, its practical orientation as well as its greater realism regarding the difficulties of problems that have not yet been solved-this is in regards to environmental problems which are difficult to solve***. At the national level, formulating or setting up an environmental policy might be so hard to find, if the various institutional framework conditions are not well stabilized. For example, the Cameroon National biodiversity status plan which was designed since 1999 and has yet to be fully implemented. If the Cameroon government could employ the capacity model practically by investigating the different institutional conditions, then there will certainly be a greater understanding why the plan has not been enable to be implemented and measures could therefore be taken to amend these factors. On the other hand, the greatest environmental problem faced by Denmark is the cutting down of its carbon dioxide emission level. Employing this capacity model to assessment the factors or conditions which are hindering the companies in meeting their required environmental permits could open up a

new mode of handling energy consumption, rather than depending on economic instruments to push the companies to minimized or shift to alternative or innovative aspect of energy consumption. As mentioned before, some companies pay all environmental taxes, fines if they are allow to pollute, so it is not necessarily due to the presence of the economic instruments that could change a company to be environmental conscious, but these factors mentioned above.

Bibliography

Arne Remmen and Mikkel Thrane, 2005: Life Cycle Thinking: Tools for Sustainable Development: Prelimiary edition, pp 11. Aalborg University, Denmark

Bent Christensen and Cyldendal Leksikon, 2007: Denmark Supervision of the Administration. Ministry of Foreign Affairs of Denmark http://www.denmark.dk/en/menu/AboutDenmark/GovernmentPolitics/ (Accessed 13-12-2007)

Binder Claudia., 1996, The early recognition of environmental impacts of human activities in developing countries, Ph.D. Dissertation 11748, Swiss Federal Institute of Technology, Zürich.

Biswas, Asit K and S.B.C Agerwala 1992: Environmental Impact Assessment for developing countries. Butterworth-Heinemann Ltd: London UK

Britain Standard Institute, 1994: Britain Standard for Environmental Management System: BS7750.http//:www.eiris.org/files/research%20publications/emsperformanceoct05.pdf (Accessed 02-10-2007)

Bue Nielsen, 2007: Denmark, Danish National Encyclopedia. http://www.um.dk/Publikationer/UM/English/Denmark/index.asp (accessed 15/12/2007)

Cameroon Constitution: https://www.cia.gov/library/publications/the-world-factbook/geos/cm.html (Accessed 29-10-2007)

Cameroon NGOs among African NGOs: http://unpan1.un.org/intradoc/groups/public/documents/UN/UNPAN007726.pdf (Accessed 19-12-2007)

Cameroon Profile, 2007: http://news.bbc.co.uk/1/hi/world/africa/country_profiles/1042937.stm (Accessed 29-10-2007)

Cartsen Hunding, 2007: Denmark Geography and the Environment, Ecosystem and Environmental protection. http://www.um.dk/Publikationer/UM/English/Denmark/kap5/5-6.asp (accessed 12/12/2007)

Chebo K. Asangwe, 2006: The Douala Coastal Lagoon Complex, Cameroon: Environmental Issues. http://www.fig.net/pub/figpub/pub36/chapters/chapter_9.pdf (Accessed 12-12-2007)

Chicago Manual Style, 2003: Author-Date-System. http://www.libs.uga.edu/ref/Chicago.html. (Accessed 31-10-2007)

Daniel Gbetnkom, 2001: Deforestation in Cameroon, and Poverty in the Rural Zone. Faculty of Economic and Management, University of Yaounde II

http://www.csae.ox.ac.uk/conferences/2004-GPRaHDiA/papers/2p-Gbetnkom-CSAE2004.pdf (Accessed 21-12-2007)

D.Jepsen and C. Tebert, 2003: Best Available Techniques in the Printing Industry: Federal Environmental Agency, Berlin, Germany. http://www.umweltdaten.de/publikationen/fpdf-1/2457.pdf.(Accessed 28/10/2007).

Denmark State of the Environment, 2005: Danish Ministry of Environment. http://www2.dmu.dk/1_viden/2_Publikationer/3_Ovrige/rapporter/MTR2005_folder_UK.pdf (Accessed 12-10-2007)

Environment at a Glance, 2004: Cameroon. http://siteresources.worldbank.org/INTEEI/Data/20799687/Cameroon.pdf (Accessed, 15-12-2007)

Environmental Risk: http: //www.junk-mail.org.uk/articles/printing.html.(accessed 15-10-2007)

European Commission, 2006: Wood, Paper and Printing. Forest-based and Related Industries in the EU

European Commission, 2003: Sustainable Forestry and the European Union

Explanatory research, 2004: hhtp/engines-fuels.ifp.fr/IFP/en/researchhindustry/refiningpetrochemicals/ac04_05.htm (Retrieved on 01-11-2007)

Global Village Cameroon, 2006: The Participation of Civil Society in Hydropower Development in Cameroon. http://www.managenergy.net/indexes/I50.htm (Accessed 13-12-2007)

Gunnar Gjelstrup and Cyldendal Leksikon, 2007: Denmark Judicial System. Ministry of Foreign Affairs of Denmark, http://www.denmark.dk/en/menu/AboutDenmark/GovernmentPolitics/ (Accessed 13-12-2007)

Henrik Zahle and Cyldendal Leksikon, 2007: Denmark Government and Politics. Ministry of Foreign Affairs of Denmark, http://www.denmark.dk/en/menu/AboutDenmark/GovernmentPolitics/ (Accessed 13-12-2007)

Ingvar Andersson, 1998: Environmental Management Tools for SMEs: Environmental Issues Series, Centre for Corporate Environmental Management (CCEM), European Environmental Agency.

Indicators of Denmark and Cameroon:

www.denmark.dk and http://www.infoplease.com/ipa/A0107382.html (Accessed 15-11-2007)

ISO 14001, 2004: Environmental Management. Requirements with guidance for Use: Course material-Corporate Environmental management, 2006.

ISO Survey of Certifications, 2005: http://www.iso.org/iso/en/iso9000-14000/certification/isosurvey.html (assessed, 20-12-2007)

Journal of Food Science, 2004: *Food Waste Management by Life Cycle Assessment of the Food Chain*. Volume 69 Page CRH107 - April 2004 http://www.blackwell-synergy.com/doi/abs/10.1111/j.1365-2621.2004.tb13342.x (assessed 14-11-2007

J.de Wit et la, (1996): Management of Waste from Animal Product Processing. FAO Corporate Document Repository, January 1996, Wageningen, Pg 2 http://www.fao.org/WAIRDOCS/LEAD/X6114E/x6114e01.htm#TopOfPage. (accessed 14-11-2007)

Karen Poder and Anne Tortzen, 1997: Denmark's Policies on the Environment, The Royal Danish Ministry of Foreign Affairs/ the Ministry of Environment and Energy.

Lars Bille and Cyldendal Leksikon, 2007: Denmark Control Measures. Ministry of Foreign Affairs of Denmark, http://www.denmark.dk/en/menu/AboutDenmark/GovernmentPolitics/ (Accessed 13-12-2007)

Louse Story, 2006: The Hidden Life of Paper and its Impact on the environment, http://www.nytimes.com/2006/10/25/business/media/25adco.html?ex=1319428800& en=09ac79cfbc5f3df4&ei=5088&partner=rssnyt&emc=rss (accessed 17-10-2007)

Maria Enroth, 2001: Tools for Eco-efficiency in the Printing Industry, http://www.nada.kth.se/utbildning/forsk.utb/avhandlingar/lic/011213.pdf (accessed 20-11-2007)

Martin Janicke and Helmut Weidner, 1996: National Environmental Policies. A Comparative Study of Capacity-Building, International Profiles of Changes Since 1970

Mikkel Thrane &Jette E, Halgaad, 2005: Cases of Cleaner Production. Tools for Sustainable Development: Prelimiary edition. Aalborg University, Denmark

Mikkel Thrane and Arne Remmen, 2005: Cleaner Production. Tools for a Sustainable Development, Preliminary Edition, Aaborg University, Denmark

MIENP, 2005: Cameroon National Biodiversity Status Action Plan, Third National Report. http://69.90.183.227/countries/?country=cm (Accessed 21-12-2007)

Ministry of Foreign Affairs of Denmark, 2007: Factsheet Denmark. http://www.netpublikationer.dk/UM/6712/pdf/1_Denmark_-_an_Overview.pdf (Accessed 15-10-2007)

MINEF/UNIDO, 2001: Main Marine Ecosystems of the Gulf of Guinea. Cameroon Coastal Profile, http://www.unido.org/userfiles/hartmany/cameroun-E.pdf (Accessed 19-12-2007)

Mogens Moe, 1995: Environmental Administration in Denmark, Danish Environmental Protection Agency/Ministry of Environment and Energy.

Nico Siegenthaler and Tobias Graf, 2003: Optimizing waste flow in a printing plant at Limbe, Cameroon. http://www.iees.ch/EcoEng061/EcoEng061_Siegenth_Graf.html (Accessed 18-11-2007)

Nick Moore, 2000: How to do research. The complete guide to designing and managing research projects.3rd edition, Library Association Publishing, London

OECD, 1995: Encouraging Environmental Management in Industry. Science and Technology Industry. Business and Industry Forum Series.

Paul D. Leedy &Jeanne Ellis Ormrod, 2001: Practical research: Planning and design, 7th edition, Merrill Prentice Hall

Pearce, D W, Markandya, A and Barbier, E B 1989: Blueprint for a Green Economy, 3rd ed, Earthscan Publications Ltd London.

Piers Blaikie and John Mope Simo, 1998: Cameroon's Environmental Accords: Signed, Sealed, but Undelivered: Engaging Countries, by Edith B. Weiss and Harold K. Jacobson, the MIT Press, Cambridge, Massachusetts London, England

Recorded Cassette, 2006: Interview Information with Danish Crown Aalborg Environmental Coordinators

Recorded Cassette, 2007: Interview Information with Nordjyske Medier Plant Manager

Recorded Cassette, 2008: Interview with Cameroon case Companies

Richard Welford, 1998: Corporate Environmental Management: Systems and Strategies. Second Edition

Robert K. Yin, 2003: Case study research-designing and methods, 1st edition. Applied social research methods series, Sage Publications Inc., Thousand Oaks

Sama Nchunu Justice, 2003: Criminal Law and Environment, Prosecutors, Inspectors and NGOs in Cameroon. http://www.inece.org/conference/7/vol1/Sama.pdf (Accessed 15-12-2007)

Søren Lokke, 2006: Course Material for Politic, Institutions and Discourse, Aalborg University Denmark

Søren Peter Iversen, Thomas Jørgensen, Neel Gammelgård & Iben Gammelgård, 1997. Writing seminar reports-requirements and guidelines, 1st edition, Samfundslitteratur, Narayana Press

UNDP 2000: The State of the Environment: Past, Present, Future, 30 years UNEP Global Environment Outlook-3 http://www.partnerships.stockholm.se/press/UNEP30Years.pdf (Accessed 20-09-2007)

UNDP/UNEP/GEF, 2001: The Integration of Biodiversity into National Environmental Assessment Procedures: National Case Studies, Cameroon. http://www.unep.org/bpsp/EIA/Case%20Studies/Cameroon%20(EIA).pdf (Accessed 20-12-2007)

UNEP 2005a: Cleaner Production-Key Elements. www.uneptic.org/cp/understanding cp/home.htm (Accessed 03-10-2007)

UNEP 2005b: Cleaner Production-Related concepts www.uneptic.org/cp/understanding cp/concepts.htm (Accessed 03-10-2007)

World Bank, 2002: Upgrading of Low Income Settlements Country Assessment Report, Cameroon. http://web.mit.edu/urbanupgrading/upgrading/case-examples/overview-africa/country-assessments/download/CAMEROON.pdf (Accessed 29-12-2007)

Victor Andersen, 2007: Denmark Geography. Ministry of Foreign Affairs of Denmark http://www.denmark.dk/en/menu/AboutDenmark/GovernmentPolitics/ (Accessed 13-12-2007)

Appendices

Resumé af virksomhedens egenkontrol.

Indhold i vilkår	Krav til antal målinger/registreringer	Resultatet af målinger/registreringer.	Antal og omfang af overskridelser af kravværdier/grænse-værdier.
Maksimal vandføring må ikke overskride 300 m3/døgn	6 årlige prøver	Seneste analyse er øverst 128 m^3 /døgn 128 m^3 /døgn 144 m^3 /døgn 146 m^3 /døgn 169 m^3 /døgn 199 m^3 /døgn 192 m^3 /døgn	Ingen overskridelser
pH skal ligger i intervallet 6,5 – 9	6 årlige prøver	Seneste analyse er øverst 7,12 6,93 6,93 6,96 7,28 6,94 6,74	Ingen overskridelser
Temperatur må ikke overskride 50 °C	6 årlige prøver	Seneste analyse er øverst 24 °C 26 °C 18 °C 20 °C 23 °C 24 °C 25 °C	Ingen overskridelser
Bundfald må ikke overskride 50 ml/l	2 årlige prøver	Seneste analyse er øverst 14 ml/l 6 ml/l	Ingen overskridelser
Koncentrationen af olie/fedt må ikke overskride 200 mg/l	6 årlige prøver	Seneste analyse er øverst 340 mg/l 500 mg/l 430 mg/l 780 mg/l 230 mg/l 670 mg/l 1100 mg/l	6 overskridelser
Nitrifikationshæmningen må ikke være over 50 %	2 årlige prøver	Seneste analyse er øverst 10 % 20 %	Ingen overskridelser

Appendix 6A: Resume of Company self policing system/self-checking,(Green account of Danish Crown Aalborg, 2004/05).

Redegørelse for virksomhedens miljøforhold.

Baggrunden for de følgende oplysninger er nærmere beskrevet i afsnittet "læsevejledning" i dette regnskabs Koncerndel.

Nøgletal Aalborg. (18)		**2004/05**	03/04	02/03	01/02	00/01	Enhed
	El.	**22,6**	20,8	19,9	17,8	20,6	KWh./kreatur.
Kreaturslagteriet	Varme.	**28**	27	27,6	22,3	28,3	KWh./kreatur.
	Vand.	**523**	507	458	457	471	l./kreatur.

Aalborg		**2004/05**	03/04	02/03	01/02	00/01	Enhed.	Datakilde.
Råvarer.	Kreaturer.	**74.722**	80.376	79.218	81.642	68.115	Stk.	M
	Kød fra andre afdelinger.	**4.155**	4.782	4.884	2.800	-	kg.	M
Energi.	El.	**2.099**	2.143	2.144	2.113	2.055	MWh	M
	Naturgas.	**188.124**	195.718	197.823	162.727	170.727	m^3	M
Hjælpestoffer.	Vand.	**39.117**	40.711	36.283	37.332	34.669	m^3	M
	Kemikalier til lugtreduktion. (1)	**0**	0	3.550	-	-	kg.	M
	Rengøringsmidler. (2)	**7,62**	7,8	9,7	10,6	10,7	Ton.	M
	Klorforbrug. (3)	**0,3**	2	2,4	-	-	Ton.	S
	Kemikalie til spildevandsrensning	**0**	8,1	40	-	-	Ton.	M
Færdigvarer.	Oksekød.	**22.514**	24.092	23.935	22.651	17.059	Ton.	M
	Ikke spiselige biprodukter. (5)	**14.214**	15.485	15.856	16.350	12.574	Ton.	B
Affald.	Affald til biogasanlæg.	**3.967**	5.100	5.985	6.992	6.137	Ton.	M
	Pap/papir til genanvendelse.	**2**	3	4,3	3,3	9	Ton.	M
	Anden affald til genanvendelse.	**35**	10	37	20	9,6	Ton.	M
	Affald til forbrænding.	**43**	42	2	46	70	Ton.	M
	Affald til losseplads.	**0**	9,6	7	-	-	Ton.	M

Grønt regnskab Danish Crown 2004/05

Aalborg		**2004/05**	03/04	02/03	01/02	00/01	Enhed.	Datakilde.
Farligt affald.	Spildolie.	**400**	624	0	363	2.000	Liter.	M
	Elektronikskrot.	**0**	0	0	350	-	kg.	M
			50	0		0	Stk.	
	Lysstofrør.	**22**			35		kg.	M
	Andet	**0**	0	0	211	0	kg.	M
Udslip til luft fra virksom-	CO_2	**416**	447	438	364	382	Ton.	B
Hedens energi-produktion.	SO_2	**0**	0	0	0	0	Ton.	B
	NO_x	**0**	0	1,1	1	1	Ton.	B
	Volumen af røggas.	**1.848.000**	1.923.000	1.943.000	-	-	N- m^3 tør røggas	S
Udledning til kloak.	BI_5. (7)	Måles ikke længere		14,5	27	47,6	Ton.	M
	COD	**149**	103	-	-	-	Ton	
	Total kvælstof.	**9,7**	7,9	3,7	7	10,4	Ton.	M
	Spildevand.	**31.864**	28.505	33.022	32.084	35.772	m^3.	M

Appendix 6B Account for company environmental conditions from 2001-2005 (Green account of Danish Crown, Aalborg, 2004/05).

FIELD WORK

A COMMON QUESTIONNAIRES FOR CASE COMPANIES

Interviewer:

Who is the respondent?

What is his title?

What is his background?

How long has he been working at the case company?

SECTION A:

1. When was the company formed?
2. What is the main activity performed by your company?
3. Do this company carryout any other activities, other that the one mentioned above?
4. Is it a privately or government owed company?
5. How many employees are employed in this company that takes part in the daily activities of the company?
6. Could you estimate the average capital or the turn over of the company annually?
7. What is the company culture? That is, the mission, rules, norms, and values (if there are on paper then I will be grateful to get a copy)
8. How is the company organized? That is the organizational structure of the company.(from top manager to the employees)?
9. Does the company aware that its product production processes has an effect on man and the environment?
10. Does the company have an environmental coordinator, who is charged of the company's environmental issues like: waste disposal, plant cleaning, hygienic conditions, complains from neighbours, non-governmental environmental organizations or governmental environmental regulators?
11. If yes, what are the company environmental policies?
12. Are the employees aware of the environmental impacts of the company, if yes, are they involved in the daily environmental works of the company?
13. How often does the company discuss environmental issues with its employees?
14. Does the top management take part in formulating the environmental policies or discuss about the environmental impacts of the company with its employees?
15. What is the name of the government or municipal authority in charge of regulating the company environmental performances?
16. Does this governmental authority have some environmental guidelines policies which the company followed in course of their activities? (Would like to get a copy)?
17. Does this governmental authority assist the company with any financial or material resources which the company can use to facilitate its environmental activities?
18. If yes, which type of assistant?
19. Has the company ever been charged with fine, caution, penalty, suspensions, or banned on any wrongful environmental impact activities?

20. If yes, name them and the types of charges?

SECTION B

Management

- How does the organizational structure look like?
- What is the relationship of the management with the workers vis-à-vis
  - Communication
  - Working conditions/ Training
  - Feedback mechanism
- What are your company norms? (or how would you characterize your company culture?)

Production process

- Can you give us a run down of your production process/highlight on the hotspots?
- Which are the by-products generated and how are they used?
- Which part of the production process consumes the highest amount of energy?
  - Break down the energy consumption pattern?
  - How do you handle spills?
  - Environmental Impacts
- Which environmental impacts results from your activities?
- Which of them are significant and why?
- When do you start working with reducing environmental impacts and why?
- What have you done to reduce these impacts (give examples)?
- Which problems do you faced with them?
- What are your improvements with these problems?
- What do you think about your environmental performance?
- Do you share environmental ideas with other printing firms?
- Do you have an Environmental management system or plan which guides your activities?
  - if yes, what is the level of implementation, is it effective?
  - How is the organization of the environmental activities coordinated?
  - Is it the responsibility of a single person or more?
- Have you carried out a general assessment of the impacts of your production process on the immediate environment?
- Have you considered environmental impact in other parts of the product chain?
- Have you taken the initiatives to improvements? That is becoming proactive
- Have your employees undergone any education (training programme), on how to minimize environmental impacts (reducing energy consumption, water used, waste generated)?
- What is the environmental policy and goals of your mother company?

Stakeholders

- Who are the main stakeholders?

- Are you faced with environmental demands or pressure from; customers, environmental authorities, neighbours, suppliers or NGOs?
- How do you cooperate with them on environmental matters?
- How is your relationship with them today?

SECTION C: TELEPHONE INTERVIEW QUESTIONS WITH PLANT MANAGERS/ENVIRONMENTAL COORDINATORS

1. What is your title/position in the Company and your educational background?

2 For how long have you been working in this position?

3 How many of you work in the environmental department?

4 What are the major threats faced by your company in term of environmental changes?

5 What organisational changes has the company undergone for the last 3 years?

6 Please can you identify some of your major stakeholders? What is your relationship with them?

7 How does each of these stakeholders contribute to the growth of the company i.e. how much influence (type of influence)? (How do these stakeholders react as concerned environmental matters and what is your respond-use for all stakeholders)

Customers

- What environmental demand is posed by the customer on the company
- what do you do with the demands

Local authorities

- Do you cooperate with the local authorities?
- What types of environmental regulation do you compliance with?
- Is it hard or strict to compliance with these regulations?
- Is it relevant for the purpose of you product production activities?
- Do you have some financial or material support from them

Non-governmental "green" organisations (NGOs)

- Have any NGOs ever come up to you complaining that the activities of your company are causing harm to the surrounding environmental and human health?
- Do you consult with them, concerns the environmental impacts of your company with the aim of seeking for solutions?
- Has the media ever raise complains about your company in terms of its impact on human health and safety?
- Have you ever gone in public through the media or newspaper publication to talk on the various ways you solve the environmental impacts of your product?

Labour organisation

- Are your employees represented by a committee which acts on their behalf?

- If, yes do you often hold meetings with the committee and help to solved their problems?

Competitors

- Who are your competitors?
- How are they doing as concern environmental performance?
- What are you doing to meet up with competition?

Suppliers

- Environmental demands from paper suppliers?
- Machine suppliers?
- Suppliers of cleaning agents?

7. What are your environmental activities?

- Past
- Today
- Future

8. What is your environmental strategy and policy?

Technology

- Is the company using old or new technology
- Do you place environmental demands on machine suppliers?

Future prospects

- What are your plans for your environmental activities in the next years?

Environmental Health and Safety