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Study

COFFEE AND THE ENVIRONMENT

AN OUTLINE

Executive Board/
International Coffee Council
15 - 18 May 2000
London, England

FOREWORD

1. In line with the Organization's policy of cooperation with United Nations agencies (Article 16 of the Agreement) and the provisions of Article 25 of the Agreement, document EB-3723/99 outlined a preliminary framework of studies to be conducted on coffee, environment and international trade.

2. At its meeting in September 1999, the Board requested the Executive Director to proceed with further discussions with the United Nations Environment Programme (UNEP) on timetables and financial implications of carrying out such a programme of studies. In December 1999 a Memorandum of Understanding for cooperation was signed between the UNEP and the ICO. The United Nations Environment Programme, Division of Technology, Industry and Economics, will contribute US$20,000 to prepare a preliminary outline document on the first subject for study as proposed in document EB-3723/99, i.e. "Study on environmental issues relating to the coffee chain through a life-cycle approach".

3. A meeting at the ICO headquarters will be held on 18 May 2000 to conclude guidelines for such a study. The following excerpts of the outline document prepared by EDE Consulting for Coffee summarise basic definitions on the "life-cycle" concept and "life-cycle assessment" approach, both tools devised to identify measures for improvement in economic and ecological management production and processing methods. The document reviews in a comprehensive way every step of coffee transformation in order to analyse its positive and negative effects upon the environment. A copy of the full document is available to Members on request.

COFFEE AND THE ENVIRONMENT

"Study of environmental issues relating to the coffee chain within a context of trade liberalisation, through a life-cycle approach"

AN OUTLINE

1. INTRODUCTION

During its "life cycle" coffee undergoes rather complex alterations when transformed from cherry over parchment to green bean and finally roast and ground coffee. Every step of transformation has particular influence on the environment and produces side products that are potentially threatening the environment. Being aware of interactions with the environment arising from the activities of the coffee industry is essential to design appropriate measures for protecting natural resources on a sustainable basis.

The central question examined in this paper will be to introduce lye-cycle assessment in order to help discussion and conclude a framework to conduct a study of environmental issues through a life cycle approach. This means to review how and to which extent activities related to international coffee business influence the environment, both negatively as well as positively in the different steps involved. Based upon this knowledge, recommendations can be developed providing alternatives to environmental damaging practices.

2. LIFE-CYCLE ASSESSMENT – A TOOL TO PORTRAY PRODUCT RELATED ENVIRONMENTAL EFFECTS

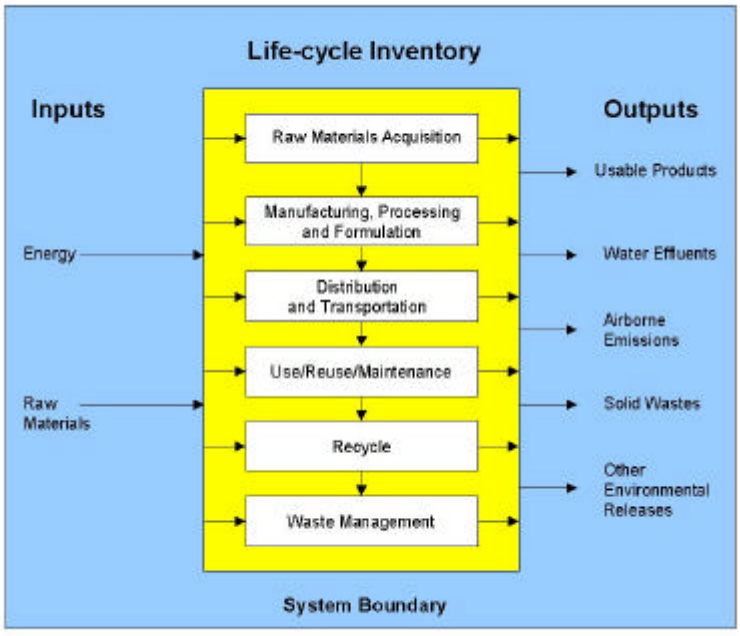
2.1 Life-Cycle Concept

The life-cycle concept is a "cradle to grave" approach to thinking about products, processes and services. It recognises that stages of a product life-cycle have environmental and economic impacts. A product's life cycle is made up of the activities that go into making, using, transporting and disposing of that product. The life cycle is commonly shown as a

series of stages, from “cradle” (raw material extraction and harvesting), through fabrication, manufacturing, packaging, transportation, consumption, and recycling, to the “grave” (disposal).

The environmental problems associated with a given product can be traced back to the inputs that go into the product (land, materials, water, energy), and the outputs generated (e.g. air emissions, liquid effluents, solid wastes), at each stage in the life cycle.

Government, business and non-governmental organisations can apply the life-cycle concept to their decision-making processes related to environment and product policy, design, and improvement. The life-cycle approach can also be used as a scientific tool for gathering quantitative data to inventory, weigh and rank environmental burdens of products, processes and services.



SETAC = Society of Environmental Toxicology and Environment

Life cycle management is an integrated approach to minimising the environmental burdens associated with a product or service over its life-cycle. Adopting a life-cycle perspective can help ensure that choices made by participants for instance of the coffee industry as well as policy makers are environmentally sound.

In particular business participants can make decisions that influence the inputs and outputs of upstream and downstream stages of the life-cycle. Examples of such decisions include:

- which product to manufacture
- design of the product
- sources of energy to be used
- type and amount of packaging
- management of manufacturing wastes
- instructions given to users
- management of post-use wastes

Taking a life-cycle management approach can change the decision-making process and result in different outcomes.

2.2 The Approach: Life Cycle Assessment

Life-Cycle Assessment (LCA), established according to the ISO 14040* guideline, follows basically the attempt of improving the environmental situation. This means a reduction of the environmental effects caused by a product through adequate measures (improvement). These can, for instance, be realised through the selection of products from earlier processing stages as well as concrete optimisation of processes.

Industry use of LCA as a tool to improve environmental performance is increasing. An LCA quantifies energy and resource inputs and outputs at all stages of a life-cycle, then determines and weighs the associated impacts to set the stage for improvements. LCA encompasses four stages:

(a) initiation analysis
(b) inventory analysis
(c) impact assessment
(d) improvement assessment

Within the initiation analysis goals and scope of the assessment are determined together with its transferability into action. The inventory analysis comprises the establishment of a flow diagram for the life-cycle of a product and recording of input-output flows at the different stages of the life-cycle. The impact assessment serves the purpose of appraising and weighing the potential environmental effects within different categories of damages (e.g. extensive use of fertilisers, green house effect etc.). Within the scope of the improvement assessment different products/options are compared highlighting potentials for optimisation. For this purpose, usually, environmental effects of the different damage categories are aggregated to represent a single value, e.g. based on environmental stress points.

According to international guidelines within the scope of analysing environmentally related questions it has to be duly differentiated between life-cycle oriented instruments such as LCA and location specific instruments such as risk assessment, environmental audits and environmental impact assessments.

The LCA method usually requires a measure and decision oriented dynamic approach where the results of a basic life-cycle A are compared with the results of an alternative life-cycle A' modified by application of certain measures. This allows quantification of effects caused by one or a number of measures. This approach is in line with a holistic view of product responsibility where the decision taker who can implement or omit a measure is held responsible for all resulting effects along the product's entire life-cycle.

∗ *International Organisation for Standardisation (ISO): Environmental Management – Life-Cycle Assessment – Principles and Framework. International Standard 14040*

The principle of product responsibility is complemented by the principle of stage responsibility where the actor at a stage is responsible for the optimum stewardship of his activities. This second principle, thus, represents the location specific assessment as mentioned above.

7. FINAL REMARKS

LCA represents a valuable tool for ecological analysis and assessment as well as the identification of measures for improvement. It can provide information for both industry and policy makers. The result of LCA, however, is depending on the point of view with which it was conducted and the availability of data.

First of all, a thorough understanding of interactions of a product chain with the environment together with a quantification of resulting effects is essential as a basis for corrective action. Placing the problem into a wider and global relation will allow identifying its relevance and dimension. Key players and actors at the different life-cycle stages have to be identified and their interests and attitudes analysed. Possibly, they can assume an extended product responsibility exceeding their potential of influencing their particular life-cycle stage at which they act. Education and awareness creation would be required to improve the actors' ability of assuming greater environmental responsibility.

In a second step, corrective planning comes in. Objectives of environmental protection have to be specified and agreed. Subsequently, analysis of alternative options for action provides the perspective for intended improvements, which largely depends on the availability of suited technical solutions. Often, in particular where changes of behavioural attitudes are implied, adequate incentives are required for encouraging an implementation of improvements. As idealism is considered a rather limited driving force the

materialisation of economic incentives would be much more important. Nevertheless, legislation is required to establish a conducive framework to be followed on a national and international level encouraging the implementation of environmentally sound solutions.

Lasting and substantial environmental improvements in product systems can only occur with the combined expertise, cooperation and commitment of all the actors in the product chain – from suppliers, designers, manufacturers, and distributors to retailers, customers, recyclers, and disposers. End-of-pipe emissions controls, and even pollution prevention measures, generally address environmental impacts at individual industrial facilities. The diffuse impacts from products themselves (whether from obtaining or making raw materials, manufacturing, or product use and disposal) are not fully addressed by these facility-specific strategies.

The LCA undertaken by KJS and cited in this paper serves as a good introduction to the environmental debate related to coffee as it highlights and quantifies areas of major impact. As far as it is based on a mainstream blend it provides information allowing a certain degree of generalisation. However, data sets have not been complete and, in particular related to the impact in producing countries, analysis had to rely largely on second hand information. Toxicity to human beings has not been considered as a parameter in the evaluation of scenarios. Additional studies were found necessary to complement and deepen information on particular aspects of interest.

8. TOPICS FOR FURTHER DISCUSSIONS

The studies which have been carried out on the environmental impact of coffee on a global basis, like conducted with the life cycle approach, made very rough assumptions in order to derive conclusions. The result was a coarse picture of the coffee life cycle leaving many questions open. Now, further discussion and research should start in order to fill the gaps. It appears logical to identify areas of interest according to geographical locations, i.e. producing countries, consuming countries and transnational perspective.