



Swedish University of Agricultural Sciences
Faculty of Natural Resources and Agricultural Sciences
Department of Economics

Environmental Certification in a Service Organization

- A case study of SLU

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Master's thesis · 30 hec · **Advanced** level
Environmental Economics and Management – Master's Programme
Degree thesis No 614 · ISSN 1401-4084
Uppsala 2010

Environmental certification in a service organization

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Credits: 30 hec

Level: Advanced E

Course title: Degree Project in Business administration

Course code: EX0536

Programme/Education: Environmental Economics and Management - Master's Programme

Place of publication: Uppsala

Year of publication: 2010

Cover picture: Swedish University of Agricultural Sciences (<http://www.slu.se/?id=1426>)

Name of Series: Degree project

No: 614

ISSN 1401-4084

Online publication: <http://stud.epsilon.slu.se>

Key words: Environmental management systems, Certification, ISO 14001,
Service organization, SLU, Sustainable development.



Swedish University of Agricultural Sciences
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Acknowledgements

I would like to express my gratitude to all those who have contributed in this work. I am most indebted to my supervisor **Cecilia Mark- Herbert** for guidance, support and invaluable comments throughout the work.

I extend my appreciation to Staff of the Department of Economics, especially my teachers: **Karin Hakelius, Bo Öhlmer, Richard Ferguson, Carl-Johan Lagerkvist, and Daniel Lunneryd** for the valuable lectures, seminars and discussions during the courses.

I would also like to acknowledge the contribution of the Environmental Manager of SLU- Agneta Melin, for providing empirical data for this thesis and taking the time to answer my questions. I am also very grateful to her for identifying possible interviewees, share her knowledge, and enthusiasm with me.

I would especially like to thank all respondents at each study unit who took their time and effort to answer my questions; **Björn Ekesten, Dianne Wästerlund, Harald Cederlund, Tiina Sarap, Ulf Heyman**. Your participation has represented a highly valuable contribution to my research and thesis.

My gratitude also extends to **Mohanad Abdelgadir** and **Adil Babiker** for always having time to correct, edit and help in the transcription of interviews.

My profound gratitude is due to my family in Sudan, my father **Abdelazim Eltoum**, my brothers and sisters.

Last but not least, there are no words to thank my family for all their blessings, my husband **Moawia Abdelgadir**, my sons **Ali, Ammar** and daughters, **Hamsa, Afaf** for the support, patience, unconditional love and beautiful things in life. I am awfully ever grateful to my husband, for giving me the courage to continue to do this thesis and for supporting me. I owe you all.

Uppsala, Sweden, May 2010
Sanna Eltoum

Abstract

In recent years several organizations in Sweden and worldwide are faced with massive practical challenges of transforming today's organizations into environmentally sustainable organization. Consequently, they have or are implementing Environmental Management Systems (EMS). The most common model used by many organizations implementing an EMS is ISO 14001. In this context, this study investigated and described the perceived challenges, driving forces and opportunities in an environmental certification process for an organization in the public science sector according to ISO 14001 as models for EMS. One particular university has been analysed; the Swedish University of Agricultural Sciences (SLU) as example of a service organization. In 2009, the Dean of SLU took a formal decision that the entire SLU environmental activities shall be certified according to ISO 14001 standard. Accordingly, this project aims to describe the motivations and challenges in the certification process, and point to the benefits that are expected from certification.

To obtain information and deeper insight into the EMS of the university, a qualitative method with case studies used to study the work with EMS in the SLU's departments. The empirical material was collected within semi-structured interviews. Theories and previous studies have been used as guidance to the analysis method as well, the methodology of plan-do-check-act (PDCA) used as method of evaluating sustainable development.

The analysis showed that the main drivers at SLU to get the ISO 14001 certification is to create better EMS, meeting legislative requirements, directives from SLU's headmaster, to be a trustworthy authority, and to be listed in the Environmental Protection Agency ranking list. Moreover, environmental certification consist of many challenges for the study units such as no engagement in the organization, EMS process consists of many detail and needs too much work, difficulty to understand the structure, and have documentation problems.

Major advantages about the SLU's EMS are: increased efficiency and reduced costs, systematic control over documents, measures and taking care of environmental impact, integrated environmental work in the normal routines, and contribute to a sustainable development

Finally, recommendations on the essential findings that play an important role in the future of ISO 14001 in a service organization are presented.

Key words: Certification, Environmental management systems, ISO 14001, Service organization, SLU, Sustainable development.

Sammanfattning

Allt fler organisationer världen över står inför utmaningar som är associerade till att miljöanpassa verksamhet för att eftersträva hållbarhetsambitioner. Många organisationer väljer att genomföra sitt miljöarbete vägleda av ett miljöledningssystem (EMS, Environmental Management System). Det mest utbredda systemet är ISO 14001, som också erbjuder en granskning med sikte på en certifiering. ISO 14001 är utvecklat för industriell produktion men är även användbart i serviceproduktion och annan verksamhet.

Den här studien är fokuserad på ett pågående miljöcertifieringsarbete i en statligt ägd serviceverksamhet, Sveriges lantbruksuniversitet (SLU). Under 2009 fattade Rektorn ett formellt beslut - hela SLUs verksamhet skall miljöcertifieras enligt standarden ISO 14001. Syftet med projektet är att beskriva drivkrafter och utmaningar i certifieringsprocessen, samt peka på effekter som certifieringen förväntas medföra.

För att få en bild av olikheterna i miljöarbetet inom olika fakulteter och institutioner valdes en komparativ fallanalys. En gedigen litteraturgenomgång gav tema för en intervjuguide. Det empiriska materialet samlades in i en semistrukturerade intervjuer. Teorier och tidigare undersökningar har också använts som vägledning för den analysmetod samt den metod för planer, göra, kontrollera, agera (PDCA-cykeln) som används som metod för att beskriva arbetet för en hållbar utveckling.

Analysen visar att de viktigaste drivkrafterna vid SLU för att få ISO 14001-certifiering är att internt anpassa ett miljöledningssystem som uppfyller lagstiftningens krav, direktiv från Rektorn, att upplevas som en pålitlig myndighet, och att anges i Naturvårdsverkets rankinglista. Miljöcertifiering innebär många utmaningar som varierar mellan de olika analysenheterna i studien. En av de främsta är att skapa engagemang i organisationen, att förmedla en helhetssyn mitt i arbetet med många detaljer och att förenkla dokumentationen av processen.

Till de förväntade effekterna med en miljöcertifiering för SLU räknas: en ökad resurseffektivitet som i sin tur medför minskade kostnader, en systematisk kontroll över förbättringsprocesser som kan följas i dokument, väl avvägda val av åtgärder för att hantera miljöpåverkan och ett integrerat miljöarbete som är en del av normala rutiner. Och allt detta ses som ett bidrag till en hållbar utveckling

Nyckelord: Certifiering, Hållbar utveckling, ISO 14001, Miljöledningssystem, serviceorganisation, SLU

Abbreviations

BS	British Standard
EMS	Environmental Management Systems
EMAS	Eco-Management and Audit Scheme
EPA	Environmental Protection Agency
HEI	Higher Education Institutions
ISO	International Organization for Standardization
LTJ	Landskapsplanering, Trädgårds- & Jordbruksvetenskap (Landscape Planning, Horticulture and Agricultural Science)
NL	Naturresurser och lantbruksvetenskap (Natural resources and Agricultural Sciences)
PDCA	Plan–Do–Check–Act model
SLU	Sveriges Lantbruksuniversitet (Swedish University of Agricultural Sciences)
TC	Technical Committee
TQM	Total quality management
VH	Veterinärmedicin och husdjursvetenskap (Veterinary Medicine and Animal Science)

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1 Introduction

The first chapter of this study presents background to the research area, which also serves as the context for the purpose of this thesis work. In addition, a problem definition, the aim of the study based on the research questions, and delimitations are presented. Finally, an outline of the study is presented.

Researchers in diverse disciplines such as economy, sociology, education and psychology have studied the environmental issues since 1970 (Charter & Plonsky, 1999, 17). There is currently a growing emphasis that within the greening process, firms need to be “learning organizations¹”, able to interact with various external stakeholders and internalized new information such that it improves organizational processes (*ibid*, 11). These factors have led to the need for a system that guides managers in their day-to-day work, such as Environmental Management Systems, EMS. An EMS can assist an organization to meet its increasingly heavy burden of managing the responsibility for the future condition of our world environment. The International Organization of Standardization (ISO) contributed specifically in the improvement of environmental management through many standards.

ISO is a non-governmental organization that formulates international standards for businesses, government and society. ISO has a collection of over 18000 international standards (www, ISO, 1, 2010). ISO's work programmed ranges from standards for traditional activities to standards for good management practice and for services (*ibid*). ISO 14001 is the most commonly used environmental management standard internationally (www, ISO, 2, 2010). A voluntary certification system requires an organization of any size or type to identify measure and control the environmental impact of its activities (*ibid*). The purpose of this system is the continuous improvement of the environmental management of the organization (*ibid*). Certified management systems are an important tool for guiding and improving an organization's activities (Tibor & Feldman, 1997). Many multinational corporations have designed, certified, and implemented environmental management systems under ISO 14001 because it provides harmonized standard for managing a corporation's environmental impacts (*ibid*).

The main objective of the Swedish government's environmental policy is to handle over to coming generation a problem-free society in regard to environmental problems which face Sweden in recent time (www, Government Offices of Sweden, 2010). Sweden might therefore be regarded as a modern developed country especially in terms of social living and environmental standards.

1.1 Problem background

Environmental liability has become of immense importance during the last three decades (Berry & Rondinelli, 1998, 38). In response to public high pressure on governments to enforce environmental regulations and legal restrictions that counter the adverse effects of pollution by many firms, the shift to proactive environmental management is motivated by pressures from governments, customers, employees, and competitors. Both consumers and investors are becoming aware about of the relationship between business performance and environmental quality (*ibid*). In Sweden, reduced climate impact, a non-Toxic environment, sustainable forests and a rich diversity of plant and animal life are just a few of the 16 environmental quality objectives that have been adopted to guide environmental efforts and to help ensure that future generations can grow up in a clean, and healthy environment (www,

¹ An organization that facilitates the learning of all its members and continuously transforms itself

1, Naturvårdsverket 2010). These goals have been set by the Swedish Parliament and are to be achieved by 2020 (*ibid*). They cover every major environmental issue and provide a basis for the action needed to improve the state of the environment. Hence, government, industry, organizations and individuals must play a part to meet these goals (*ibid*).

Now, things are moving in the right direction in many areas, but the speed of progress is not sufficient. More than half of the environmental quality objectives are judged to be very difficult or not possible to attain on time (appendix 1) (www, Naturvårdsverket, 1, 2010). The current global economic crisis offers an opportunity to make deeper investigations into the environmental issues, provided that they are channeled into more energy-efficient and environmentally sustainable systems and products (*ibid*).

In 1996, the Swedish government decided that public institutions, which include most universities, should act as role models in contributing towards long-term sustainable development of society (www, Naturvårdsverket, 2, 2010). The public institutions are expected to use environmental management systems (EMSs) to work towards this goal, although no certification would be required (*ibid*).

Since the adoption of environmental management system became part of the legislation by the Swedish government in 1998, The Swedish University of Agricultural Sciences (SLU) as one of the universities in Sweden started to reorganize its policy and to implement environmental issues in its policy in 1999 (www, SLU, 1, 2010). SLU plays a special role in developing and disseminating knowledge aimed at a more sustainable society, being the only university in Sweden with a responsibility for environmental monitoring and assessment (www, SLU, 2, 2010). SLU's strategy for research, education and environmental monitoring and assessment are developed carefully by the environmental managers (Pers.com, Bertlsson 2009 and Melin from December 2009 onwards). SLU takes additional requirements which are conditions for research funding, expectations from students, interest and devotion from employee, and also an important part of SLU's image. SLU also provide guidelines on how to work towards its environmental goals, first, strengthening the environmental aspects in education program; second, minimizing the environmental impacts of duty travelling (www, SLU, 1, 2010).

1.2 Problem

In recent years several universities in Sweden and elsewhere have or are implementing environmental management systems (EMS) in parts of their organization. The most common standard used by most Swedish universities implementing an EMS is ISO 14001. It is mainly focusing on the administrative aspect of environmental management and the internal environmental work.

SLU has serious considerations about how to certify all the departments and units in order to be 'greening university'² with positive outcomes (some of the departments and units have not yet been certified). SLU is specifically keen to increase activities in the environmental field, while also achieving marked development in the environmental management system ISO 14001 that aimed to structure, and connect the environmental operation in all kinds of faculties.

During this developmental process, there are many challenges and opportunities in the process of implementing ISO 14001 certification, such as limited resources due to the big size

² Is to make SLU a universal model of university grounds environmental sustainability through the successful implementation of the EMS

of the university, and the responses from all the employees towards the certification process is not high. Therefore, the ambition of this study is to contribute to the understanding of the challenges and opportunities service organization could have when it is implementing an EMS. This study brings forward perceptions of the environmental representatives towards certification process, and debates how SLU can support in green practices. The study is mainly based on views by employees at various departments and units with different devotion and skills; and on feedback response of the employees.

1.3 Aim

The aim of this project is to describe the perceived challenges and opportunities in an environmental certification process for an organization in the public science sector. It refers to investigating how environmental representatives at various departments and units at SLU perceive the certification process, to identify what obstacles the university meets in the certification process. The objective is to provide a picture of subdivisions' orientations towards environmental certification at SLU as an example of implementing an EMS in a service organization. The study's aim is to address the following questions:

- What are the key motivation factors in the certification process?
- What are the perceived challenges in the certification process?
- What are considered benefits results of implementing the ISO 14001 at SLU?

1.4 Delimitations

It is widely acknowledged that proper Environmental management minimizes the environmental impacts, attains continual improvement and often have a sustainable development, There exist several international ISO 14000 standards, but this research has been delimited to ISO 14001.

In this study SLU was chosen to be an example of a public service organization. The focus was mainly on departments on Ultuna campus, Uppsala, and on environmental aspects of implementing an EMS in various departments. The participants in the interviews were either employees working at the university at Ultuna campus or employees from other campuses (Umeå, Alnarp) all with a task to lead the environmental management work at the respective units.

The delimitation for this study was about finding some relevant documents in English regarding the EMS, since most of the documents were published in Swedish (e.g. government documents, reports, and some of relevant studies).

Due to time constraints, the project reflects the views of a selected number of interviewees. These interviews were conducted February- May 2010, which gives an empirical material that deals with a certain phase in process. This phase varies in the selected units of analysis. However, due to some limitations for the interviewees; such as their capacity and their time the interview questions were adapted, some for appointed interviewees who could not participate in the study, beside there were many challenges and opportunities at a particular time. Since the university is not consistent in the EMS implementations and considering the time limit of the project, I was unable to conduct more interviews with more involved individuals in this work. Six person occupying different academic positions at SLU were interviewed. Therefore, the researcher has to be restricted to the available data and interviews in order to show the already existing EMS system in this university.

1.4 Outline

The outline of the thesis, illustrated in Figure 1, is intended to give the reader a picture of the structure of the study. Chapter one gives the reader a background to the research area, this will also serve to form the purpose of this thesis work, problem definition, aim, and finally, an outline of the study is presented. The second chapter gives a summary of the scientific method used in this study, including research approach, primary and secondary data, the method of collecting data and analyzing it.

Chapter three provides an explanation of the central concepts in the study, while chapter four gives a theoretical framework with model that later will be used as analytical tool. Chapter five presents a brief introduction about specific area of study, and then in chapter six the empirical findings of the case studies are presented. In chapter seven these results are analyzed and then will be discussed in chapter eight. Finally, the drawn conclusions and suggestions for action to be taken are presented in chapter nine.

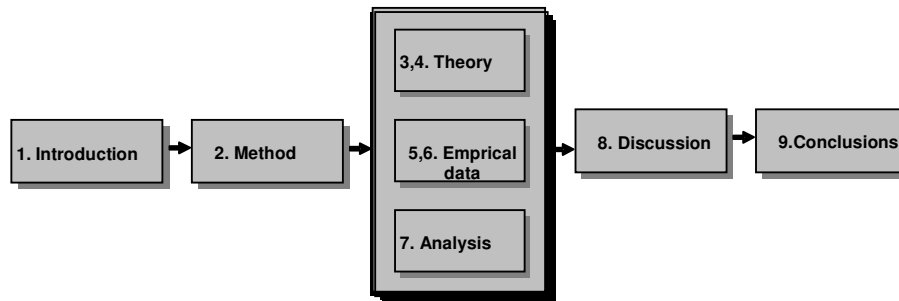


Figure 1 Illustration of the outline of the study

Figure 1 illustrated the outline of the study in order to give the reader the whole picture of the structure of the study. The next chapter gives a summary of the scientific method used in this study.

2 Method

This chapter gives a presentation of the scientific method that is being used in this study, including research approach, primary and secondary data, the method of collecting data and analyzing it.

2.1 Research approach

A qualitative research method was used during the four months study from February- May 2010. The study was focused on environmental certification at SLU as an example of implementing an EMS in a service organization. In this comparative case study multiple cases were studied by a collection of data from a number of targeted interviewees; through interviews with management and employees involved in the university I have tried to make an interpretation of their actions in relation to the implementation of ISO14001. The aim was to explore and understand the processes of the implementation and its impacts (advantages and disadvantages) on all involved actors.

2.2 Choice of case studies

The empirical material analyses is obtained from SLU as a case study and was used as method to study the work with EMS in the SLU's departments. The case studies are primarily built on interviews with an environmental manager, university director, the faculty dean, the vice-dean and two environmental representatives in the following faculties and units:

- Faculty of Landscape Planning, Horticulture and Agricultural Science (LTJ) (Alnarp)
- Faculty of Forest Science (Umeå) - Department of Forest Resource
- Faculty of Natural resources and Agricultural Sciences-Uppsala BioCenter SLU
- Faculty of Veterinary Medicine and Animal Science (VH)
- University Administration
- Environmental management office

Each of the case studies was chosen to represent different stages of ISO14001 certification process (considering suitability, planning to implement, currently implementing, successfully implemented). The main criteria for selected these cases were that the departments at varying phases in the certification process experience different motives, challenges and benefits. Some have already been certified with ISO 14001 for Property Management and forest resources management (e.g. Umeå campus). Other units are prepared to start the certification (e.g. Alnarp campus for Landscape Planning, Horticulture and Agricultural Science Environmental management office). The rest of units screened for certification, have already started the documentation process Uppsala Biocenter and university head office of SLU), and some didn't start yet (Faculty of veterinary medicine and science).

The targeted interviewees were selected according to different academic positions at SLU with different skills to provide a picture of subdivisions' orientations towards environmental certification at SLU as an example of implementing an EMS in a service organization.

In SLU, there are currently 2 units that are certified with ISO 14001. However, there are many departments and units that are currently undergoing the implementation of ISO 14001 and some have recently been certified. Interviews were conducted at six departments/units located in Uppsala, Umeå and Alnarp. In each departments/units, interviews were conducted with one member of management or employee. Some limiting criteria for selection of the departments/units were that most of faculties were in the process of implementing ISO 14001

or were already certified. In the selected departments/units, interviews were made with two environmental representatives, environmental manager, university director, dean, and vice-dean depending on their time and availability. In total, six people were interviewed (Table 1).

2.2.1 Comparative case studies

This method is suitable for this study since case study may be defined as a sustained process (e.g. the adoption, implementation and institutionalization of an innovative program) in which a certain unit is described and analyzed in qualitative, and widespread terms (Mils & Huberman, 1994, 26). The strength in this method is its capacity to handle many different kinds of empirical materials such as observations, documents, and interviews (ibid, 9).

A case study of SLU contains cases of specific departments as Mils & Huberman (1994) stated that cases may have sub cases within them; and it must be sampled. They argue in their books, that multiple cases sampling offer the researcher deeper understanding of processes and outcomes of cases. Sampling in qualitative research should be theoretically driven and purposive rather than random (ibid, 27). Accordingly, purposive - theoretical sampling is the main ground for selecting these comparative case studies because it allows the researcher to choose cases in terms of the theory, choosing deviant cases to make comparison between each, and choosing the size of the sample during the research (Silverman, 2000, 105). Therefore, each of the targeted interviewees selected was chosen according to their work in various study units which differ in the stages of ISO14001 certification for example: considering suitability, planning to implement, currently implementing, successfully implemented; with the possibilities to compare the results and generalize them to other service organizations.

2.3 Trustworthiness robustness

The validity is to check and control the quality of investigation throughout the seven stages (Kvale & Brinkmann, 2009, 248-249):

1. **Thematizing:** is to formulate the research questions of the study with relation to the theoretical perspective.
2. **Designing:** is about the sufficiency of the aim and the methods used for the study. In a qualitative approach, the ethical perspective is an important issue to minimize harmful consequences.
3. **Interview:** should be relevant to the trustworthiness of the subject's reports and to the quality of the interviewing with a continual checking of the information obtained.
4. **Transcription:** should be done in valid translation from oral to written language with choice of linguistic technique of transcript.
5. **Analysis of the validity:** here is to put the interview questions into a text and the meaning of the text should be understood in the logical way.
6. **Validating:** is about what forms of trustworthiness are relevant in a specific study. Reliability and validity should be assured with a quality control.
7. **Reporting:** is about the validity of the given report. The main findings of the study should be reported in a scientific way that the reader of the report could be validating the results.

2.4 Data collection

Data collection is known as primary and secondary data. Primary data is related to data that is gained by different methods such as interviews and questionnaire distribution. The sources of secondary data are for example, literature studies, reports, related articles, and internet. The data collection in this study has focused on the driving forces for an EMS, the problems and opportunities that SLU has perceived with the system ISO 14001. The empirical material in

the study consists of the data that was collected through studying the relevant literature concerned in environmental management system ISO 14001, for example appropriate written public documentations, journals and internet, and from interviews.

2.4.1 Secondary data

It is most interesting for my research to understand the concepts of ISO14001 certification process, its impacts (advantages and disadvantages) and driving forces for the implementation. Accordingly, once an interesting article was found, the relevant ones were identified and requested. These publications were also in turn reviewed. To get more information concerning the methods that used in the work, books and articles that regarded relevant were reviewed. The main empirical data were collected through personal contacts to obtain more details. These personal contacts have been taken either directly or via e-mail. Moreover, essential information was found on searching in the internet; such as www.iso.org; www.naturvardsverket.se; and www.slu.se.

2.4.2 Primary data

The sources of relevant information are interviews with six persons of different academic positions at the SLU (an environmental manager, university director, the faculty dean, the vice-dean and two environmental representatives). Interviews have been chosen as the major data collection method. The reasons for choosing interviews are to make a deeper dialogue with interviewees, focus on their opinions about the work with environmental aspects, and follow up the process of certification.

Early in the research process suitable departments and units were identified in accordance with the criteria established above and all the interviewees were appointed by the environmental manager. To strengthen the conceptual validity of the study, the environmental representatives were chosen as the main interview respondents, because they have good insights into how the organization has dealt with environmental aspects and environmental policy implementation and were usually responsible for the recognition and assessment of environmental aspects. Beside they can be expected to know the internal environment-related procedures better than anyone else does. Nevertheless, the weaknesses of choosing these respondents might influence the validity of the study because they have to communicate their own social role within the organization as a positive one, so that they will not give any information that could harm the organization or themselves as environmental experts. This might lead to bias (Zobel, 2005, 48).

A semi-structured interview- presented in Appendix 2, was prepared and the questions were derived from the literature review in Chapter 4 and developed from the research questions. Then the authors' supervisor has checked them. However, during the interviews the number of the questions was sometimes decreased due to the limited time related to the respondents. Six out of ten identified key informants agreed to participate in the interview. Initially, electronic mails were sent out with a general interview guide and background about the study to the person that had been recommended to the researcher. The e-mail was informative in its formulation but as only a few replies were received within the first week, an alternative approach was set off.

The researcher made note of when the email was sent to the respondents - and gave them one week and then re-sent the same mail (with the same request). Some of the respondents do not have the time to respond to many questions so the interview questions were adapted to their

capacity and their time. Finally, the case studies were primarily built on interviews with six persons of different academic positions at different department and units as shown bellow:

Table 1: *The respondents participated in the investigation*

Names of interviewees/ Position	Date / kind of interview	Faculty/ department/unit	Stage of implementation	Date sent summary of interview and date of confirmation
Agneta Melin Environmental manager	Direct personal contact - 18 April-2010, 1:00AM	Environmental management office	Prepared to start	26 april 2010 3ed May 2010
Björn Ekesten Vice-Dean	By email- Send: Friday, April 30, 2010 11:55 AM	Faculty of Veterinary Medicine and Animal Science	didn't start yet - would like to be certified	
Dianne Staal Wästerlund Environmental coordinator	By email- Send: Tuesday, May 04, 2010 11:55 AM	Department of forest resource management of SLU in Umeå	Successfully implemented (Certified 2004)	25 May 2010
Harald Cederlund Environmental coordinator	Direct personal contact- Monday 19 April-2010 kl.10:00 AM	Faculty of Natural resources and Agricultural Sciences- Uppsala BioCenter SLU	Planning to start	3ed May 2010 18 May 2010
Tiina Sarap Dean of the faculty	By email/ Send: Wednesday, April 28, 2010 11:13 AM	Faculty of Landscape Planning, Horticulture and Agricultural Science (Alnarp)	Prepared to start	25 May 2010 26 May 2010
Ulf Heyman Director of University Administration	Direct personal contact- 8 April-2010, 1:00 AM	University Administration	Planning to start	26 april 2010

A possible problem with interviewing is the actual recording of the data. It may be difficult to write notes while people are speaking. While tape recording seems fairly suitable during the interview, transcribing or summarizing the tape afterwards is time consuming (Pole &

Lampard, 2002). Therefore, all direct personal interviews were recorded as it provides the opportunity to listen to what was said on later times and thus facilitate analysis.

Each of the interviews lasted from 45 minutes to 1 hour the respondents answered the questions and also provided further information, such as internet links and annual reports in order to further deepen the understanding for their particular viewpoint.

The method used in transcribing the primary empirical data refers to the method which was used for recording interview. It was audio recording -digital voice recorders- because it provides a high sound quality and can record for many hours without interruption. The recording was transferred directly to a computer where it can be stored, played, analyzed and then transcribed (Kvale & Brinkmann, 2009, 179).

The transcription of research interviews transformed into a more formal, written style as a conversational analysis that to be reporting later in a readable way. It took about 6 to 10 hours to transcribe a 1hour interview results into 6 to 10 pages, depending on the length of dialogue and how it is set up in typing. The constructive nature of transcripts appears when we take a closer look at their reliability and validity (Kvale & Brinkmann, 2009, 179). The transcripts were sent back to the interviewees by email in order to validate the data with the possibility to clarify misunderstandings, make corrections and addition. Then there were follow up contact by e-mails and telephone.

2.5 Qualitative analysis

The strengths of qualitative data based on the capability of the analysis and how it carried out. Analysis is consisting of three existing flows of activity: data reduction, data display and conclusion drawing/verification (Miles & Huberman, 1994, 10). In analyzing the empirical findings, theories and previous studies have been used as guidance for the analysis method. Accordingly, gathered data from empirical interviews were reduced and transformed through summary and displayed into matrices to drawing justified conclusion. In this study the analysis based on Cross-case displays analysis to enhance generalizability, to know something about the relevance or applicability of the findings to other similar settings and to examine similarities and differences across cases (Miles & Huberman, 1994, 177). Initially, the gathered data was made comparable via common codes and common report formats for each case, then the data sorted and reduced into analytic categories (according to key variables such as driving forces, problems and benefits) and entered the data in commonly formatives matrices so-called meta-matrix. According to Miles and Huberman (1994, 178) *Meta – matrices are master charts assembling descriptive data from each of several cases in a standard format. The simplest form is a juxtaposition of all of the single case displays on one very large sheet or wall chart.* Furthermore, there were several paragraphs of analytic text clarifying and deepening the entries in the display for each case, which can help in condensation (Miles & Huberman, 1994, 179).

Further analysis is performed, based on the theoretical framework presented in chapter 4. As ISO14001 requires a continuous evaluation of environment performances, the analysis include the methodology of plan–do–check–act (PDCA) as method of evaluating sustainable development. Finally, discussion is drawn and a conclusions and suggestion for further research were presented in the last chapter

The purpose of the following chapter is to provide the reader with sufficient insights about the chosen theoretical framework.

3 A theoretical background

This chapter gives an introduction to concepts and definitions of importance to the study, so that the understanding of the forthcoming chapters will be facilitated regardless of the reader's previous knowledge in the field. Some concepts of EMS are presented in this chapter, such as, ISO standards, ISO14001. In addition, after defining a specific EMS and its main requirements a model of Deming Cycle Diagram for total quality management (TQM) will be discussed.

3.1 Environmental management system

From a theoretical point of view, an environmental management system (EMS) is a set of management tools, principles, and process that an organization can use to facilitate, protect human health and the environment from the potential impacts of the organization's activities, products, and services (Tibor & Feldman, 1997, 8). Beside that, an EMS also supports sustainable development by improving the quality of the environment (*ibid*). The adoption of environmental management systems as frame works for integrating corporate environmental protection policies, programs, and practices is growing among both domestic and multi-national companies (Morrow & Rondinelli, 2002, 159).

Many companies that adopt an EMS follow industry standards, such as 'Responsible Care' in the chemicals sector, or international guidelines such as ISO 14001 or the European Eco-Management and Audit Scheme (EMAS) (Morrow & Rondinelli, 2002, 159-171). By adopting, an EMS a company ensures that responsibility is well assigned to maintain a process that is aimed at continuous improvements. However, adopting an EMS may lead to satisfaction of customer pressures and it may ensure that suppliers are operating in responsible ways (*ibid*). Therefore, EMS is the framework used by the management of the organization to guide, measure and evaluate their work. Multinational and domestic corporations around the world are adopting EMS and certifying them by international standards (ISO) (*ibid*).

An EMS consists of various parts like: an environmental policy, targets, objectives and organizational provisions for implementing environmental measures, and dispositions for monitoring and reporting (Sheldon, 1997,p23).). The requirements for an EMS are conditioned by, for example, British standard (BS 7750), the European Environment Audit Scheme (EMAS) or the ISO 14000 Series (North., 1997, 175).

3.1.1 ISO standards

ISO is a specialized international non-governmental organization established in 1947 and located in Geneva, Switzerland. The organization function is mainly to develop voluntary technical standards that aim at making the development, manufacture and supply of goods and services more efficient and with higher quality (Tibor & Feldman, 1997, 15).

The idea of setting up an ISO to develop international standards on environmental management is coming out during the preparations for the United Nation conference on environment and development, which was held in Rio de Janeiro in 1992. ISO created a Technical Committee³ (TC 207) in 1993 to investigate how such standards might benefit

³ TC 207 on Environmental Management is the committee responsible for developing the ISO 14000 series of standards and guidance documents.

business community. As the result of that, investigation, ISO technical committee (TC 207), developed international standards in environmental management called ISO 14000 (Sheldon, 1997, 20).

The ISO 14000 is a series of standards that addresses a variety of aspects of environmental management and provides a framework for the development of an environmental management system. The main objectives of the ISO 14000 series are to address what the organization does to minimize the environmental impacts caused by its activities, and to attain continual improvement of its environmental performance (www, ISO, 1, 2010).

The series consists of many standards, for example ISO 14001:2004 which offers the requirements for an EMS and ISO 14004: 2004 which gives general EMS guidelines (www, ISO, 2, 2010). While other standards in the series reflect different aspects of environmental management like: Environmental Auditing (19011), Environmental Labeling (14020, 14021, 14022, 14023, 14024, and 14025), Environmental Performance Evaluation (14031), and Life Cycle Assessment (14040, 14041, 14042, and 14043) (Tibor & Feldman, 1997, 23). ISO 14001 is a globally recognized standard for an environmental management system.

3.1.2 ISO14001

ISO 14001 which was first published in 1996 and recently revised in 2004, specifies the actual requirements for environmental management system. ISO 14001 sets rules for maintaining and improving the environmental performance of an organization. It can be adopted by any organization and applies to environmental aspects, which the organization has control over and which it is expected to have ability to influence. ISO 14001 is often seen as the corner stone standard of the ISO 14000 series. However, it is not only the most well known, but also the only ISO 14000 standard against which it is currently possible to be certified by an external certification authority. It does not itself state specific environmental performance criteria (www, ISO, 3, 2010).

Morrow & Rondinelli (2002, 161) defined ISO 14001 as “a set of guidelines by which a facility, a single plant or a whole organization can establish or strengthen its environmental policy, identify environmental aspects of its operations, define environmental objectives and targets, implement a program to attain environmental performance goals, monitor and measure effectiveness, correct difficulties and problems, and review its management systems to promote continuous improvement”.

Many multinational corporations have designed, certified, and implemented environmental management systems under ISO 14001 because it provides harmonized standard for managing a corporation’s environmental impacts (Tibor & Feldman, 1996). This standard defines the requirements for controlling and improving the organization’s environmental impact and defines the basic structure for an EMS. However, a commitment to compliance with applicable environmental legislation and regulations is required, along with a commitment to continual improvement (www, ISO, 2, 2010).

3.2 Certification process

Environmental certification means that an activity is trying to work its system towards a better environment by meeting the requirements of ISO 14001, and therefore be approved and certified as environmentally friendly by an accredited certification company (Tibor & Feldman, 1996).

This certification agency can be accredited or not. Here the reliability issue is important when choosing the certifier. To certify the organization's EMS, an external, autonomous and independent certification agency is usually hired, that officially assures conformity with the requirements of ISO 14001. Certification is generally conducted by the following steps (Lopez, 2006, 17-18; Zobel, 2005 b, 1):

- Step 1: Initial review or “gap analysis”

ISO 14001-implementation begins with an initial review and analysis of the present situation, to find out whether the organization is ready to adapt certification procedures. The initial review outlines the basis for the environmental policy, objectives and targets and environmental management programmes. The review itself includes an inventory of all environmental aspects, relevant laws, regulations, and existing environmental procedures.

- Step 2: Document review

The system afterwards is constructed upon documented procedures and instructions controlling activities related to the most significant environmental impact.

- Step 3: Main assessment or certification audit

When the system is implemented, system audits are conducted to determine the efficiency of the system and use and improve an organization EMS

- Step 4: Certification

The top management carries out a management review to check the system and provide evidence that their management systems are effective and continuously improving. To achieve certification, organization will need to select a Registrar that will come and perform a registration audit, and then regular surveillance audits.

- Step 5: Surveillance

After the company gets the certificate, external audits will be run every six months to check that they are complying with ISO 14001 requirements and ensure that continuously improvement is taking place.

In order to obtain environmental certification, the relevant environmental aspects and impacts of an organization must be recognized; then, starting from these, an environmental program will be defined, the environmental objectives must be drawn up, and a sufficient EMS has to be set. This system needs to be continuously modified and periodically confirmed by the audited. To sustain a certification; the organization has to show that its environmental performance is improving. Environmental certification of an organization requires taking control of direct and indirect aspects.

Environmental aspects are often different types of emissions, use of resources such as energy, water and raw materials or production of different kinds of waste. However, an environmental aspect can also be of more organizational nature, such as lack of communication and insufficient environmental training if these elements lead to impact on the environment (Zobel, 2005 a, 14). Accordingly, the environmental aspects of an organization's activities result in environmental impacts (Tibor & Feldman, 1997, 31). Environmental impact is an important global issue, with pressure to minimize that impact coming from many sources, such as governments, trade associations, supply chains and other social and financial stakeholders. An EMS provides a framework for managing environmental responsibilities efficiently in a way that is integrated into overall operations

The ISO 14001 Standard consists of a five-step process: Environmental policy, Planning, Implementation and operation, Checking and corrective action and management review. This arrangement of elements is often referred to as a total quality management (TQM) approach which is based on the methodology of plan–do–check–act (PDCA), with objective to instruct the organization toward continuous environmental improvement (Tibor & Feldman, 1997, 25-26).

3.3 Deming Cycle for TQM

Dr. Deming who was one of the famous experts in the context of quality drew the diagram shown below in Figure1; this diagram is known as the Deming Cycle. This diagram describes graphically the action steps that we use every day to manage our lives and our businesses, and is considered as a methodology in the frame of Total Quality Management (TQM) references. Nowadays this cycle is almost an active part of the quality work in every organization and institution; Quality defined as satisfaction of customer by a product or service (Weib & Bentlage, 2006, 24). PDCA-cycle or Deming Cycle Diagram (Figure 2) is a method designed to analyze and improve the processes of evaluation the sustainable development.

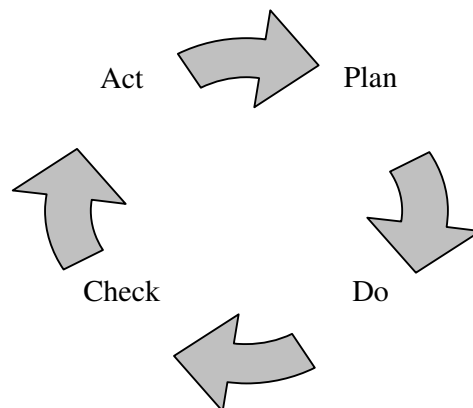


Figure 2 Deming's cycle diagram for analysis and improvement the TQM to achieve sustainable development (Söderstedt et al., 1997, 213).

This diagram shows there are four steps (Plan-Do-Check- Act) in order to complete one action. In fact, this cycle highlights the importance of continuous improvement in every action and clearly exposes that which step or steps might go wrong in every action. This model has later been adapted with additional elements according to ISO 14001 standards (Figure 2) such as Environmental policy, Planning, Implementation and operation, Checking and corrective action and management review.

In the previous chapter, the discussion was about defining the EMS, ISO14001 standard, and the steps of implementing this standard. However there were several applicable and useful points that can be used by every organization in this definition to implement this system. Now the second phase of an EMS i.e. implementation and certification process will be described in the next chapter, where a theoretical framework with basic concepts related to the research questions will be presented. Besides, implementation and certification process are presented in theoretical model in order to make the EMS applicable for every organization.

4 A Theoretical framework

This chapter gives the reader an explanation of the theories that will be applied on the empirical findings. It covers the driving forces for implementing EMS, benefits from the implementation of ISO 14001, and the problems with implementing the ISO 14001. Also it introduced a model of EMS Deming –cycle. This model later will be used as analytical tools.

4.1 Requirements for the EMS

ISO 14001 is the only standard intended for registration by a third party. It provides a specification detailing the requirements an organization must meet in order to achieve third-party certification (Sheldon, 1997, 23). The objective of ISO 14001 is to define the requirements for the EMS and maintain guide lines for its implementation. Main requirements for implementing an EMS included in Figure 2:

- Environmental policy
- Planning
- Implementation and operation
- Checking and corrective action
- Management review

4.1.1 Environmental policy

Top management is responsible for setting environmental policy. According to ISO14001, environmental policy should be implemented according to the organization's responsibilities, including compliance with relevant legal requirements, a commitment to continuous improvement, and the review and establishment of environmental objectives, targets, and management program which must be communicated to all persons working in the organization and available to the public (Sheldon, 1997, 68-70).

4.1.2 Planning

The planning elements of the ISO 14001 serve as a basis for establishing management programs that will force minimization or elimination of environmental impacts. They consist of many requirements of ISO 14001, here presented in four aspects: environmental aspects, legalization requirements, objectives and targets and EMS programs (Tibor & Feldman, 1997, 245).

Significant **environmental aspects** according to ISO 14001 must be identified to serve as a basis for setting future objectives and targets (Mac Donald, 2002, 638). Accordingly, organization should try to identify all environmental aspects of activities, products, or services that can have a significant impact on the environment and to consider these impacts in setting objectives and targets for the EMS (Tibor & Feldman, 1997, 246). The aspects are judged for their significance and a measurement system is developed to separate those aspects which are significant and those that are not (Sheldon, 1997, 71).

The ISO 14001 states that an organization must consider **legal and other requirements** in establishing its objectives and must make a commitment to regulatory compliance (Tibor & Feldman, 1997, 248). Therefore, companies are now developing environmental policies for their operating facilities, services and supply-chain partners while trying to maintain consistency with the new regulations (Sroufe & Sarkis, 2007, 13).

Organizations must set up documented and quantifiable environmental **objectives and** targets including time frame and monitoring method, and it is of immense importance to convert its policy into defined goals. Accordingly, the organizations should be able to consider significant environmental aspects, and the views of interested parties into account, must be consistent with the policy, which it self must include commitments to comply with the law, prevention of pollution and continual improvement (Sheldon, 73). Organizations must establish an **environmental management programs** for achieving objectives, including defining responsibilities, goals and time frame by which they are to be achieved (Tibor & Feldman, 1997, 246).

4.1.3 Implementation and operation

ISO 14001 defined essential elements to implement and support improvement in management system. The elements that can be necessary are (Tibor & Feldman, 1997, 248-251):

- **Structure and responsibility:** Assign, document, and communicate responsibility and authority to ensure that management system are implemented and reported to top management.
- **Training, awareness and competence:** All employees associated with environmental systems need to understand how their work impacts the environment and the result if they do not follow procedures. Employees should obtain training in the skills needed to carry out their work.
- **Communication:** set up methods for communicating environmental information to employees and procedures receiving input from external parties. Consider implementation of a process for providing information to external parties.
- **Environmental management system documentation:** Establish documentation system to describe systems and their interaction.
- **Document control:** guarantee documents are available, current, completed and controlled. Documents held for legal purposes should be so marked.
- **Operation control:** Requires the implementation of processes to manage and control environmental aspects of activities. Also provides for communicating relevant procedures to suppliers and costumers.
- **Emergency preparedness and response:** provides systems and processes for preventing environmental impacts and responding to releases.

4.1.4 Checking and corrective action

According to ISO 14001, Tibor and Feldman (1997, 251-253) subdivided this step into four elements:

- **Monitoring and measurement:** The organization should monitor and measure its operation that have significant impacts in the environment for the purpose of tracking performance controls, and to be able to follow up environmental legalizations and meeting its objectives and targets.
- **Non-conformance, corrective and preventive action:** The organization needs to define responsibility, and authority for control of nonconformance in terms of identification, improvement, and correction of nonconformance.
- **Records:** In order to identify, maintain and control environmental records, the organization should set up and maintain specific procedures.
- **Environmental management system audit:** The organization needs to establish a program and processes for periodic EMS audits to evaluate a system's ability to identify all environmental aspects, significant impacts, and risk levels of process, and reasonableness of corrective action programs, and then report the result to

management. Accordingly, management should use these results to address the need to change policy, objectives, and elements of the EMS.

4.1.5 Management review

The management in an organization should periodically review the EMS to maintain its continuation. This review should consider the alternations in the organization’s policy, objectives and other elements of the EMS in accordance to the audit result.

4.2 Environmental management system model

The ISO 14001 Standard based on a five-step system model (Figure 3), according to the methodology of plan–do–check–act (PDCA) (Tibor & Feldman, 1997, 25-26). However, by looking at these five steps and going back to the Deming cycle (Figure 2) we will find similarities between them. These similarities means that we can put the steps defined by ISO 14001 into Deming cycle with some changes, then the new created model (Figure 3) will have more efficiency. Inside these steps, as Mac Donald (2002, 632) pointed out, there are many sections or general requirements (Figure 2), which describe general outcomes of the system, gives a structured activity for making environmental improvements in the organization, and seeks sustainable development.

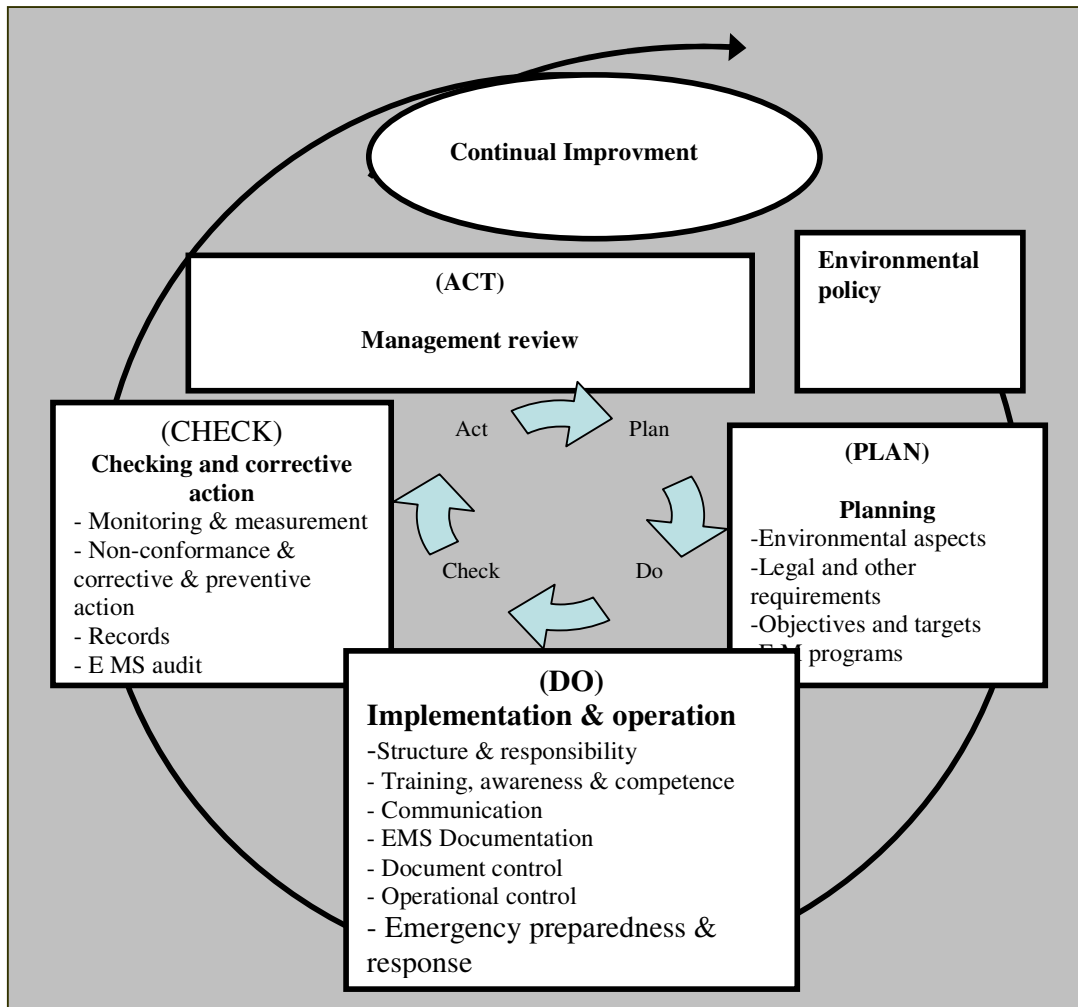


Figure 3 EMS Deming –cycle with different components adapted from ISO 14001 (Tibor & Feldman, 1997, 26).

ISO 14001 provides a specification detailing the requirements an organization must meet in order to achieve third-party certification (Sheldon, 23). Therefore EMS Deming –cycle (Figure 3) illustrate the suggested model, which its components are as follow:

- Plan step is a start with an initial review. The initial review outlines the basis for the environmental policy, objectives and targets and environmental management programs. The review itself includes an inventory of all environmental aspects, relevant laws, regulations, and existing environmental procedures.
- Do step is about an implementation of an EMS and document review including documented procedures and instructions, controlling activities, training, awareness, communication, and emergency preparedness and response.
- Check step has been regarded as evaluation step. This step has to do with evaluation of the plan and do steps by conducting audits, measuring performance, implementing corrective and preventive actions.
- Act step provides management review of an EMS to check the system and providing evidence that their management systems are effective and continuously improving.

4.3 Driving forces for implementing EMS

Recently, an increasing number of organizations around the world are certifying their environmental management systems by ISO 14001 standard. The driving forces for implementing environmental management practices are self-commitment and business management. This suggests that implementing environmental management practices are motivated by the willingness of management to implement an EMS and by the assumption that it pays to be green (Sroufe & Sarkis, 2007, 200). In addition Kenneth *et al* (1998, 1181) have identified four factors driving proactive environmental management: Regulatory demands; cost factors; stakeholder forces and competitive requirements.

Advocates of International Standards for EMS certification state many benefits that should motivate organization managers to adopt an integrated system of environmental management (Morrow & Rondinelli, 2002, 162):

- Save companies money by improving efficiency and reducing the costs of energy, materials, fines, and penalties. Moreover, the development and certification of EMS can increase investor confidence in a company and give it international competitive advantages.
- Simplify and integrate their environmental protection programs into a more coherent framework.
- Make it easier for corporations to develop voluntary EMSs and assess a company's commitment to improving environmental performance and reducing risks.
- Satisfy customer pressures and to ensure that their suppliers are operating in environmentally and socially responsible ways. Growing interest among corporate stakeholders within and outside of the firm.

4.4 Benefits from the implementation of ISO 14001

ISO14001's voluntary approach gives companies the flexibility to develop EMSs that are suitable for their operations, traits, location, and levels of risk (Morrow & Rondinelli, 2002, 163). Adoption of ISO14001-certified EMS are perceived as improved performance, compliance with environmental legislation and regulations, reduction of the risk of penalties due to non-compliance with environmental legislation, raise motivation, commitment and communication with employees; ameliorate image and competitive advantage (Lopez, 2006, 6).

4.4.1 Cost savings and reduction in resources usage

According to Sheldon (1997) many of the benefits may be difficult to measure in financial terms, but effective environmental management can help organization to develop processes to decrease energy and raw materials consumption, reduce waste and pollution, and reduce risks of accidents and emergency situations. Such procedure will not be only environmentally friendly, but more profitable and efficient. Therefore, Implementation of ISO14001 leads to long-term cost savings

4.4.2 Environmental objectives

The main objective of the ISO 14001 EMS standard is to enhance and continuously improve compliance with environmental laws and regulations, and the environmental stewardship policies of organizations. Accordingly, organizations must set their objectives and targets, as well as a time frame and monitor method for these objectives to translate its policy into action. Therefore organizations should be able to consider significant environmental aspects (Weib & Bentlage, 2006, 50). As a result; Implementation of ISO14001 shows commitment to the protection of the environment.

4.4.3 Customers and stakeholders requirements

An environmental management system (EMS) which certified to ISO 14001 enables an organization to stand strong against the competition. Certification increases confidence in the company and enhances organization competitiveness globally. adopting EMS leads to satisfaction of customer pressures and ensures that their suppliers are operated in responsible ways by environmental and social means; Improved relations with stakeholders (i.e. the environment, neighbors, NGOs, employee, shareholders, customers, clients, financial institutions, insurers, authorities, competitors, etc).

4.4.4 Less environmental impact

Implementation of environment management system gives the structure for an organization to attain a very good level of environmental performance that shows the complete commitment of an organization in controlling the impact of environment waste, pollution and energy consumption. It helps companies reduce their environmental incidents and liabilities, increase efficiency of operations by removing waste from production and sharing processes, increase awareness of environmental impacts of among all employees, and set up a strong image of corporate social responsibility. Therefore, it is ensuring all operations have procedures to minimize their environmental impacts (Tibor & Feldman, 1996, 383-384).

Morrow and Rondinelli (2002, 164) found many advantages after ISO14001 certification, in the study held by Rondinelli and Vastag (2000) about Alcoa's Mt.Holly plant:

- Employee training programs increased awareness of the importance of waste reduction throughout the plant and encouraged many departments to track and monitor their waste.
- The process of developing the EMS for ISO14001 certification also generated procedural improvements.
- In developing and certifying the EMS, managers were required to improve existing practices for processes, equipment, and areas of the plant that could increase emissions.
- The Environmental Department had to develop and maintain environmental management manuals for waste water management, cooling water treatment, waste management, chemical management, air quality control, spill prevention, control and counter measure plans, and emergency preparedness and response.
- The EMS required more and better record keeping and documentation, which led to improved controls in several of the plant's departments.

4.5 Problems with implementing the ISO 14001

A report by Arvidson (2004) pointed factors that limit some Swedish universities to fulfill commitments towards implementation of EMS such as, cost of implementation, documentation, environmental performance.

4.5.1 Costs of implementation

There is concern that the benefits offered by ISO14000 may not be sufficient to offset the costs incurred in meeting the requirements of the program. Many managers are hesitant to pursue ISO14000 certification due to the high economic costs associated with EMS development and implementation. These costs include cost of acquiring information, cost of record, documentation, and changes in practices, cost of employee training, costs of internal auditing and third party auditing, and registration cost. The costs of ISO 14001, however, depend on factors like type and size of the organization, stringency of the EMS, stakeholder awareness, and the approach used for certification process (Yiridoe & Marett, 2004, 40-58). Nevertheless, many companies see the problem of costs as not that important since the implementation of ISO 14001 leads to increased benefits rather than cost (Nordström, 1997).

4.5.2 Documentation

The main obstacle that faces the implementation of ISO 14001 is the high demand on documentation (Morrow & Rondinelli, 2002, 162). Instead of achieving the environmental objectives and developing the environmental performance the organizations may assign vast resources on documentation, which represents a major risk (Nordström, 1997). Nevertheless there is another risk that documentation could be a real time-consuming process for most employees, taking in consideration that documentation is an important process for successful implementation. However, efforts needed to decrease the risks that could arise from this process.

4.5.3 Environmental performance

Despite the perceived benefits, critics argue with this view and say a wide criticism of ISO 14000 standards is that it is not connected directly and sufficiently to environmental performance because ISO 14000 EMS standard does not inform a company how to achieve its stated objectives (e.g. improve efficiency and reduce environmental impact). For example

Tibor and Feldman (1997, 20) argued that ISO 14000 standards are a system, not performance because it doesn't dictate how the organizations will reach their policy's goals like compliance with laws and regulations and prevention of pollution. Thus, the general goal of implementing ISO14000 is to increase confidence among all stakeholders that an organization has a system in place that is likely to lead to better environmental performance. Beside, environmental performance differs between the organizations because the standards are flexible enough to recognize the differences in EMSs approaches (Tibor & Feldman, 1997, 20). Therefore, the main problem that applies for an organization is that: there is no level for environmental performance, and the stakeholders can lose confidence in the organization if the organization does not act in accordance with this communicated environmental perspective.

In the next chapter a brief introduction about specific area of the study will be presented including selected departments and units.

5 Background for the empirical study

This chapter serves as the background chapter for the empirical study, there will be a brief review about earlier studies in implementation of an EMS, which included Implementation of an EMS worldwide and Implementation of an EMS at Swedish universities , afterwards a brief presentation about organizations and institutions related to ISO 14001 in Sweden.

5.1 Previous studies in implementation of an EMS

According to some studies which performed previously about the implementation of an EMS in universities it has been found that the awareness of EMS work increasing, serious discussions were raised about the possible drivers, problems and benefits of EMS; however similar issues about implementation of an EMS have been identified in areas where EMS is commonly applied.

5.1.1 Implementation of an EMS worldwide

In the article named *A decade of ISO 14001* by Peglau & Baxter (2007), there is special report covering the period 1996-2006. This report highlights a selection of users to illustrate the enormous variety of organizations that implement ISO 14001 and addresses their environmental challenges. The authors put a list of governmental and regulatory programmers in different countries to encourage use of ISO 14001. Peglau & Baxter (2007) reported secondary results from many surveys in different periods for example; in 1996 a survey by SGS Yarsley in four European countries within more than 500 companies that confirms the main benefits of ISO 14001 is long-term business security, compliance with legislation; and improving market share.

In 2000 there were comprehensive surveys of ISO 14001 users published by the German Federal Ministry for the Environment and the German Federal Environmental Agency (Peglau & Baxter, 2007). The result of the survey shows that 83% certified respondent's state that they intend to continue with certification. The main benefits found by the users are improved organization and documentation, and greater legal security. But the most cited dissatisfaction is lack of image (*ibid*).

In 2004 Administrators of Chester Zoo in the United Kingdom identified direct benefits from ISO 14001 certification including improved performance and monitoring, legal compliance, reduced waste and energy use and lower operating costs (Peglau & Baxter, 2007).

In 2006 more than 600 environmental experts in the United Kingdom reacted to a survey on EMS; most of respondent state that an EMS brings useful and sustained benefits to organizations, going beyond those that would have been achieved by many drivers. They believed that implementing an EMS increases the regularity that whether an organization in legal compliance. All respondents confirmed that an EMS improves understanding of the organization's legal status (Peglau & Baxter, 2007).

Peglau & Baxter (2007) concluded that since 1990s the users of EMS have increased gradually particularly in the heavy industry, manufacturing sectors and companies which had large-scale environmental impacts and experience of using standards in management. The number of EMS users will continue to grow, particularly as ISO 14001 penetrates more effectively into supply chains (Peglau & Baxter, 2007, 21). As environmental issues have increased, the

range of EMS users has expanded to areas including zoos, farming, schools and universities, military services, media, ships and airlines (Peglau & Baxter, 2007, 21). The future challenge for ISO 14001 will be how to maintain its international currency as a force for environmental protection, behind that challenge ISO 14001 will need to show its ability to deal with climate change, resource use, biodiversity loss and legal compliance along with remaining an efficient tool for sustainable consumption and production (Peglau & Baxter, 2007, 21).

A similar international survey, based on 131 companies across the world and undertaken by Raines (2002), concluded that majority of respondents reported environmental improvements related to the implementation of an ISO14001 EMS, despite their reasons for becoming certified. In addition, ISO14001 should help industries improve their ability to meet the expectations of regulators, which imply improved relationships between the regulators and the regulated.

Another study in Austria performed by Schylander & Martinuzzi (2007, 145) examined 71 ISO 14001 certified sites in Austria. The study focused on experiences and effects obtained by Austrian organizations working with ISO 14001 and it discusses future challenges. The results showed that ISO 14001 often results on less environmental impact. Strong driving force behind implementation is the expected improvement of an organization's image.

5.1.2 Implementation of an EMS at Swedish universities

EMS at Swedish universities and other public agencies can be seen as an example of an important tool to achieve a sustainable society (Sammalisto & Brorson, 2006, 300). Therefore, Swedish universities as public authorities are responsible for contributing to the sustainable development of the society so it is expected to use EMSs to work towards this goal. The importance of using EMSs has been discussed by Arvidson (2004); in her study she provides a review of the activities at the 35 Swedish universities. She reported some issues including the motivation, benefits and problems when such systems are adopted.

Arvidson (2004) found that, most common driving forces are: employee and student commitment, the governmental commission, management commitment, and legislation.

In the case study at the University of Gävle, Sammalisto & Brorson (2006) concluded that EMS training and communication are very significant activities, in both industry and at universities, since they always inform and motivate management and employees about internal and external driving forces and it expresses the practical and economical benefits of the EMS.

Sammalisto & Brorson, 2006 also stated that the university savings and legal compliance are obvious driving forces for the implementation of the EMS

The over all outcome of implementing accredited (EMS) gives benefits at environmental, social and business aspects. Arvidson (2004) on her study indicated that there is a well developed awareness about environmental issues among the staff and the students. Besides, it has been shown that by offering environmental education and research, an evidence of great environmental ambitions could be seen (*ibid*).

In a report by Arvidson (2004) pointed factors that, limit some Swedish universities to fulfill commitments towards implementation of EMS such as, lack of financial resources, near-sighted economic planning and organizational structure instability. However, adoption and implementation of (EMS) at a given university is not a problem-free route; difficulties may be found at the level of environmental training of employees and creating and organizing

environmental training programs. Other obstacles include challenges associated with follow-up, evaluation, and environmental auditing. According to Sammalisto & Brorson (2006), the knowledge about implementation and certification of EMS (ISO 14001) at universities is quite limited due to different factors including the awareness and attitude of the employees at the universities.

General agreement has been drawn that EMS work at the Swedish universities is becoming increasingly more restricted, but is progressing gradually. Despite the fact that EMS work is easier for the smaller universities, which can organize around a single goal (Arvidson, 2004, 91).

5.2 Organizations and institutions related to ISO14001 in Sweden

5.2.1 Swedish Environmental Protection Agency (Swedish EPA)

Swedish Environmental Protection Agency (EPA) formed in 1967, it is a central governmental environmental authority under the Swedish Government (www, Naturvårdsverket, 3, 2010). The main tasks of EPA are to coordinate and enhance environmental work nationally and internationally. EPA follows the ISO 14001 environmental management standard and EMAS for both direct and indirect environmental impact. EPA focuses on the ecological dimension of sustainable development with cooperation with other agencies and organizations. The Agency's most important task is to guide other government agencies in how to use Environmental Management System (EMS) like: development of environmental work, implementation of environmental policy, follow-up and assessment (www, Naturvårdsverket, 2, 2010). The organization of the Swedish Environmental Protection Agency (Figure 4) working through many employees distributed organizationally across an Executive Staff, four Secretariats and five Departments (www, Naturvårdsverket, 2, 2010).

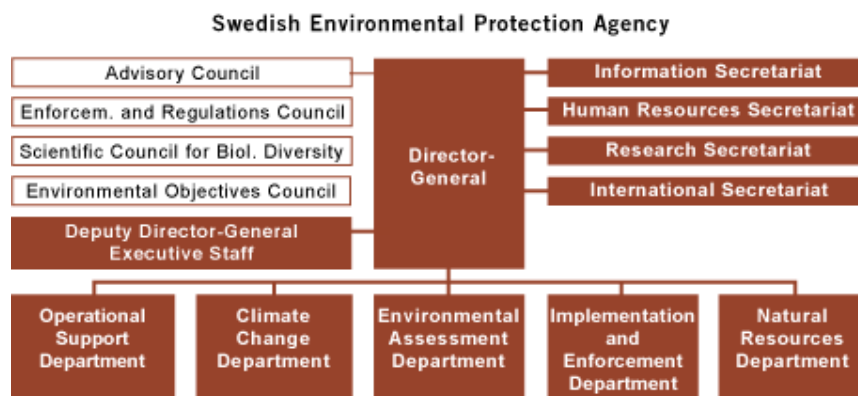


Figure 4 the organization of the Swedish Environmental Protection Agency (www, Naturvårdsverket, 4, 2010).

Figure 4 illustrates the organization of the Swedish Environmental Protection Agency (SEPA). SEPA consists of four secretariats, four councils, five departments, deputy director and director general (head of the organization).

The administrative departments are:

- **Implementation and Enforcement Department:** Responsible for the Swedish EPA's activities as regards the implementation and enforcement of environmental legislation, such as inspections, fees and sanctions (www, Naturvårdsverket, 5, 2010).
- **Natural Resources Department:** Responsible for the work related to conservation of biological diversity and the sustainable use of natural resources such as, outdoor recreation issues and coordinates the Strategy for the Management of Land, Water and the Built Environment (www, Naturvårdsverket, 6, 2010).
- **Climate Change Department:** Responsibility for the work related to the climate objective, ecological sustainable development and for evaluations of environmental activities. The Department coordinates the Swedish EPA's work relating to the action strategy for more efficient energy use and transport (www, Naturvårdsverket, 7, 2010).
- **Environmental Assessment Department:** Responsible for the work relating to collect and build knowledge on the state of the environmental impact, it also coordinates international reporting, follow-up, evaluation and information provision in relation to the national environmental quality objectives. The department encourages consultation and collaboration in work relating to regulations and in inspection and enforcement activities under the Swedish Environmental Code (www, Naturvårdsverket, 8, 2010).
- **Operational Support Department:** Responsible for the work relating to administration, legal affairs and information. It also coordinates internal matters relating to quality improvement, planning and follow-up (www, Naturvårdsverket, 9, 2010).

5.2.2 Swedish National Agency for Higher Education

Swedish National Agency for Higher Education is the public authority that reviews the quality of higher education by: Ensuring the compliance with the regulations, monitoring the trends and developments in higher education, and offering information about higher education (www, Höskoleverket, 1, 2010).

Higher education institutions (HEIs): At the beginning of the twentieth century a strong growth in higher education was started in Sweden. Currently, there are about fifty-two institutions of higher education run by either central government regional authorities or private sectors (www, Höskoleverket, 3, 2010). In the latter part of the twentieth century, there was a major expansion of higher education and the student population grew drastically. Statistics shows that, there is a quick increase in the number of university entrants at higher education institutions in Sweden during the academic years of 1997/98-2007/08 (Appendix 3).

In Sweden, higher education is in focus on three sets of activities research, education and co-operation with the rest of society (www, Höskoleverket, 4, 2010).

The government is playing an important role in higher education, where most of finance for education is funded by government (see appendix 4) (www, Höskoleverket, 2, 2010). There are 36 government-funded higher education institutions (fourteen universities and twenty two university colleges) (www, Höskoleverket, 2, 2010). According to Sammalisto & Brorson,

(2006, 300) environmental management system at Swedish institutions and other public agencies can be seen as an example for a sustainable society as shown in (Figure5).

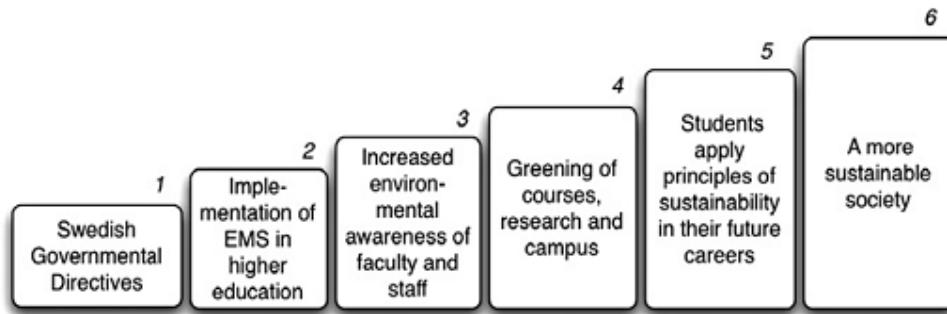


Figure 5. The role of EMS in higher education in the steps towards a more sustainable society (Sammalisto & Brorson, 2006, 300)

This figure illustrates the six steps towards a sustainable society that public agencies can follow to achieve the objective. The steps begin with driving force from Swedish governmental side, implementation of EMS in higher education, increase environmental awareness of faculty and staff, greening of courses and researches and then students apply principles of sustainability in their future careers which lead to a more sustainable society.

6 The empirical study

In the following chapter, the introduction and some facts about SLU and its departments will be reviewed; results of the qualitative findings from both documents and interviews regarding to the EMS of this university will be presented in order to give the reader an insight into the problems.

6.1 Introduction about Swedish University of Agricultural Sciences

SLU has broad responsibilities concerning the biological resources, learning and biological production. Through wide range of agricultural, forestry and food industry, veterinary medicine and applied biotechnology; SLU has leading responsibilities towards the teaching and contact with industry and society (www, SLU, 3, 2010).

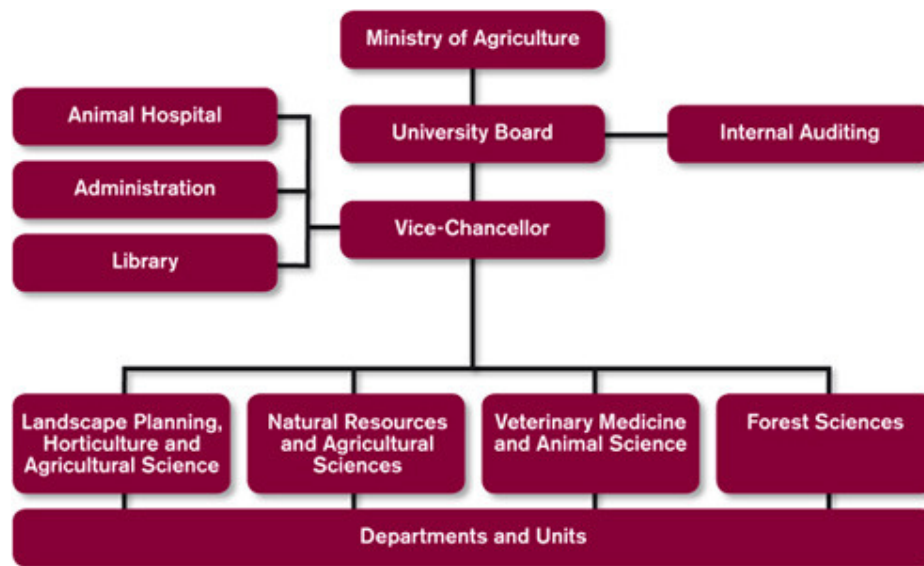


Figure 6 Structure of the organization - Swedish University of Agricultural Sciences (www, SLU, 3, 2010).

Through the different departments and faculties spread within the university, SLU offer broad educational programs and courses for undergraduate and postgraduate students. These activities are organized in four faculties which found at different locations around Sweden. The Faculty of Landscape Planning, Horticulture and Agricultural Science are based at Alnarp, the Faculty of Forest Sciences at Umeå, the Faculty of Natural Resources and Agricultural Sciences at Uppsala. The Faculty of Veterinary Medicine and Animal Science is mainly based in Uppsala, but also carries on a significant part of its work at Skara. A total of 3 200 people are employed within the university and over 3500 students enrolled within the different campuses in Alnarp, Skara, Ultuna and Umeå (see appendix 5) (www, SLU, 3, 2010):

- Faculty of Landscape Planning, Horticulture and Agricultural Science (Alnarp): Lying within different areas in plant protection and horticulture, the Faculty of Landscape Planning, Horticulture and Agricultural Science had several researches concerning these fields (www, SLU, 8, 2010).
- Faculty of forest science (Umeå): One of the most leading faculties in Sweden concerning the higher educational and research, with 11 departments within this area. The faculty is provides 80 programs and courses covering wide range of topics (e.g. functions of forests). Also, the faculty combines the functions of research in soil, vegetation, condition, water and climate to be used also in teaching and further education. The main campus is located in Umeå (www, SLU, 6, 2010).
- Faculty of Natural Resources and Agricultural Sciences (Uppsala): The BioCenter in Uppsala consist of different departments and faculties working together in collaboration to offer better and higher standard environment for research and education. Those departments are Chemistry, Food Science, Microbiology, Molecular Biology, Forest Mycology and Pathology and; Plant Science and Forest Genetics. Those departments have advanced facilities and equipments to enable better quality for research among the different fields (www, SLU, 5, 2010).
- Faculty of Veterinary Medicine and Animal Science (VH) (Uppsala and Skara): Linking the farm, education and research in Sweden, is one of the Faculty of Veterinary Medicine and Animal Science (VH) concerns. The faculty provides popular teaching programs (e.g. veterinary medicine, animal science, ethnology and animal welfare, animal caring science and equestrian science). The research within this faculty lay around the deep research in basic biosciences as well as applied science and production (www, SLU, 7, 2010).

6.1.1 SLU`s mission, vision and strategy

SLU develops the understanding and sustainable use and management of biological natural resources. This is achieved by research, education and environmental monitoring and assessment, in collaboration with the surrounding community. The strongest vision for the university is to be *a world leader in the field of Life Sciences*. (www, SLU, 4, 2010). SLU's strategy for research, education, and environmental monitoring and assessment (2009-2012) are expressed in the life science and knowledge for a sustainable future as (www, SLU, 10, 2010): *SLU is able to track changes in environmental conditions, assess problems, and provide a basis for the sustainable utilization of natural resources.*

6.2 Environmental Management at SLU

According to Governmental decision in 1997 the SLU should introduce and then work as an EMS. In order to realize this SLU must be committed to: (www, SLU, 10, 2010):

- Chart direct and indirect environmental impacts
- Maintain an environmental policy
- Set goals for environmental management
- Develop an action plan with responsibilities and time frames
- Implement the policies
- Recognize and evaluate the results

- Annual review of environmental objectives and continuously improve environmental policy

In the 15th of June 2009 the Vice-Chancellor's decided that the whole university should be certified under the ISO 14001 standards. Accordingly, a model of SLU's Environmental Management System has been developed and used now (figure 7). The certification process has already lasted some years and some units have so far received environmental certificates.

6.2.1 Requirement for environmental management

Each SLU unit, or group of entities, such as clusters or faculty, will implement the following (figure):

- Environmental review: Identify their environmental impact and evaluate what is most important (positive and negative).
- Make sure they are abiding by environmental legislation (Environmental Code, etc.).
- Determining objectives and action plan based on the environmental review, Writing a simple action - like a checklist - with what should be done, who should do, and when?.
- Implement environmental improvement according to their plan.
- Follow-up results; the results are reported to management with a need of improvement. This is often called "management review".
- Environment court audited results.
- Annual Report; report submitted to the SLU's annual report.

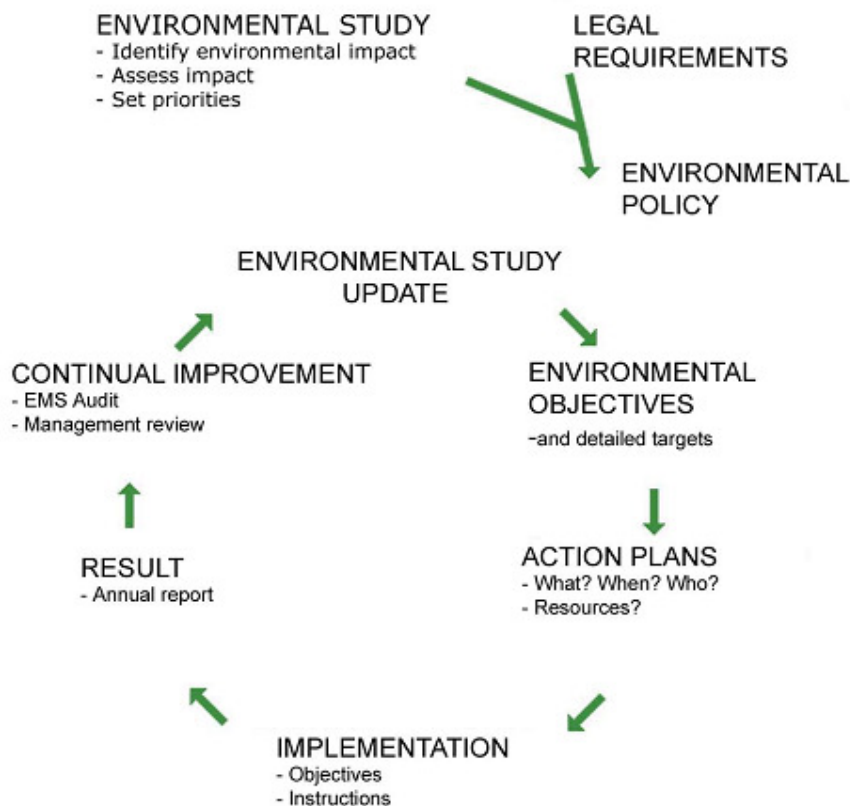


Figure 7 Environmental management systems for SLU (www, SLU, 11, 2010).

Figure 7 illustrates the guidelines for implementing an EMS at SLU. After completion of environmental review, the departments or units, prepare and adopt targets and determined an action plan for each environmental objective to implement the work as well as reporting the results to the top management. Environmental management must be monitored and reported to the EMS audit to check the results.

SLU environmental goals could be discussed in two steps in term of time aspects of setting goals: overall, long-term environmental goals for 2-4 years each, and detailed milestones, three steps of one year each as a part of the long-term goals.

The choice of the overall environmental goals should be based on SLU's Environmental Policy and the individual institution or equivalent self-updated environmental review to identify the most significant environmental issues.

6.2.2 Environmental management policy

The university has a policy with the visions and principles for the work with long-term sustainable development. The philosophy of sustainable development is present throughout the university in research, education and environmental monitoring and assessment. SLU environmental policy indicates aims to work towards ecological, social and economical sustainable development in relation to the national environmental objectives of the Swedish government (www, SLU, 12, 2010).

SLU aims to continually strengthen environmental aspects of courses and research. Their policy is related to the international standard for environmental management ISO 14001. SLU's policy is to make continuous improvements in the long term. SLU will provide opportunities for all staff and students to obtain a good understanding and knowledge of environmental aspects. Thus all staff and students can contribute to sustainable development. All students and staff should be committed to sustainable development and should comply with the environmental policy. The university should pay attention to possible environmental circumstances, both positive and negative. The university aims to focus on saving energy, such as from electricity and cars. In the policy, SLU should try to integrate environmental issues into all courses, decision making and in all activities carried out within all of SLU's units.

6.3 Investigation - Cases studies

This section is investigating the findings of the researchers regarding the EMS applied at SLU in order to address my project questions about motivation factors in the certification process, perceived challenges and expected results. Selected questionnaires were chosen to highlight the strength of the results.

Since the university is not consistent in the EMS implementations and considering the time limit of the project, I was unable to conduct more interviews with more involved individuals in this work. Six person occupying different administrative positions at SLU were interviewed in this section with different question categories. Selected quotations are made to enlighten and strengthen the results. The question categories were highlighted below (see appendix 2):

- **Planning:** The question on specific environmental plan.
- **Implementation:** These questions were concerned with the evaluation of the present situation on the implementation process of the EMS (ISO 14001).

- **Checking & management review:** Set of questions to evaluate the monitoring, follow up and the frequency of managerial review.
- **Driving forces:** The major driving reasons to implement the standards for environmental management at SLU.
- **Problems:** This category was designed to evaluate the obstacle and problems that may be encountered during the implementation process of the environmental management system.
- **Benefits:** This questions category dealt with the major benefits that result from the implementation of ISO standards.
- **Continual improvement:** a measure of the opinion about how to improve the future of the system.

6.3.1 Environmental management office

Interview with environmental manager

In the interview with the environmental manager of SLU the following results has covered a variety of topics

The environmental manager works as coordinator of environmental management system in SLU. She was responsible for the external but not the internal environmental issues and the working environment within the department. There is no specialized staff responsible for the environment at SLU but this issue is supported by a network of persons. SLU has one environmental policy for the whole organization.

The manager has specific environmental plan for 2010 (called LOTS®). This plan consists of goals for long and short terms perspectives. The goals were set to make measures, collecting data about the environmental impact of the university, listing the most important environmental aspects, listing the activities that ought to be done during the year, and for making a list of stakeholders and their interest in the environmental work of SLU. The level of commitment is in the organization regarding the work with environmental goals is not so high. SLU affected by many regulations like the Environmental Code in Sweden regarding the SLU farming and legislation about chemicals and hazards waste (Pers.com, Melin, 2010).

In the implementation process, SLU started to certify all the departments and units by ISO 14001 standard. Two certificates were issued, one for Property Management “Egendomsförvaltningen” and one for Department of Forest Resource “Institutionen för skoglig resurshushållning”. Some departments/ units started the certification process but the rest didn’t start yet. There is no standard plan for communication with employees except for orientation rounds and lectures with the expected feedback.

The main driving forces for certification were to follow the demands of the Swedish Government and legislation and the decision of the headmaster of the university.

Also to get a better management system according to ISO 14001 and to be listed in the ranking list of Environmental Protection Agency one of the driving forces. One of the driving forces to be certified is to present SLU as a trustworthy authority and to satisfy the stakeholders by following the standard of ISO 14001.

Since SLU is a big organization, the major obstacle during the implementation process was the shortage of resources. There is no participation in the whole SLU because people believe that it is a complicated system with a lot of daily tasks, time and resource consuming.

To deal with this problem, people must be appointed to be engaged in writing the routines and structures and follow it afterwards, and explain to them how to implement the management system.

Since there is no certification for all unites, the benefits expected to provide better and systemized environmental work and give good measures of the impact on the environment (*i.e. how many chemical we use, how much energy we consume, how much paper we buy and so on*) (Pers.com, Melin, 2010).

In a way to improve the system, the environmental manager should make the system more understandable, establish a clear structure and make the information easy to access.

It is also good to point out the most important environmental aspects, write a plan and a road map for how to continue the work.

6.3.2 Faculty of Forest Science (Umeå) - Department of Forest Resource

Interview with The environmental coordinator

The environmental coordinator performs her duty as a part-timer at the department resembling 15 % of her work. The department is working according to the environmental policy of SLU, but they formulated their own environmental objectives/goals. They are preparing a specific plan for 2010.

According to government decision 1997 the department started the work with environmental management systems in the period between 1998 and 2002, and accordingly the department was certified ISO 14001 in 2004. In 2007 the certification was renewed in November 2009 and the certificate will be re-examined.

For each goal there is a group responsible for monitoring. These groups were assigned the responsibility of monitoring at least once per year, and develop new operational plans each year. Twice per year, the department writes and presents an internal report to the departmental board. The departments have an internal and external audit each year. The major finding after checking concerns the environmental goal for traveling that they want to reduce their domestic traveling. "*We want to reduce our domestic traveling by air.*" (Pers.com, Wästerlund, 2010).

The main driving forces are to be a trustworthy authority, taking care of the environmental impact, and the demands from the Swedish Environmental Protection Authority. One of the obstacles is the growing need to deal with the environmental goals and the goals of the department. Another obstacle is to keep up the spirits among the environmental groups and look up for new ways to improve.

The expected benefits are that a large part of the activities will be monitored and the authority will be more trustworthy. Taking care of the environmental impact and using the ISO 14001 in the marketing strategies will also be benefits. Creating bridges between researchers to work together is expected as well to be a benefit.

The implementation of ISO 14001 is expected to contribute to sustainable development as a consequence of its systematic approach. The expectations after five years speculate that the department will have new exiting goals to work for.

6.3.3 Faculty of Landscape Planning, Horticulture and Agricultural Science- LTJ (Alnarp) Interview with the Dean of the Faculty

The environmental plan is to reduce the environmental impact as much as possible in the every day work and to do some investigations and writings in order to start the implementation process (Pers.com, Sarap, 2010). Environmental representative was appointed at every department, prepared to start the implementation when all the documents are ready. There will be shorter educations connected to this.

“LTJ is the smallest faculty at SLU and we regard ourselves as flexible and in front of changing processes in general. There was a major reorganization at faculty level in 2007, and we thought the process of environmental certification might be one of a few themes of concern for the whole campus, to make researchers from different disciplines to meet and act together. Now, I realize, all other matters connected to the reorganization where so energy consuming, that the environmental issues were not enough prioritized” (Pers.com Sarap, 2010).

They plan to follow up the environmental goals once a year. LTJ have no audit so far, but in registering different activities, they realized that their travel behavior is the most environmental affecting factor.

The respondent articulated the main driving force to obtain the certification is to have a good system for describing the environmental impact of the faculty activities and to reduce it as much as possible. She stated that there are no problems accrued since they are not started the implementation process yet.

The major benefits that the implementation will lead to: systematic control over documents concerning responsibilities toward dangerous chemicals and changes in travelling behavior *“Take the train instead of flying and some of the meetings are held with video conference techniques”* (Pers.com, Sarap, 2010). Moreover, it will increase awareness and present good standard models for the students, beside there are great opportunities to rearrange the energy systems in greenhouses (both light and climate control). After certification the faculty will use ISO 14001 in the marketing strategies

The respondent think the implementation of ISO 14001 contributes to a sustainable development which lead to change in traveling behavior and decrease the operation cost later. *“What today is exceptional will be normal in five years time. We hope to be earlier than most colleagues, but in a few years time this will probably be the standard”* (Pers.com, Sarap, 2010).

6.3.4 Faculty of Veterinary Medicine and Animal Science (Uppsala) Interview with The Vice-Dean of the faculty

The respondent is the Vice-Dean of the faculty who has been working in the faculty for about 3 months. The faculty has no specific environmental plan, but to some extent it has taken environmental issue on its operation as important. The NL faculty has more than 500 employees, more than 1000 students, farms, laboratories ... etc; so it has an impact on the environment in several ways (Pers.com, Ekestén, 2010).

The faculty did not made any plan to get ISO 14001 so far. Some times they communicate with the environmental manager and other employees about environmental issues. They do not receive any information on the standard yet. The respondent explained his strongest

arguments for promoting ISO 14001 in the faculty that it has been decided by the Vice-Chancellor.

Since the faculty is not start the implementation yet the respondent had no idea about problems and benefits of implementing ISO14001. *“Most likely, the people having to deal with the work are already overwhelmed by various forms of administration, re-organizations etc”* (Pers.com, Ekesten, 2010). In addition he expected that after five years, the faculty would like to be certified by ISO 14001 standards.

6.3.5 University Administration

Interview with the university director

According to Heyman (2010) there is no specific environmental plan, but they are working to develop an environmental governing scheme in order to certify all university according to the ISO 14001 standard.

The university has direct impact on the environment. For example the kind of paper to buy, way of printing and energy used. However indirect impacts are hard to control, they try to install a lot of video meetings and video conferences to increase communication and decrease traveling between campuses. For controlling the transportation, they decrease the number of parking spaces to 5 and decrease the number of cars, and then people would have to take the buss.

Since, there is no standard plan for communication with employees except for orientation rounds, website, discussion with administration people and decision making with the expected feedback. The interviewee thinks they do have to increase the communication role with other employees according to ISO 14001.

The respondent stated that since they were not started the system they don't follow environmental plan and they are not monitored. They try to follow up traveling and look at the energy use but are not systematic.

The main driving forces are to have a good system for describing the environmental impact of the university activities and to measure its impacts. Motivating people to discuss the environmental issues is one of the driving forces for certification. Also he said:

“It seems like a good idea to be certified and it's the moral thing to do” (Pers.com, Heyman 2010)

The main problem faced the university to obtain ISO 14001 is that the system is a little bit detailed and need too much work. *“The problem within the university today is we don't work systematically with improvement”* (Pers.com, heyman 2010). So the implementation of ISO 14001 will contribute to a sustainable development if the university follows the system in every step.

In the context of the continual improvement the respondent argues that, there is nothing to be done to improve the system but changing simple things such as traveling and food in restaurants will be good improvements. In five years or ten years the university may have zero impact on the environment.

6.3.6 Faculty of Natural resources and Agricultural Sciences (Uppsala BioCenter)

Interview with The environmental coordinator

The environmental coordinator performs his duty as a part-timer coordinator for Uppsala BioCenter beside his work at the department of microbiology. BioCenter does not have any environmental plan, but the unit is taking the environmental issues as important in its operation. There is a lot of research going on the environmental issues and the risk assessment (pers.com, Cederlund, 2010).

An environmental group with representatives from all the departments was formed in 2008. The group has been working continuously from the autumn 2008 until the beginning of 2010. The initial step was to identify and rank different environmental impacts from activities at the BioCenter.

Further work has consisted in producing all the different kinds of steering documents that are included in the ISO 14001 certification. These included: descriptions of the organization at the BioCenter, lists of environmental aims, action plans for how to achieve the environmental aims, protocols for how to report and measure the environmental aims. In addition: instructions for waste handling, lab work, office work, field work etc. in order to reduce environmental impact from these activities.

According to the respondent the environmental groups were finished the initial review of the work. But what was lacking was a reporting system, so that people working at the BioCenter could report "avvikelser" if something does not work as it is supposed to, or hand in suggestions for improvements.

At this stage it was decided that SLU should obtain a certificate as a whole, and their work stopped. Therefore, they have not really implemented any part of the system in the organization yet. *"We as group think it's probably a wise idea to have it as SLU as whole system because if all the departments should have to do the same work, then why don't we collaborate and do this all together"* (pers.com, Cederlund, 2010).

Concerning the checking and management review they have one audit as start up, for major finding the audit had a few direct and good suggestions for improvements. However, since it was decided soon that SLU as a whole should obtain the certificate they have not worked further with this.

The major driving forces are:

- Motivation from the environmental manager.
- Decision by the rector.
- Environmental concern *"Because it was required from us by the rector and from the beginning that we thought that it was going to be required from us"* (pers.com, Cederlund, 2010).

The major obstacles such as the difficulty to understand the structure of the work and what actually should be written in which document. As a result, people in this group have been frustrated and started thinking that this work would waste their time. *"When we work with this environmental certification suppose to do an evaluation at how important are the different issues or criteria we can guess but we can't evaluate because we don't have any quantification data"* (pers.com, Cederlund, 2010).

The benefit from this work is concerning the handling of chemicals and field work of how things are done at different departments. *“At least we have made an inventory of how things are done at the different departments; this might be valuable in the future. I hope that some of the instructions that we have written might be valuable such as the instructions for handling of chemicals and field work”* (pers.com, Cederlund, 2010).

The system need to be more accessible for example by constructing the BioCenter webpage about the environmental work. *“I don’t think that it leads to sustainability – it might however, contribute towards a sustainable development. I believe that small step might be good, although larger steps are required”* (pers.com, Cederlund, 2010).

7 Analysis

This chapter analyses the empirical data and addresses the questions posed in chapter one, with regard to the theoretical perspective presented in chapter 3. The research questions are focusing on motivation factors, perceived challenges in the certification process, and expected results of implementing the ISO 14001 at SLU.

7.1 Driving forces, problems and benefits

The concept of EMS and its related notions like ISO14001 has been elaborated so forth in this study. In addition, there was an investigation about the EMS at this university and how they work within it, however some facts about the implementation of the ISO 14001 standards were found as a result of this investigation. In analyzing the case, the most important driving forces, benefits and problems of the university's implementation of ISO 14001 appear to be as following (table 2):

Table 2: Comparative table of target faculties and units (driving forces, benefits, problems and the stage of implementation ISO14001 at SLU)

Cases	Environmental management office	Faculty of Veterinary Medicine and Animal Science (Uppsala)	Faculty of Forest Science (Umeå) - Department of Forest Resource management	Faculty of Natural resources and Agricultural Sciences- Uppsala BioCenter SLU	Faculty of Landscape Planning, Horticulture and Agricultural Science- LTJ (Alnarp)	University Administration
Main driving forces	<ul style="list-style-type: none"> - Demands form Government and legislation. - Decision by SLU headmaster. - Better EMS. - Listed in the ranking list. - To be a trustworthy authority - Satisfy the stakeholders 	Decision by SLU headmaster.	<ul style="list-style-type: none"> - Demands form Government and legislation. - To be a trustworthy authority 	<ul style="list-style-type: none"> Self commitment - Decision by SLU headmaster. - Environmental concern - Driving from environmental manager. 	<ul style="list-style-type: none"> - Opportunities to rearrange the energy systems. - Changes in travelling behaviors. 	<ul style="list-style-type: none"> - Better EMS. - Motivating people to discuss the environmental issues.
Major problems	<ul style="list-style-type: none"> - Shortage in resources. - Big organization. - No engagement in the whole of the organization 		<ul style="list-style-type: none"> - Have a collision between the environmental goals and the goals of the department - To keep up the spirits among the environmental groups and look for new ways to improve. 	<ul style="list-style-type: none"> - Difficulty to understand the structure - To keep up the spirits among the environmental groups. - Documentation problems 	No proplems occurred yet	EMS detailed and need too much work,
Major Benefits	<ul style="list-style-type: none"> - Better EMS - Systemize the work. - Measures environmental impact 		<ul style="list-style-type: none"> - Monitoring the activities. - Be a trustworthy authority. - Taking care of the environmental impact. -commissions from other actors. - integrated environmental work in the normal routines. - Use ISO 14001 in the marketing strategies. - Objectives were closed to achieve. - Join forces among colleagues 	<ul style="list-style-type: none"> - Handling of chemicals -Feedback work to the different departments. 	<ul style="list-style-type: none"> - Systematic control over documents. - Changes in travelling behaviors. - Increased awareness. - Present good standard models for the students. - Less pollution - More efficient energy use in greenhouses 	<ul style="list-style-type: none"> - Contribute to a sustainable development
Stage of Implementation process of	Prepared to start	Didn't started yet	Successfully implemented (Certified 2004)	Planning to start	Prepared to start	Planning to start

According to table 2, most departments either prepared to start the implementation of ISO 14001 or planning to start, only one successfully implemented and one did not started yet. In the next sections there will be more interpretations of table 2 regarding driving forces, benefits and problems of the university's implementation of ISO 14001.

7.1.1 Driving forces

This question category dealt with the major reasons that drove the university to implement the standards for environmental management. The reasons explained by the respondents were that the university aimed to present itself as a trustworthy authority. Also the demands raised by the Swedish government to the public in the 1990th to consider the importance of the environmental management systems. Later on and on 2009 these demands became legislation. The stakeholder's requirements seem to play a major role as a driving force according to the environmental manager's view. Almost all the respondents showed their willingness to reduce the environmental impact as much as possible (see table 2).

Table 3: Comparative table of target faculties and units (driving forces of implementation ISO14001 at SLU)

Driving forces according to theory	Environmental management office	Faculty of Veterinary Medicine and Animal Science (Uppsala)	Faculty of Forest Science (Umeå) - Department of Forest Resource management	Faculty of Natural resources and Agricultural Sciences- Uppsala BioCenter SLU	Faculty of Landscape Planning, Horticulture and Agricultural Science- LTJ (Alnarp)	University Administration
Motivation by the willingness of management to implement	- Decision by SLU headmaster.	Decision by SLU headmaster.		Decision by SLU headmaster. Driving from environmental manager.		Motivating people to discuss the environmental issues.
Regulatory demands	- Demands form Government and legislation.		Demands form Government and legislation.			
Competitive requirements	To be a trustworthy authority Listed in the ranking list.		To be a trustworthy authority			
Integrate EMS into a more coherent framework.	Better EMS.				Better EMS	Better EMS.
Improving efficiency					Reducing environmental impact	
Self commitment				Environmental concern		
Stakeholder forces	- Satisfy the stakeholders					

Table 3 shows the major driving forces for the implementation and according to Sroufe & Sarkis (2007); Kenneth *et al* (1998); Morrow & Rondinelli (2002) in the theory chapter are:

- Motivation by the willingness of management to implement ISO 14001.
- Regulatory demands

- Competitive requirements
- Integrate EMS into a more coherent framework.
- Improving efficiency
- Self commitment
- Stakeholder forces

Different departments mentioned one or more motives. The most prevalent driving forces shared by different departments were the decision from the headmaster, the equally demand from government, better EMS and to be trustworthy authority.

The driving reasons to implement the standards for environmental management explained by the respondents were: *willingness of management to implement ISO 14001*; the willingness of the headmaster and environmental manager to implement ISO 14001 were respected and be as a major motivation among employees, Then the *regulatory demands* raised by the Swedish government to the public in the 1990th to consider the environmental management systems. In addition, to stay *competitive in the future* the university aimed to present itself as a trustworthy authority and to be listed in the Environmental Protection Agency ranking list. Other driving force that was stated by most of the respondent is to have a better EMS by *integrating EMS into a more coherent* framework. Moreover, *Improving efficiency* by reducing environmental impact, *self commitment, stakeholders and customers requirements* didn't seem to play a major role as driving force.

7.1.2 Problems

This section evaluates the obstacles and problems that are encountered during the implementation process of the environmental management policy. The major problem was to keep up the sense of the importance of this issue among employees in addition to avoidance of collision with policies of the departments or the university. The allocation of the needed resources is another major problem when dealing with this issue.

Setting the organization and structure of the work required the appropriate expertise which could be a real problem for some departments. The efficiency of information delivery system and the availability of information source at the appropriate time was also a major obstacle for some departments (see table 4).

Table 4: Comparative table of target faculties and units (problems and the stage of implementation ISO14001 at SLU)

Major obstacles according to the theory	Environmental management office	Faculty of Veterinary Medicine and Animal Science (Uppsala)	Faculty of Forest Science (Umeå) - Department of Forest Resource management	Faculty of Natural resources and Agricultural Sciences- Uppsala BioCenter SLU	Faculty of Landscape Planning, Horticulture and Agricultural Science- LTJ (Alnarp)	University Administration
lack of financial resources	- Shortage in resources. -Big size of the organization					
high demand on documentation	No engagement in the whole of the organization		To keep up the spirits among the environmental groups and look for new ways to improve.	To keep up the spirits among the environmental groups. Documentation problems		EMS detailed and need too much work.
Environmental performance			- Have a collision between the environmental goals and the goals of the department	Difficulty to understand the structure	No problems occurred yet	

Table 4 shows the major obstacles for the implementation and according to Morrow & Rondinelli, (2002); Yiridoe & Marett (2004); Arvidson (2004) in the theory chapter are:

- High demand on documentation
- Lack of financial resources
- Environmental performance

Major obstacles that more than one department agreed with is to keep up the spirit among the environmental groups. Other wise a list of different obstacles was mentioned ranging from one reason to no problems occurred yet.

- Lack of financial resources: According to Melin (2010) the main obstacle is the type of organization, since SLU is a big organization and hesitating to put on resource.
- High demand on documentation: there is no really engagement in the whole of the organization; employees believe that it's a complicated system with a lot of daily tasks to do, time and resource consuming. Another obstacle is to keep up the spirits among the environmental groups.
- Environmental performance: the main obstacles at SLU are to understand the importance of the management system within the organization, and then employees must be appointed to engage in writing routines and structures, how to implement the management system and follow it afterwards. The efficiency of information delivery system and the availability of information source at the appropriate time were also major obstacles for some departments. One department has its own goals and it perceived a collision between the SLU's environmental goals and the goals its own.

7.1.3 Benefits

Within the university units there is a need to monitor the environmental impact for activities like systematic control of documents, changing traveling behavior and the responsibilities of handling dangerous chemicals. Some of the respondents think that having a clean environment (e.g. less pollution by changing travel policy) and being able to avoid the effects of environmental toxins (better handling and proper disposal of chemical waste) were the major benefits. They also mentioned increasing the awareness among students and better energy consumption among the major benefits. The respondents think that the implementation of ISO14001 contributed to sustainable development (see table 5).

Table 5: Comparative table of target faculties and units (Benefits of implementation ISO14001 at SLU)

Major Benefits according to the theory	Environmental management office	Faculty of Veterinary Medicine and Animal Science (Uppsala)	Faculty of Forest Science (Umeå) - Department of Forest Resource management	Faculty of Natural resources and Agricultural Sciences- Uppsala BioCenter SLU	Faculty of Landscape Planning, Horticulture and Agricultural Science- LTJ (Alnarp)	University Administration
Less environmental impact	Measures environmental impact		- Monitoring the activities. - Taking care of the environmental impact. - integrated environmental work in the normal routines.	- Handling of chemicals	- Changes in travelling behaviors. - Less pollution	
Cost savings and reduction in resources usage			- Use ISO 14001 in the marketing strategies.		- More efficient energy use in greenhouses	
competitive advantage			-Be a trustworthy authority. -commissions from other actors.			
developing the EMS	- Better EMS - Systemize the work.				Present good standard models for the students.	
Environmental objectives			- Objectives were closed to achieve.			
record keeping and documentation control				Feedback work to the different departments.	Control over documents. -Systematic control over documents.	
Others			Join forces among colleagues		Increased awareness.	Contribute to a sustainable development

Table 5 shows the major benefits for the implementation and according to Morrow & Rondinelli, (2002); Sheldon (1997); Weib & Bentlage (2006); Lopez (2006) in the theory chapter are:

- Less environmental impact
- Cost savings and reduction in resources usage
- Competitive advantage
- Developing the EMS
- Environmental objectives
- Record keeping and documentation control.
- Others

The main and important benefit stated by different departments was concerning the monitor of environmental impact for activities. Meaning that, they will be better in the environmental work such as handling everything in a more environmental friendly way and also it leads to systemize the work and measure the impact on the environment (*i.e.* how many chemical they use, how much energy they use, how much paper they buy and so on). Beside that SLU would be a trustworthy authority, presents good standard models for the students and contribute to a sustainable development. Other perceived benefits like record keeping and documentation control leads to feedback work to the different departments and control over documents.

7.2 Analysis according to EMS Deming –cycle

In fact, it has been discussed that the overall objective of this project is to provide a picture of subdivisions' orientations towards environmental certification at SLU in order to address the project questions about motivation factors in the certification process, perceived challenges, and expected results. Therefore, the researcher has tried to compare the EMS of this university to the general principles of EMS, from definition to the implementation.

7.2.1 Environmental policy

SLU has one environmental policy for the whole organization. Their policy is related to the international standard for environmental management ISO 14001. SLU has defined its strongest vision as to be a world leader in the field of Life Sciences for a sustainable future as: *SLU is able to track changes in environmental conditions, assess problems, and provide a basis for the sustainable utilization of natural resources.*

Moreover, the environmental manger has defined some long-term goals and short term- goals, which are towards SLU vision. One of the strongest points that this university stands for is about focusing on their vision and this vision has to be achieved by research, education, environmental monitoring and assessment, in collaboration with the surrounding community. In order to reach these goals and vision they have started to design an EMS of their university in different issues according to the legislation and the Vice-Chancellor's decision that is the whole university should be certified under the ISO 14001 (Pers.com, Melin, 2010). Accordingly, a model of SLU's Environmental Management System has been developed and is being used now (figure 7). Hence, there are similarities between it and the models of EMS Deming–cycle (figure 3) which was introduced at chapter four; that both of them are based on the Deming concept the PDCA-cycle (Plan, Do, Check, Act). The two models intend to be run on a continuous basis improving the environmental performance of the organization. Next

section analyzed the similarities between the two models referring to the empirical finding from the investigation.

7.2.2 Planning

According to EMS Deming-cycle and in the **plan step**, some objectives and guiding principles were published by this university. Within these objectives and principles, they have network of environmental representatives (different responsible teams) to work towards these policies and objectives within different departments and units. In addition, this university has defined a plan (called LOTS) including activities that the university must follow to reach its objectives (pers.com, Melin, 2010). Within these developments, they try to evaluate and assess their work regularly and in all issues. The survey questions on planning included a question on specific environmental plan. One of the respondents (SLU, Umeå) explained that the department adopts the SLU environmental policy for the time being and they are preparing a specific plan for 2010. Some departments are formulating their own environmental plan (e.g. waste management, especially toxic waste). The rest of the responses excluded the existence of specific environmental plan. Some of the departments showed big interest in the environmental issue at the level of research and risk assessment. Most of the departments showed less interest in environmental question despite their far bigger impact on the environment (SLU has 500 employees, 1000 student, farms, laboratories ... etc). Almost all respondents showed their willingness to reduce the environmental impact as much as possible.

7.2.3 Implementation

The second step is the **Do step** of the theoretical model which comes when the improvements are being done. According to Tibor & Feldman (1997) when the organization has decided what its plan is, it should come up with the essential elements such as the structure and responsibility, training, awareness and competence, communication, EMS documentation, document control, operation control and emergency preparedness. These elements would assist in building successful implementation.

SLU started working with the environmental management system in 1997 which also marked the start of the implementation process of the whole university. As for the individual departments, some already have been certified ISO 14001 (e.g. forest resources management - Umeå). Some faculties are preparing to start the implementation process and they are in the beginning of the process of certification (e.g. Alnarp campus for Landscape Planning, Horticulture and Agricultural Science, SLU). Other units had already started the documentation process (e.g. Uppsala Biocenter and university head office of SLU), and some didn't started yet (Faculty of veterinary medicine and science), despite ISO14001 was a governmental legislation.

There is no standard plan for communication with employees except orientation rounds, websites, discussion with administration staff and decision making with the expected feedback; some of the interviewees think they do have to increase the communication role with other employees according to ISO 14001

7.2.4 Checking, management review & continual improvement

The third and fourth steps in the model are **check** and **management review**. In this respect, some questions category tried to evaluate the monitoring, follow up and the frequency of managerial review (Tibor & Feldman, 1997). According to these steps, usually groups were assigned the responsibility of monitoring the goals at least once per year (For each goal there

is a group responsible for monitoring). Some departments assign internal and external audits each year. Accordingly; twice per year, the department writes and presents an internal report to the departmental board. Moreover, some departments participate in serving this question by referring it according to non-certified positions.

Final step in the model is **continual improvement**, which comes when the management review of the EMS by an organization are being done. This review should take up the possible variable points in the organization's policy, objectives and other elements of the EMS according to the audit result to guarantee that it continues to meet the needs of the organization. Therefore, SLU is involved in sustainable development of its EMS by making the system more understandable and establishing a clear structure in addition to implementing green travel policy, decreasing the toxic emission and information easy accessibility. From the interview responses it becomes very clear that SLU is trying to continuously improve the system and implement the above mentioned parameters and that will help put the whole system in a better position after such a period of time.

8 Discussions

This chapter aims at address the research questions stated in chapter one, based on the theoretical framework and the empirical data. The research questions are presented in the following parts:

- What are the key motivation factors in the certification process?
- What are the perceived challenges in the certification process?
- What are considered benefits results of implementing the ISO 14001 at SLU?

8.1 Driving forces for implementing ISO14001

A summary of the driving forces that the theoretical part of this essay presents is given below; each of these driving forces compared to empirical finding in the discussion below:

Table 6: Driving forces according to the theory and the finding

According to the theory	According to the respondents
Self-commitment and business management (Sroufe and Sarkis, 2007, p200)	Decision by SLU headmaster. Driving from environmental manager. Motivating people to discuss the environmental issues.
Regulatory demands (Kenneth et al, 1998).	Demands form Government and legislation.
Competitive requirements (Kenneth et al, 1998).	To be a trustworthy authority Listed in the ranking list
Integrate EMS into a more coherent framework (Morrow & Rondinelli, 2002).	Have better EMS
Improving efficiency (Morrow & Rondinelli, 2002).	Reducing environmental impact
Self commitment (Sroufe and Sarkis, 2007, p200)	Environmental concern
Stakeholder forces (Kenneth et al, 1998).	Satisfy the stakeholders

According to Sroufe and Sarkis (2007, 200), the driving forces for implementing environmental management practices are self-commitment and business management. This suggests that implementing environmental management practices is motivated by the willingness of management staff to implement an EMS and by the assumption that it pays to be green. Almost all respondents showed their willingness to reduce the environmental impact as much as possible and to create better environmental management system according to ISO 14001 in order to be listed in the Environmental Protection Agency ranking list.

In addition Kenneth *et al* (1998. p1181) have identified four factors driving proactive environmental management: Regulatory demands; cost factors; stakeholder forces and competitive requirements. From the interview responses the main driving force behind getting

the ISO 14001 certification is to follow the demands of the Swedish Government mainly found on the objective to reduce the cost of energy used. Beside stakeholder's requirements seem to play a major role as driving force according to the environmental manager's view. Also SLU aims to present itself as a trustworthy authority.

8.2 Problems

This table (Table 7) shows the major obstacles for the implementation and according to Morrow & Rondinelli, (2002); Yiridoe & Marett (2004); Arvidson (2004) in the theory chapter are: Problems relating to finances, needs for documentation and environmental performance.

Table 7: Main problems according to the theory and the finding

According to the theory	According to the respondents
Lack of financial resources (Yiridoe & Marett, 2004, 40-58).	Shortage in resources. Big size of the organization
High demand on documentation (Morrow & Rondinelli, 2002, 162).	No engagement in the whole of the organization To keep up the spirits among the environmental groups and look for new ways to improve. EMS detailed and need too much work.
Environmental performance (Tibor & Feldman, 1997, 20)	Have a collision between the environmental goals and the goals of the department Difficulty to understand the structure

The main obstacle that faces the implementation of ISO 14001 is the high demand on documentation (Morrow & Rondinelli, 2002, 162). Most of departments/ units confirm the problem of documentation. One respondent mentioned that some employees are not motivated to do the documentation. Other respondents pointed out that documentation was a difficult task for employees and they think that this work is waste of time.

A report by Arvidson (2004) pointed out the factors limiting some Swedish universities to fulfill commitments towards implementation of EMS (*e.g.* lack of financial resources). Major obstacle faced the environmental manager at SLU that it is a big organization and hesitating to put on resource needed for the implementation.

Tibor and Feldman (1997, 20) argued that ISO 14000 standards are a system, not performance because it doesn't dictate how the organizations will reach their policy's goals. At SLU setting the organization and structure of the work required the appropriate expertise which could be a real problem for some departments. According to Melin (2010) the main problems at SLU are to understand the importance of the management system within the organization, so people must be appointed to be engaged in writing the routines and structures, explain to them how to implement the management system and follow it afterwards. The efficiency of information delivery system and the availability of information source at the appropriate time was also a major obstacle for some departments. Beside the fact that SLU is a big organization, the major obstacle during the implementation process was the shortage of resources. Another obstacle is to keep up the spirits among the environmental groups.

8.3 Benefits

The overall outcome of implementing an accurate environmental management system (EMS) is to give benefits at environmental, social and business aspects (Arvidson, 2004). It means that there is a well developed awareness about environmental issues among the staff and the students. Besides, it has been shown that by offering environmental education and research, an evidence of great environmental ambitions could be seen (*ibid*). Accordingly, SLU environmental policy indicates aims to work towards ecological, social and economical sustainable development in relation to the national environmental objectives of the Swedish government (www, SLU, 12, 2010). Beside, SLU should try to integrate environmental issues into all courses, decision making and in all activities carried out within all of SLU`s units.

According to Morrow & Rondinelli, (2002); Sheldon (1997); Weib & Bentlage (2006); Lopez (2006) the main benefits associated with ISO14001 certification is perceived as following (Table 8):

Table 8: Main benefits according to the theory and the finding

According to the theory	According to the respondents
Less environmental impact (Tibor & Feldman, 1996, 383-384).	Measures environmental impact Monitoring the activities. Taking care of the environmental impact. Integrated environmental work in the normal routines. Handling of chemicals Changes in travelling behaviors. Less pollution
Cost savings and reduction in resources usage (Sheldon, 1997).	Use ISO 14001 in the marketing strategies. More efficient energy use in greenhouses
Competitive advantage (Lopez, 2006, 6).	Better EMS Systemize the work.
Developing the EMS (Morrow & Rondinelli 2002, 164)	Better EMS Systemize the work. Present good standard models for the students.
Environmental objectives (Weib & Bentlage, 2006, 50).	Objectives were closed to achieve
Record keeping and documentation control EMS (Morrow & Rondinelli 2002, 164)	Feedback work to the different departments. Control over documents.
Others	Join forces among colleagues Increased awareness. Contribute to a sustainable development

Within the SLU all respondents agreed that the implementation of ISO14001 in the form of monitoring the environmental impact for activities like systematic control of documents, changing traveling behavior and the responsibilities of handling dangerous chemicals led to better EMS. Some of the respondents thought that the major benefits were having a clean environment (e.g. less pollution by changing travels policy) and being able to avoid the effects of environmental toxins (better handling and proper disposal of chemical waste). There were some benefits according to the certified department at SLU regarding the reduction of pollution, integrated environmental work in the normal routines and also this

certified department stated that their objectives were closed to achieve (Pers.com, Wästerlund, 2010).

The respondents mentioned more efficient energy use in greenhouses and better energy consumption among the major benefits that leads to cost savings, controlled energy consumption, and reduction in resources usage.

ISO14001 standard helps organizations to simplify and integrate their environmental protection program into amore coherent framework (Morrow & Rondinelli, 2002, 162). Therefore, the main benefits that SLU perceived from implementing ISO14001 are to have competitive advantage, compared with other institutions and EMS will be developed in to more coherent framework. Accordingly, SLU would be a trustworthy authority, systemize the work, presents good standard models for the students, and contribute to a sustainable development. Other perceived benefits like record keeping and documentation control leads to feedback work to the different departments and control over documents.

The respondents think that the implementation of ISO14001 contributed to sustainable development if the university follows the system in every step. Environmental policy leads to increased awareness of the students towards environmental issues, present good standard models and joining forces among colleagues. Wästerlund (2010) stated that researchers can sometimes have difficulties to work together and this work has sometimes helped to build bridges.

9 Conclusions

The last chapter of this study presents the conclusions that can be drawn by answering the research questions stated in the problem discussion chapters.

The main objective of this study was to investigate how environmental representatives at various departments and units at SLU perceive the certification process.

The answers during the interviews and surveys obtained from different authorities regarding the specific environmental planning revealed the existence of variations in the planning procedures. Most of the units don't have specific environmental planning of their own and the planning used in each unit is line within the whole SLU environmental plan. The example applied at SLU showing a centralized network environmental plan (called LOTS) designed for the whole sub units in the university. The goals for this network were set to make measures and collect data about the environmental impact of the university and to list the most important environmental aspects.

The aim of this study was to describe the perceived challenges and opportunities in an environmental certification process for an organization in the public science sector and to identify what obstacles the university meets in the certification process. The study's aim was to address the following research questions:

9.1 What are the key motivation factors in the certification process?

Different departments mentioned one or more motives, for example motivating employees to discuss the environmental issues, to have a good system for describing the environmental impact of the university activities and to measure its impacts are main driving forces stated by the units that were started the documentation process. Other units such as the units prepared to start the certification mentioned different driving forces such as, to create a better environmental management system within each unit, to present SLU as a trustworthy authority and to satisfy the stakeholders. Other driving force that was stated by the environmental manager of SLU is to be listed in the Environmental Protection Agency ranking list. However, some driving forces were found to be shared by different departments the most important one was the decision from the headmaster then after comes equally demand from government, better EMS and to be trustworthy authority.

The argument for getting better management system according to ISO 14001 at SLU is to be listed in the Environmental Protection Agency ranking list. The goal of ranking list is to show how better the management system works, developed and implemented well within each sub-unit. The ranking list is a measure of how environmental systems should work to achieve the goals behind.

9.2 What are the perceived challenges in the certification process?

Some problems arose when the implementation of the ISO 14001 started at some units. The main problem is concerns the general understanding of the structure and how employers can deal with such plan. Most of them have argued with the structure of the work itself and thought it was difficult to understand and hard to achieve. To avoid such a problem, the authorities are working to receive all criticisms from the employees, evaluate them, combine them in one document and make it easy to understand and to access. These problems was

observed at the units where they started applying the ISO 14001 and have already started the documentation process such as Uppsala Biocenter and university head office of SLU, where other units didn't express such problem.. Major problems faced the environmental manager at SLU were the shortage of resources in consideration to the big size of the organization and there were no engagements in the whole of the organization. Beside that one department which have already been certified with ISO 14001 have their own goals and they faced a collision between the SLU's environmental goals and the goals of their department also to keep up the spirits among the environmental groups was other problem faced this department.

9.3 What are considered benefits results of implementing the ISO14001 at SLU?

The benefits may vary according to each unit. Within the units that were prepared to start the certification there is need to monitor and measures environmental the environmental impact of activities like systematic control of documents, changing traveling behavior, the responsibilities of handling dangerous chemicals, less pollution, and more efficient energy use in greenhouses. As well they benefit more from systemize the work by having better EMS. Moreover, there were some benefits observed from the department that applied the ISO 14001 certification regarding reduction of pollution, energy consumption, increasing the awareness of students towards environmental issues, join forces among colleagues, having commissions from other actors and integrated environmental work in the normal routines.

For further improvements based on the standards of ISO 14001, the certified units are working to make their environmental systems more understandable, accessible and clear structured for better contribution towards sustainable development.

9.4 EMS implementation at SLU – a summary of finding

Among key reasons why those departments/units implemented or would like to implement an ISO 14001-based EMS were to:

- Assist in meeting legislative requirements
- Directives from SLU's headmaster.
- To be a trustworthy authority
- Listed in the ranking list.
- To have better EMS
- Demonstrate a strong environmental concern

The main problems occurred when the implementation of the ISO 14001 started at SLU:

- No engagement in the whole of the organization
- Have a collision between the environmental goals and the goals of the department
- To keep up the spirits among the environmental groups and look for new ways to improve.
- EMS is over detailed and needs too much work.
- Difficulty to understand the structure
- Documentation problems.

EMS implementation can lead to:

- Better EMS
- Competitive advantage
- Prevention of pollution and conservation of resources
- Increased efficiency and reduced cost

- Establishing measures to take care of environmental impact.
- Monitoring the activities
- Integrated environmental work in the normal routines.
- Systematic control over documents.
- Contribution to a sustainable development

9.5 Recommendations for continued EMS work

There is a significant value to be gained from the implementation and certification of EMS by an organizations and the country as a whole, and also making efforts to adopt and enforce this innovation. However, *if this framework for applying ISO 14001 is adopted widely, it will dramatically improve the chances of achieving sustainability* (Sheldon, 1997, 211).

Firstly, in my view, the SLU's EMS plan should be placed on a fast roadway for finalization. This means that it should be circulated widely to all departments and units within the shortest possible time. The value of EMS implementation should be encouraged more regularly to target environmental groups to raise awareness of its benefits among these groups along with the availability of management systems training programs.

I also support enabling the environmental manager to identify opportunities for collaboration, particularly in EMS matters. Printed and electronic material should be up-to-date and accessible, making it known where to obtain management system information.

The Swedish Government should actively encourage donor agencies to assist organizations in ISO 14001 EMS implementation and certification.

9.6 Recommendations for continued research

During the development of this thesis two areas for future research were identified that would have helped the formulation of more accurate conclusions in this study had they been studied. Although the nature of this research was qualitative, the following suggestions address quantitative and qualitative studies for organizations, with consideration of their size, site or nature of their activities.

The first area for future work would be an economic analysis of the implementation and certification of ISO 14001. A cost benefit analysis comparing organizations of different sizes, countries and activities, taking into account if they have already an EMS in place or not, and also considering the legal system of the country.

A second area of research would be a comparison of the environmental performance of organizations prior to and after implementing the standard. This would help to draw conclusions on the ISO 14001 implementation's contribution to environmental improvements and to continual performance improvements.

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Personal messages

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Appendix 1: Sweden environmental quality objectives

Will the environmental quality objectives be achieved?

OBJECTIVE	Forecast for 2020	Trend	OBJECTIVE	Forecast for 2020	Trend
1. Reduced Climate Impact*			9. Good-Quality Groundwater		
2. Clean Air			10. A Balanced Marine Environment, Flourishing Coastal Areas and Archipelagos		
3. Natural Acidification Only			11. Thriving Wetlands		
4. A Non-Toxic Environment			12. Sustainable Forests		
5. A Protective Ozone Layer			13. A Varied Agricultural Landscape		
6. A Safe Radiation Environment			14. A Magnificent Mountain Landscape		
7. Zero Eutrophication			15. A Good Built Environment		
8. Flourishing Lakes and Streams			16. A Rich Diversity of Plant and Animal Life		

*Target year 2050, as a first step

Smileys for environmental quality objectives and interim targets

	The objective is expected to be achieved within the defined time frame.		The target year has passed. The target was achieved by that date.
	The objective can be achieved within the defined time frame, provided that further action is taken.		The target year has passed. The target was not achieved by that date.
	The objective will be very difficult or not possible to achieve within the defined time frame, even if further action is taken.		

Trend arrows for environmental quality objectives

	The trend in the state of the environment is positive.
	No clear trend in the state of the environment can be seen.
	The trend in the state of the environment is negative.

(www, Naturvårdsverket, 1, 2010)

Appendix 2: Interviews guides

Interview guide -1 (Environmental manager)

Background

1. How long have you been working in the department/unit?
2. What is your role within the department/unit (Responsibilities/Duties)?
3. Do you have an environmental policy of your own?

Planning

4. Do you have specific environmental plan?
5. What environmental issues have been selected to work with within the framework for EMS?
6. What is your view of direct and indirect environmental aspects as concepts and in what way you work with them?
7. How do you feel the level of commitment is in the organization regarding the work with environmental goals?
8. Which environmental regulations are you aware of?

Implementation

9. What standards are you currently following?
10. Why was ISO 14001 selected as the model for EMS within the university?
11. When and how did you start the implementation of a certification of SLU as a whole?
Are you following a roadmap?
12. Where are you at present in the implementation process?
13. Do you communicate with other employees about environmental issues in all departments? How often? Through what channel?
14. Are there any feed back you get from them?
15. Where are you at present in the implementation process?

Driving forces

16. Please tell me why you started the work with ISO 14001? What are the major reasons for implementing this standard?
17. How important were these factors?
 - a. Stakeholders/ customers requirements
 - b. Environmental concern benefits from systematization of the environmental work
 - c. Cost reasons
18. Are there any other reasons that might have motivated you in your environmental work?

Problems

19. What major obstacles did you face during the implementation?

Benefits

20. What major benefits have the implementation led to?

Continual improvement

21. What can be done to improve the system?
22. Where are you heading in a time perspective of 5 years?

Thank you, may I get back to you if I have additional question?

Interview guide -2 (Planning to implement)

Background

1. How long have you been working in the department/unit?
2. What is your role within the department/unit (Responsibilities/Duties)?

Planning

3. Do you have specific environmental plan?
4. Has your department/unit taken environmental issues as important in its operation?
5. How would you say that your department/unit activity has an impact on the environment?
6. What is your view of direct and indirect environmental aspects as concepts and in what way you work with them?

Implementation

7. How do you communicate with the environmental management?
8. Do you communicate with other employees about environmental issues?
How often? What form is used?
9. Are there any feed back you get from them?
10. Have you made any plan to get ISO 14001 for your department/unit?
11. Where are you at present in the implementation process?

Checking & management review

12. How often are the environmental goals monitored/followed up?
13. How many audits have you had so far (internal and external)? What were the major findings?

Driving forces

14. When you promote ISO 14001 in your department/unit. What are your strongest arguments?
15. How important were these factors?
 - a. Stakeholders/ customers requirements
 - b. Environmental concern benefits from systematization of the environmental work
 - c. Cost reasons

Problems

16. What is your perception regarding challenges/difficulties of obtaining ISO 14001 certification?

Benefits

17. What are the benefits from implementation of ISO 14001(based on your experiences or issues that discussed in your department/unit)?
18. Do you think the implementation of ISO 14001 contributes to a sustainable development?

Continual improvement

19. What can be done to improve the system?
20. Where are you heading in a time perspective of 5 years?

Thank you, may I get back to you if I have additional question?

Interview guide -3 (Currently implementing & certified)

1. What is your role within the university/department/unit (Responsibilities/Duties)?
2. Do you have a specific environmental plan?
3. Where are you at present in the implementation process?
4. Were you involved in the implementation of ISO 14001?
5. When and how did you start the implementation?
6. How often are the environmental goals monitored/followed up?
7. How many audits have you had so far (internal and external)? What were the major findings?
8. Please tell me what were the major reasons for implementing this standard?
9. What major obstacles did you face during the implementation process?
10. What major benefits have the implementation led to?
11. Do you perceive that you have reached a competitive advantage by having an EMS, compared with other university/department/unit? In which way?
12. Are you using ISO 14001 in your marketing strategies?
13. What have you achieved so far in term of:
 - a. Environmental objectives
 - b. Environmental policy
 - c. Environmental aspects
 - d. Environmental reports
14. What has change as a consequence of the EMS in term of:
 - a. Costs.
 - b. Daily tasks.
 - c. A competitive advantage, compared with other departments/units.
 - d. Resources use.
 - e. Relationship with your employers/ employees.
15. Do you think the implementation of ISO 14001 contributes to a sustainable development?
16. Where are you heading in a time perspective of 5 years?

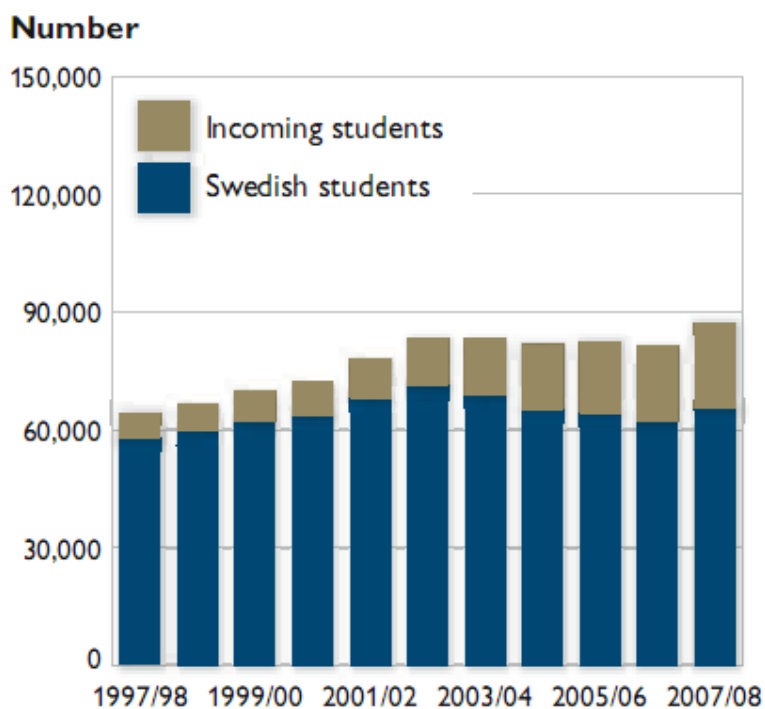
Thank you and May I get back to you if I have additional questions?

Interview guide -4 (Not started the implementation)

1. How long have you been working in the department/unit?
2. What is your role within the department/unit (Responsibilities/Duties)?
3. Do you have specific environmental plan?
4. Has your department/unit taken environmental issues as important in its operation?
5. How would you say that your department/unit activity has an impact on the environment?
6. What is your view of direct and indirect environmental aspects as concepts and in what way you work with them?
7. Do you communicate with the environmental manager and other employees about environmental issues?
8. Are there any feed back you get from them?
9. Have you made any plan to get ISO 14001 for your department/unit?
10. When you promote ISO 14001 in your department/unit. What are your strongest arguments?
11. What is your perception regarding challenges/difficulties of obtaining ISO 14001 certification?
12. What are the benefits from implementation of ISO 14001(based on your experiences or issues that discussed in your department/unit?
13. Where are you heading in a time perspective of 5 years?

Thank you

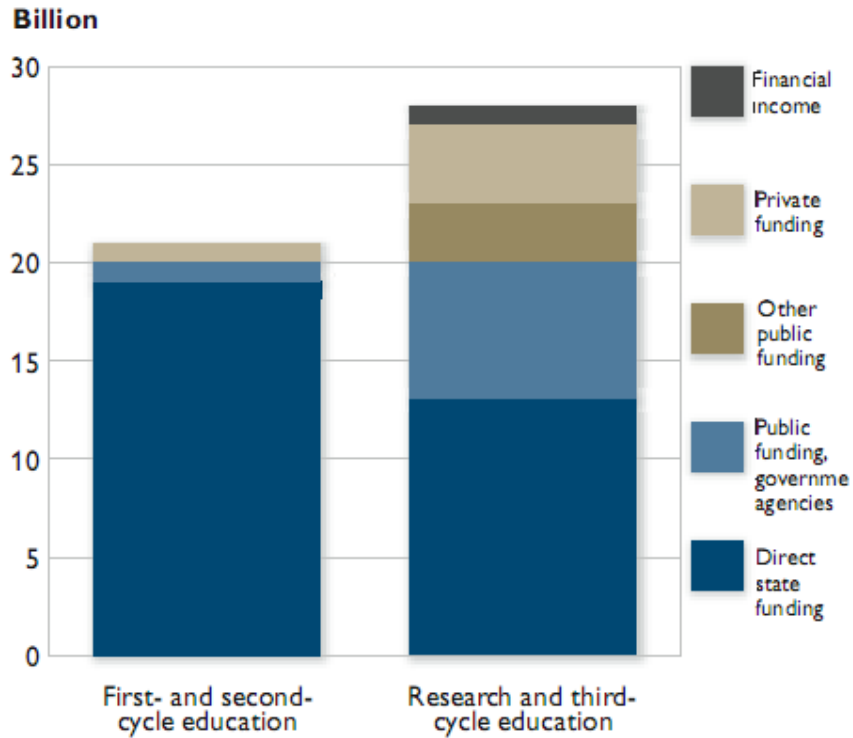
Appendix 3: Higher education entrants



Higher education entrants 1997/98 to 2007/08. The numbers entering higher education totalled 87 000 in 2007/08. Of these one-quarter came from abroad. Incoming students from abroad consist of both students participating in exchange programmes at Swedish higher education institutions or free movers, i.e. students arranging their own studies in Sweden.

(www, Högskoleverket, 2, 2010)

Appendix 4: Higher education finance



Funding for the various operational areas. 86 per cent of the funding for first- and second-cycle programmes takes the form of direct government allocations while funding for research third-cycle programmes comes from a variety of sources. Just under half is allocated directly by the government.

(www, Högskoleverket, 2, 2010)

Appendix 5: A total number of students at SLU, 2009

Full-time student equivalents

	2007	2008	2009
Bachelors	2 630	2 572	2 793
Masters	579	815	949
None-classified courses	407	141	50
Total	3 616	3 529	3 793

Application and admission statistics 2007–2009 for Bachelors programmes

(www, SLU, 3, 2010)

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