
EcoESAB – Bragança Higher School of Agricultural Engineering (Portugal) - An EMS project.



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Abstract

Higher Education Institutions play an important role in modern societies being able to contribute to sustainability in a decisive manner. One of the possible contributions consists on the adoption of adequate environmental management practices, ensuring a higher level of control over environmental aspects. Environmental Management Systems can be an important tool in this process.

Bragança's Higher School of Agronomics develops, since 2002, an Environmental Management System implementation project designated EcoESAB. This Project has developed from an initial environmental evaluation to the establishment of various environmental management programs and consequently reducing School's environmental impact.

Ever since the start of this Project it become clear that two essential structures should be developed, one organizational and other documental, adapted to Higher Education Institutions' reality. In this sense, EcoESAB has an integrated participating structure adapted to school's reality, based on a three layer structure and including an Environmental Commission, key element in environmental management. Both documental and organizational structure relate with each other, as most of the documents are discussed and approved at the Environmental Commission.

Learning from EcoESAB experience some advantages and drawbacks are presented, as well as some limitations faced by this kind of projects.

Keywords: Environmental Management Systems, Higher Education Institutions, Campus Greening.

Introduction

Higher Education Institutions (HEI) have nowadays a basic role in creating and disseminating the knowledge, skills and values for society (Cortese and Faia, 2001). As HEI they play several important roles in society: responsibility in the student's scientific, civic and environmental education, and, the possibility of transferring an internal sustainable development dynamics to the community, through the adequate management of their structures and resources and the consciousness of their human resources. Their importance on sustainability is based on many factors (Shriberg, 2002): they have the expertise, leverage and resources to make significant progress on sustainability; they have the Social and Ethical obligation of doing it; they should act as role models to society; they are problem-causers generating a great role of impacts; they have image benefits driven by efficiency and management practice. HEI can also be considered as complex structures with a great diversity of activities, human and structural resources:

- Activities developed goes from teaching, to scientific and technical activities;
- Human resources include teachers, students, technical and administrative staff;
- Their structures are usually complex, including both buildings and exterior *campus* spaces.

Several environmental problems arise from this complexity, such us:

- Waste production can be very significant, specially if it isn't addressed by adequate management practices;
- The use of chemical in laboratories, fertilizers and pesticides in the campus, may contribute to water and air pollution, representing an important threat to the environmental (Smith, 1993);
- The use of chemicals that can reduce the ozone layer in the heating and cooling systems (Creighton, 1999);
- Direct impacts are also generated by the campus deriving from the consumptions of exterior goods and services (Creighton, 1999).

There is nowadays a moral dilemma in HEI: can they deliver change without changing themselves first? In many cases, this means transformation from "teaching what to do" to "doing what we teach" and "practice what is preached" (Cortese, 1999). In this sense, therefore, sustainability calls the Twenty-First Century University within its own structure.

An important action in this "Quest for Sustainability" is the implementation of Environmental Management System (EMS), as they have been regarded as playing an important role in sustainability, reducing environmental impact through careful, systematic and integrated management, and thus improving the organizations global efficiency.

Conversely, it is symptomatic that only few HEI have been implementing EMS in Portugal. As it is argued later in this paper, drawing conclusions from our own experience, many limitations can be stated as important contributors to this phenomenon, as the task becomes evermore challenging.

In fact, HEI's complexity demands a different focus whenever trying to implement an EMS, as this process demands for a great role of participation and conscience building among the HEI community.

Bragança's Higher School of Agronomics (ESAB) has an EMS Project, named EcoESAB, seeking for the correct environmental management of their activities, through the effort of students, professors and employees and aiming to contribute to a more sustainable Campus.

Project Presentation

The Bragança's Higher School of Agronomics (ESAB) is part of the Bragança's Polytechnic Institute (IPB) and is located in the Northeast of Portugal, near the Spanish border, surrounded by Classified Natural Habitats. The school shares its campus with two other Schools, two Students Residences and

other facilities. This Campus is located in a central area within the urban structure, crossed by the river Fervença and keeping a great deal of relationships with its surroundings.

Founded in 1986, the IPB has had an important role in recent social and economical development of this countryside city, as this institution has around 5000 students, in a city shortly over 20000 inhabitants (INE, 2001).

The ESAB, was created in 1987, is a School dedicated to teaching and research in agrarian and environmental sciences, through eight Courses. It has around eight hundred students, 80 Teachers and 70 employees, working within 5 buildings that include offices, laboratories and different farming facilities.

Its organization is quite complex as it has 8 departments, different management structures and different representative and administration structures. Such diversity exists in many HEI and defines heterogeneous and complex organization.

Driven by the growing interest among the school community for environmental management, the ESAB Management Board declared, in 2002, its interest for the development of an EMS based on ISO 14001:2004 (ISO, 2004) and EMAS II (EU, 2001) models. These Standards are based on a Demming Management Cycle, a very comprehensive and practical Framework, based on planning, development, evaluation and action, which enable a continuous improvement in the management practice (Roberts and Robinson, 1998).

As an initial action, an initial environmental evaluation was developed, trying to set a milestone, upon which to establish the EMS. This task, turned out to be harder than was initially expected, as there was little control over organization of environmental aspects, leading to a lack in quantitative data and putting strong constraints to an adequate evaluation. As a consequence, most evaluations were built upon questionnaires and interviews, fostering the direct contact with the organization structure, trying to establish the basis that would allow quantitative evaluation of environmental aspects and future implementation of management practices.

The ESAB Environmental Policy was meanwhile approved as a School compromise to the adequate Environmental Management, defining the organization proposes, upon which to establish the necessary management actions.

As the initial environmental review ended, it was clear that the shortage of environmental information could only be solved through the involvement of the school community. Therefore, in 2003, the EMS team concentrated mainly on four essential tasks:

- Quantifying environmental aspects as a mean to justify environmental action;
- Implementing basic environmental actions, such as a Waste Management System;
- Developing a wide variety of initiatives aiming at increasing conscience awareness among the community;
- Developing an adequate Environmental Management Structure that could set the basis to the EMS implementation.

Acknowledging the vital role of an adequate evaluation, several environmental aspects were then evaluated, that included energy and materials consumption, waste, noise and security. This information revealed the existence of significant environmental aspects and therefore justifying action.

The implementation of the Waste Management System was a decisive action in building an adequate atmosphere to promote action within the EMS. This System was soon adopted by the schools community which rapidly started to collect and deposit recyclable materials, including paper, plastic, metal and glass in interior deposits, this materials are then collected by the Municipal Waste Management System. This action was then complemented by the publication of leaflets and other information.

Starting from 2003, Yearly Seminars on EMS at HEI, have been taking place, bringing together initiatives from other institutions, allowing the acknowledgement of different experiences, and therefore promoting greater recognition on project relevance among the school community.

The need for a more effective interaction within the school community lead to the development of an Internet site, which started to simply present the project, and later becoming a more useful and interactive tool. From public exposure comes commonly public understanding of the project, however to keep an updated internet site has become a difficult task.

The most challenging task initiated in 2004 was the definition of the EMS structure, in both its documental and its organizational structure. Although, the ISO 14001 standard and EMAS II Regulation define the same guiding principles, they have to necessarily be adapted to each organizations characteristics.

In 2005, has the organizational structure started to settle, the EcoESAB Team concentrated in delivering the first of intended yearly reports, trying communicate both internally and externally its environmental management practices. This effort lead to the publication of the 2004 Environmental Report (Figure 1), stating ESAB's environmental policy, EMS structure, management practices and results.

Over the last year, their has been an important decrease in EcoESAB's activities, driven by the shortage in human resources actively engaged in the project. As this present reality causes greater constrains in the development of such activities as environmental monitoring, communication and actions implementations, the Schools Community has already incorporated environmental concerns, and thus being able to sustain many of the environmental management actions established in previous years, especially waste and acquisitions practices.

The Environmental Management System

The ESAB EMS can be described both in its documental and organizational level, as both are complementary and adapted to school characteristics.

The documental structure, presented in Figure 2, answers both to the definition of the ISO 14001 standard and EMAS II Regulation and to the need for achieving a higher level of integration within the School Management System. The documental structure sets its roots on an initial environmental evaluation, which identified the most significant environmental aspects, and, thus, setting the basis to the establishment of the EMS. Based upon this evaluation, the EMS documents are defined as follows:

- The *Environmental Policy Statement* which clearly states the organization commitment to comply with relevant environmental legislation and regulations, and with other requirements to which the organization subscribes (ISO, 1999)
- The *EMS Internal Regulation* developed as a comprehensive document presenting the most significant elements in the System Architecture, including the project definitions, the EMS requirements, the evaluation and communication methods, the organizational structure, the documental structure and the managerial tools. This document has been defined to strengthen internal relevance, has its states internal and external roles and responsibilities in environmental management;



Figure 1 – Environmental Report Cover

- The first layer includes the *school community*, with both teachers, employees and students, essential elements in the operational implementation of EMS definitions;
- The second layer has three columns:
 - The school community has its own defined structures, such as *Scientific Departments, Administrative Units and School Unions*, each having their own agenda and internal organization, as they are key elements in the EMS success;
 - The *Administration Board*, responsible for the global Institutional Management, including the EMS;
 - The *Environmental Management Office*, which has an Environmental Manager and several collaborators, which represent the operational structure that ensures the EMS implementation and continuous improvement.
- The third layer has the *Environmental Commission*, with representatives from Students, Employees and Scientific Structures, from the Management Board and is coordinated by the Environmental Manager. This structure works as a Forum for the discussion of School's environmental issues, including the approval of the Environmental Management Programs, Environmental Action Plans and Environmental Reports;
- In addition to these internal elements of the systems, two other elements complete the organizational structure:
 - The *Partners* are organizations or individuals which recognize the value of the ESAB Environmental Policy and are willing to collaborate in the EMS implementation and continuous improvement. This recognition is officially stated through a Partnership Statement.
 - The *Observers* are organizations or individuals that can access elements describing the ESAB EMS, through such ways as the Internet Site or the Environmental Report. These elements are essential in the external communication policy.

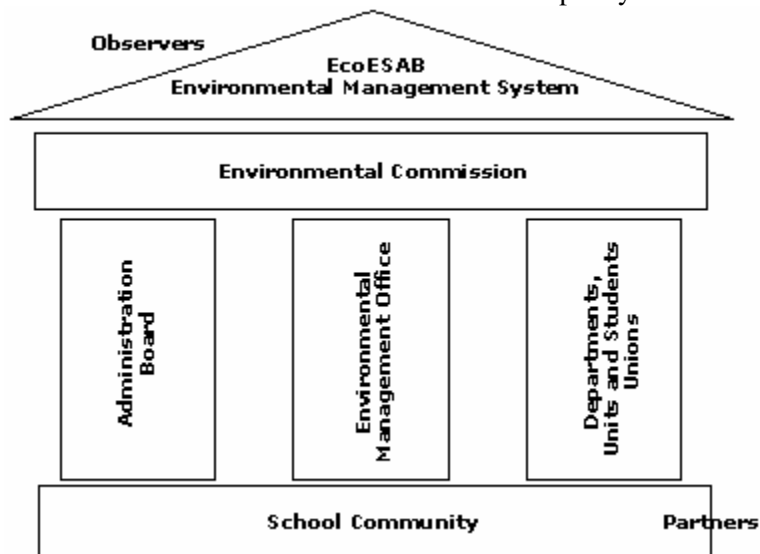


Figure 3 – EMS Organizational Structure

These three levels are the basis for the EMS, as they prompt both horizontal and vertical action among the School community and simplify communication within the system. Environmental Commission reunions, which have been held for eight times, have shown great relevance in environmental issues evaluation and mostly in communicating with the different elements within the School's Structure.

Based upon both documental and organizational structure and implemented since 2004, the EMS establishes a yearly management cycle (Figure 3):

- The Environmental Action Plan is defined with contribution from the different structures represented at the Environmental Commission, and approved in a meeting held in October;
- As the Plan is implemented, records are collected in order to insure its operational control, and are first evaluated in an Environmental Commission reunion held in January or February;
- Based on a predetermined form, each structure fills in an environmental report which is delivered to the Environmental Management Office, responsible for the elaboration of the Institution Environmental Report;
- In the Months of June or July of the following year, the Environmental Report is presented and approved by the Environmental Commission, along with the following year Environmental Action Plan, restarting the Cycle.

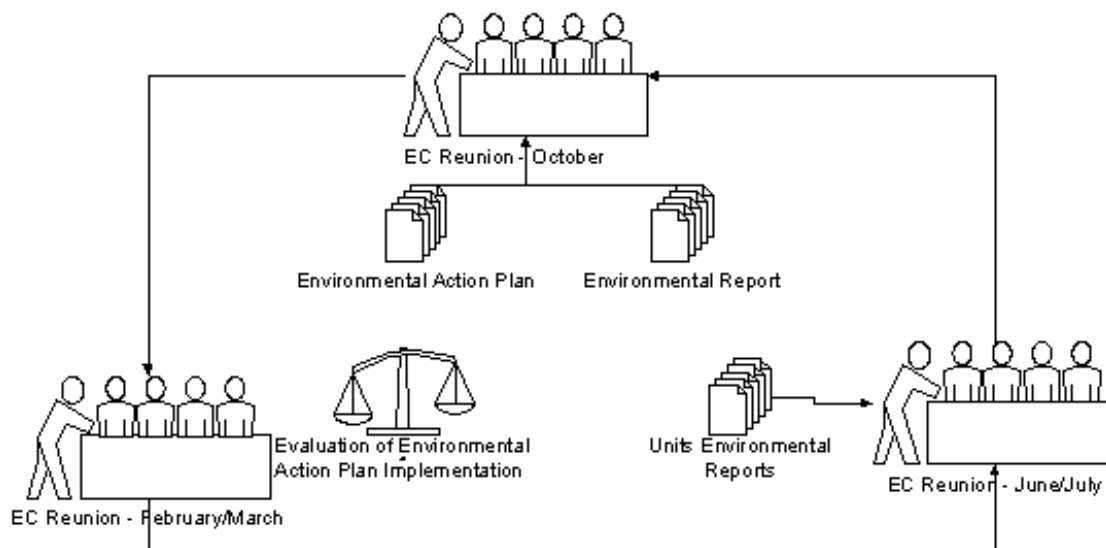


Figure 4 – EMS Yearly Management Cycle

The management cycle has been established to follow the academic year (From September to August), changing from its initial formula in 2005, as it was till then developed based on the Civil Year. This modification aims to ensure constant students yearly engagement, as this is a variable portion of the community.

In addition to these yearly management actions and in order to intensify the evaluation of the EMS, monitoring campaigns are established to deeply evaluate some environmental aspects, as has been the case of waste production and noise. It has been established that once every three years an Environmental Audit is to be developed, allowing a significant evaluation of the EMS, and so contributing to the continuous improvement of the System.

EMS in practice

EcoESAB has been able to promote multiple practices and therefore has prompted improvements in environmental performance, contributing to sustainability within the institution and building conscience in an important segment of the population.

One of the environmental aspects that have been considered is domestic wastes, especially paper, glass, plastic and metal. Starting form 2003, the EcoESAB, has managed to ensure a higher grade of waste

segregation, leading to subsequent recycling. The internal waste collection has been ensured by an internal waste management scheme based on a network of internal collectors. Despite some initial attempts, organic wastes aren't still being recycled within the institution.

Stimulated by the community engagement in waste minimization practices, some other types of waste have progressively been managed according to legal regulation and ensuring primary choices on reducing, reutilization and recycling, as was the case of computer and electronic devices, car waste, oils or batteries, amongst others.

Another important environmental aspect is energy consumptions, as it leads to significant environmental impacts and important expenses. Most of the work that has been developed focused on efficient consumption, achieved by good housekeeping and soft structural interventions. Although there has been an important reduction in consumptions, approximately 2 % per year over the last three years, many other actions could be carried affecting both the lightning and heating systems leading to the increases in efficiency, some interventions have already been identified and could be implemented given the necessary financial resources.

In relation to water, efforts have been developed to decrease consumption, by encouraging efficient management of local sources of freshwater. However, much has to be done yet, especially in developing more efficient irrigation of school's farmlands.

As it has been stated earlier, conscience building and training is an essential element in EMS for HEI, therefore much attention has been given to this aspect, including such actions as:

- Yearly EMS Seminars, taking place over the last three years and focusing on sharing experiences with similar projects, bringing up issues relevant to environmental management;
- Thematic conscience building campaigns around such issues as: Waste minimization (2003), energy and water consumption (2004), non smoking (2005);
- Thematic day initiatives, including Clean Up the World (2004-2005) and the European Mobility Day (2004);
- Training session for cleaning services collaborators (2004);
- Booklets and other publications, including the Environmental Reports (published in 2005), Water and Energy reduction recommendations (2004) and freshmen's Guidelines for a Sustainable School (2005).

EcoESAB also tries to communicate with other HEI aiming at sharing common ground information concerning environmental management. This aspiration has been achieved by participating in several Conferences, through the Internet site and Environmental Reports.

Despite the stated developments, much has still to be done, especially by establishing the necessary bases to ensure adequate intervention in such environmental aspects as: agricultural activities, risk and safety, dangerous waste management, amongst others.

EMS Evaluation

The task of developing environmental management actions in HEI turned out to be simultaneously a stimulating and difficult task. As it was argued earlier on, a higher grade of complexity exists in this kind of organizations, driven both for its processes and activities but moreover for its organizational structure.

The experience achieved so far allows us to draw some conclusions about the implementation of EMS in an HEI such as the ESAB, as this task presents some particular characteristics different from other Organizations.

The complexity and diversity of HEI in its organizational structure and its multiple activities, demands a great deal of involvement among the community. Without a broad commitment, the implementation of an EMS would become an extremely difficult task. The definition of participation structures has

proven to be an important element in empowering the implementation of Environmental initiatives, presenting several advantages:

- The communication amongst the community based upon a Commission allows regular interaction between different elements, stimulating information and experiences exchange useful to Environmental Management;
- The level of representation within the Commission establishes linkups with the existent organization structures, helping to incorporate Environmental Initiatives within their own agendas;
- By ensuring Environmental Programs and Action Plans discussion and approval, there is an improvement on the level of community commitment to Environmental Management;
- The presentation and approval of Environmental Reports, stimulates evaluation and strengthens community commitment, as results and actions become more visible to the school community.

Another element which proved to be very useful was the definition of an Internal Regulation, as it was discussed and approved by the Environmental Commission and it clearly states the EMS definitions. This document sets the basis for community understanding of the systems, stating each element function within it.

However, many persistent difficulties were faced while implementing the EMS:

- Conversely to other organizations, HEI communities are regularly changing, as new students are added and others leave, this fact demands for continuous conscience building and project communication;
- There is a low level of control on most of the environmental aspects, as introducing new procedures to ensure environmental control has proven to be a difficult task.
- Some of the environmental management practices demands for a higher level of financial investment, although they tend to be in a secondary level of investment priorities. In the cases where efficiency is at stake, the investment payback is regularly seen as incompatible with the institution yearly financial management;
- Despite some initiatives taken place in some Portuguese HEI, environmental management is yet to be regarded as an essential element in the institutions daily management, as a consequence EMS tend to be ranked as second line priority by the school community, and thus compromising the allocation of adequate human and financial resources appliance.

Conclusions

EcoESAB is one of the pioneer Portuguese *campus* EMS, having been able to develop from an initial environmental evaluation to ensure a higher level of community commitment and participation as some environmental objectives have already been achieved.

From the start of the EMS implementation, it soon became clear that a higher level of community participation had to be established to ensure project effectiveness. The definition of wider management structures has already shown its benefits, improving institution's commitment to its environmental performance.

The scarcity of EMS initiatives in Portuguese HEI shouldn't only be faced as lack of internal communities understanding over these projects relevance. It can be argued that despite the necessary bottom-up approach, much should be done in a Top-down approach by establishing the necessary governmental basis to encourage EMS implementation and ensuring the necessary support to this kind of initiatives, as they require a great deal of commitment and support.

The action developed under this project allows us to face the future in a more sustainable way, whilst ensuring a higher level of coherence with school's scientific, academic and ethical principles.

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