The 2005 World Sustainable Building Conference,
Tokyo, 27-29 September 2005 (SB05Tokyo)

LAND ECOMANAGEMENT.
Environmental management and audit scheme as management measures concerning environmental quality in the territory.

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Keywords: Eco-management, environmental indicator, governance, planning, local authorities.

Summary

Recognition of the local dimension as the ideal level on which to carry out sustainable development is by now universally affirmed, as stated in the World Summit of Sustainable Development 2002, which represented an opportunity for relaunching the collaboration of local bodies in that direction. The Declaration of Local Bodies, issued as the closing document, constitutes an acceptance of responsibility regarding the promotion and carrying out of governing policies and measures of sustainable development in their individual communities. Unfortunately, these local bodies are still today not in a position to translate these policies into territorial programming, management and planning. This is the leading idea of a project financed by the Ministry of Education, University and Research, in which the authors are involved. This project was born from an interdisciplinary research activity, based on mutual exchange of scientific tools belonging to different disciplines: Architecture, Engineering and Computer Science. This paper deals with the main objective of the activity related to the research project. The main objective emerges as a proposal for putting in order useful measures in favour of eco-management development activities and an audit scheme for the sustainability of the territory in line with currently existing European Community regulations.

1. Introduction

The general objective of the research is the development of useful measures favouring the development of eco-management and auditing of territorial sustainability in line with European Community rules currently in force [1]. Over recent years, experimentation in this field has been directed prevalently towards providing environmental management methods and procedures to be applied to small communal realities.

However, in line with the research objectives of the European Community and the Environment Ministry for empowering and developing European Community environmental policy, our project aims at favouring the diffusion of environmental management and audit scheme – Emas - in public bodies operating over a vast area, verifying the suitability of developing positive synergies with the territorial programming and planning measures already in use [2].

Specifically the idea is to experiment with applying environmental management and audit scheme to a local authority, so called "mountain community", on the hypothesis of its relevance as a model within the European common space, particularly in view of the forthcoming extensions to the European Community.

In point of fact, up till now only one "mountain community" has obtained Emas registration. This registration was obtained by mainly investigating the management activities of the territory regarding the cycles of water, waste, etc. (direct aspects).

Compared with this way of approaching certification, our attention has focused on how to identify indirect environmental aspects, such as those deriving from official sources, which may have major impact.

This is due to the fact that those bodies responsible for territory management are often considered as "dispensers of services" and not as programmers capable of influencing the life prospects of the local community, as indicated by new European Community policies and by the voluntary measures of programming a territorial organism.

With the aim of contextualising the sphere of research, to guarantee data control, verify failures and gauge the measures to be developed on operational realities, coordination thinks it is useful to be able to refer to several actual case studies.

These permit the establishment of a profitable exchange between the working group and the local body involved in the research. Consequently it has been decided to select Local Bodies which could operate in central and southern Italy, this because the geographical and administrative distribution of public bodies so far certified shows a wider spread of certification in the north [3].

With regard to the application of already developed Emas on local bodies, The innovation will principally concern the following spheres:

- Integration of Emas with the environmental management measures applicable to Bodies that operate on a wide scale (and specifically in mountain communities);

- Analyses and explication of the environmental vocation in programming, planning and management measures of the territory as already adopted for the purpose of obtaining, thanks to Emas, the programming of environmental sustainability of interventions to be carried out on the territory even over a long period;

- Proposition and validation of methods which permit the checking of Indoor Air Quality (IAQ) in the projection and diagnostic phases of those building systems inserted in defined territorial spheres;

- Pinpointing and analysis of energy system characterising the territory - Pinpointing of a set of environmental indicators to be used in the eco-management of the territory;

- Organisation of ways of involvement and participation of local citizens in the environmental control initiatives of the territory;

- Development of a computerized system for the management and diffusion of know-how regarding activities of eco-management and an audit scheme for the sustainability of the territory.

Regarding the framework outlined above, attention has been focused on two problems considered crucial:

1) The state of fulfillment of environmental policies and their interaction;

2) The role of Emas and ISO 14001 as management measures in view of the environmental quality of the territory.

The state of fulfillment of environmental policies and their interaction.

Currently we have been unfortunately witnessing a poor state of accomplishment of those policies aimed at sustainable development and also a lack of interaction between environmental policies and management measures present in the territory, both as regulated and of a voluntary nature.

Despite growing interest towards these new measures, the capacity of interaction both between themselves and also with regulated multi-sectorial programming and planning is scarce in the local state of affairs.

On these themes of the integration of policies and measures, a programmed interest is noted in the European Community, as illustrated in the *VI Action Programme for the Environment* "Our Future, Our Choice" [4], in which the links between the various sectors of action and, the financial undertaking are stressed. In point of fact, there are many European Community projects which sustain interaction plans [5].

The role of Emas and ISO 14001 as management measures in view of the environmental quality of the territory.

In applying these "environmental control" measures to local bodies, the aspects taken into consideration for the purpose of certification are fundamentally those derived from "direct" management activities of the territory (management of refuse collection, water supply, energy etc...).

But often ignored is the "territorial dimension" of local bodies and recognition of their role as subjects who plan, project and make rules, thereby "governing in prospect" the quality of life of persons who are concerned with that territory also from the environmental point of view.

Attention should also be given to the state of those measures of management and regulated planning in the local way of life which do not explicitly foresee the environmental control of programmed intervention. It would be useful to verify the environmental vocation of such measures and amplify it, providing phases of progressive analyses and verification of planning, projecting and fulfillment (to coincide with the directive 2001/42/CE), in order to allow their insertion in the application of Emas and thereby obtain long-term environmental programming of territorial interventions on any scale whatsoever [6].

From the brief outline described above the general objective of research emerges as a proposal for putting in order useful measures in favour of the development of eco-management activities and an audit scheme for the sustainability of the territory in line with currently existing European Community regulations.

2. Objectives

The research sets out to organise useful measures for encouraging eco-management development and audit of territorial sustainability with the European Community regulations currently in force.

The integration/interaction between mandatory management methods and advanced methods of environmental management aims at demonstrating that a go-ahead approach is necessary for territorial environmental management of an innovative character and with socio-economic solidity, in line with those measures foreseen by the present legislation operated at various levels by the European Community for local authorities [7].

The objective of our research is the creation of an itinerary for the sustainable development of a complex territorial administration (Montana) based on the promotion of quality in management, services, products and programming activities.

In addition, there is a proposal to organise a computerised system for spreading awareness and training on the themes of sustainability in general and on eco-management and audit scheme activities as applied to territorial bodies operating over a wide area and capable of grafting on involvement and participation of administrations, local organisations and private citizens [8].

Constructed through the interaction of the different operational units, our research aims at creating a route, interfacing the different ruling and environmental measures today available to local bodies with particular attention to environmental management and audit scheme, which, starting with the programming, planning and projecting of the terrain, should arrive at a systematic formula capable of solidifying the things to be done in the light of sustainability.

Compared with the general objective of the research, the proposal is to arrive at specific objectives and develop investigation of the themes according to the scientific competence of the operational units involved in the research:

A. Integration of management measures and implementation of Emas.

The research plan proposes to implement the European voluntary research system EMAS II with the aim of favouring a re-organisation and rationalisation of environmental management based on respecting not only the legal limits but also on a new relationship between institutions, enterprises, the general public and the environment in which they are operating [9].

B. Integration of the measures of management and governance in the prospect of environmental quality of the territory.

From an analysis of the present applications of Emas II and other voluntary measures to bodies engaged in territorial management it is seen that attention is placed mainly on assessing the state of management and quality of services which the territorial organism issues. But often left aside is the "territorial dimension" of local bodies and the recognition of their role as subjects who plan, project and make regulations, "governing in prospect" the quality of life of the persons who reside in that territory.

As a result of this, it appears necessary and indispensable to organise measures and indicators useful for monitoring and estimating the medium- and long-term environmental effects of programming, planning and performing of interventions on the territory.

C. Integration of development measures and planning practices of the territory.

Considering the environment as a complex system which answers to network logic rather than to sectorial logic, the planning measures referred to are those used in large areas capable of becoming the reference framework for actions and policies on a local scale and resulting coherent with the defined environmental objectives.

Or else, inverting the terms, it is a matter of integrating the eco-management practices of the territory within the mandatory planning processes through a close comparison with the territorial programming and planning measures already adopted not only for dealing with problems of environmental management.

D. Integration of management measures and models to follow for the eco-efficiency of settlements.

Research here aims at the laying down of simplified innovative measures, linked to the local territorial programming and planning measures.

These are to be utilised in interventions of environmental re-qualification and habitat restoration, for concise valuation and technical control of environmental performances regarding the good order of settlements and surrounding countryside with the aim of improving living conditions in relation to bio-climatic, energetic and technological factors [10].

E. Integration of management and training/communication measures.

The European Community Six Framework Programme underlines how sustainable development might be effectively put into practice only through the efficacious diffusion of knowledge.

Proposed is a model of information, communication and training that places at its centre not the university teacher but the student with his/her needs and learning times, with his/her capacity to choose the training course and to collaborate on the building-up of know-how. E-learning supplies the necessary degree of flexibility and versatility for the spread of knowledge.

This need for flexibility is felt above all in local bodies for which the adoption of advanced information technology for training constitutes the best means for transferring competency in the sector of sustainable development in general, and of eco-management and environmental auditing in particular.

3. Method

Regarding the framework outlined, research will be linked in three large phases, each of which will produce a base geared to setting up the following phase. After a feed-back of verification and validity of the applied itinerary with the selected local bodies as case studies, all the phases will converge in the end product consisting of the complex of the measures: (guidelines and software/platform of e-learning) aimed at the dual scope of:

- smoothing the processes of implementation and accreditation of environmental management and audit scheme/systems of environmental management on the part of local authorities with wide territorial jurisdiction - especially addressed to Mountain Communities;

- orienting towards major, autonomous and specific projecting and efficacious programming of these administrations which, for their particular make-up and complexity/stratification of physical and immaterial implications, have constituted one of the focus of the Research.

On the theoretical and applicative level, it is important to emphasise that the outcomes of the research will contribute to placing a measure such as Regulation (EC) n°. 761/2001 in a more incisive and advanced position.

Due to its co-evolutive and ductile nature in the positive retroaction between "universal" norm placing and its "particular" terms of application, it is seen to be susceptible to assuming a leading role in the developing and pervasive spread of striking political and practical orientations of territorial eco-efficiency in the area of the European Community.

The set of results contributes to composing the framework of the limits and application potentialities of the Emas system to the Local Authorities, in line with that sought after and requested by the same European Community 761/2001 regulation.

Also the research itself becomes an experimental field of practices and measures for training/information at a distance through their significant application to the activities of the working group.

The predisposition of a platform explicitly aimed at the spreading of the measures implemented as a result of the research, also in those countries about to become part of the European Union, defines even further the international profile of research within the frame of the European Community Sixth Framework Program for research, technological development and demonstration activities.

Phases of the programme will be supported in the continuity of the Coordination Unit which will guarantee the organization of positive earlier activities causing them to converge towards the cultural horizon and the specific objective, already agreed on by all the local units.

The unit will act in strict collaboration with the other modules more specifically referred to the project and the governing of the environment and territory, taking in the contributions of the units dealing with the in-depth investigations, and with the constant support of the information technology unit, which will build up the inter-active platform that is useful and indispensable for the constant linking between the research units themselves.

With this aim, the coordinating group and the local groups listed above, will operate homogeneously throughout the entire research, integrating sectorial contributions into their own specific disciplines and, in turn, orienting and supporting these in focusing on the complex relationships/stratifications between human systems and physical-environmental matrices among the territorial practices.

These latter are often minute, additional and pervasive, and also of an immaterial nature, and the changes they determine on a maxi environmental scale.

The programme is linked in three maxi phases which go towards the collection and organising of starting-point data - both in terms of homogeneity of the duties to be performed among the working groups. These

range from analysis of case studies to application according to orientations emerging from environmental audit and certification, and end with the correction and final validation of this experience in a product/measure, as the overall outcome of the single contributions, of a concise/operative type, open to and capable of correction and evolution in accordance with the progress of their application.

Phase 1: *Analytical Phase.*

This phase will deal with recognition of the physical-environmental and socio-economic framework of the territory and its planning at various levels.

Generally speaking, this will continue with the identification of the management /planning measures already taking place on the territory (not only environmental management measures) and with the defining of the organization of roles and responsibilities of the public bodies taking part in the experiment.

In addition, there will be recognition of the processes enacted and, in general, regarding current community projects, structural funds and activities/projects of systematic environmental relevance, also with the aim of testing the limits for further synergies in favour of the audit-environmental process.

Within this phase two logical sequences can be picked out:

1. Pinpointing of the diagnostic/ cognitive set-up;

2. Organization and construction of the diagnostic-cognitive set up.

Phase 2: *Operational Phase.*

All actions in this phase will be directed to developing support methods and procedures for the carrying out of the Initial Environmental Analysis and the system of Environmental Management utilizing the case studies selected for validity. In other words, action will continue towards the construction of procedures and methods useful in developing a management system that integrates the regulation management methods of a territory with those that are defined as voluntary methods, or as being of good practice, in environmental management.

Within this phase, two logical sequences can be pinpointed, the first concerns content and the second aims at the diffusion of knowledge to date, as follows:

1. Laying down of the prospective operational format;

2. Participation in the prospective operational format

Phase 3: *The Putting Together Phase.*

The definite formalizing of measures and the constructing of ways of communicating results are the final objective of all the activities that will be put into being in this last phase.

Two logical sequences within this phase can be pinpointed, the first is relative to the definite editing of the measures, the second is a result of the research aimed at the transference of the necessary tasks required by the application of such measures.

Specifically, as follows:

1.Integration of eco-management procedures and territorial actions;

2. Development and harmonized experimentation of the e-learning platform.

4. Results

In line with the "informative" and propagative spirit of the environmental management and audit scheme system, the research hopes to provide diffusion and visibility of its results.

1. Integration of procedures of eco-management and territorial actions:

- Outline of an environmental system compatible with the territorial organism;

- Directional informative routes for territorial action;

- Methods for the integration of mandatory and voluntary measures;

- Implementation or creation of action models (management, planning, projecting, realisation) aiming at environmental quality;

- Construction of an analysis process for estimating the value of prospective action;

2. Development and harmonised experimentation of the e-learning platform:

- E-learning platform for the transfer of action duties (management, planning and projecting) on a territorial organism;
- Construction and harmonisation of territorial action;
- Training of personnel employed by territorial management bodies engaged in the research programme.

5. Conclusion and implications

Among these, the environmental systems of management certified as Reg. C.E.n°.761/2001 EMAS II (Eco-Management and Audit Scheme) and the international standard ISO 14001 are an important novelty from the quality point of view. These concern the measures used by public bodies in support of local environmental policies, internal management innovation and improvement of relations with territory programming and planning together with its various participating players, and actions from the base [3].

Those tools have well structured and defined rules of the process, and besides they have a good external visibility thanks to certification label, and in this view, environmental certification can become the support structure to realize the sustainable development targets in the territory.

The Rule CE 761/2001 EMAS (Eco-Management and Audit Scheme) concerns the voluntary adhesion of organizations to a common eco-management and audit system, and then it is a good way to operate, because it gives objective comparisons to citizens about the Institution success or failure, assuring a new way of communication, transparent and clear.

Furthermore the Environmental Management System (EMS) should be able to match other territorial governance tools such as Local Agenda 21, Strategic Environmental Assessment, environmental accountability, etc.

Introduced in 1993 with the Rule EC n.1836/1993, EMAS has been modified and improved with the Rule EC n.761/2001 (EMAS II) and it has become the most complete and articulated environmental certification system; it puts beside the command and control tools and it introduces the environmental quality objectives inside the enterprises, organizations and Public Institutions' management.

The new Rule has been enlarged to all activities which involve significant environmental impact, to overcome the old EMAS rule limitations (it was applicable only to productive sites): the new EMAS rule is applicable to all societies, companies, enterprises, local and government authorities, public and private institutions.

To set in motion this expansion of the EMAS field of application, the European Commission has actively pledged to encourage and develop EMAS through policies and promotional activities: moreover, it has developed energy efficiency, the ruling on integrated prevention and reduction of pollution (IPPC), exchange of the emission rights of greenhouse gases and the integrated product policy (IPP).

Within diffusion of EMAS procedures in public agencies which operate in territories subjected to restrictive normative regimes, methods of energy evaluation, that develop advance techniques of energy audit, are characterised by a fundamental importance.

The goal of these processes are to "photograph" the energy status of buildings, towns and territories in general, to evaluate the possibility of interventions to reduce energy consumptions, for users with high energy request, or to introduce technologies able to promote the diversification of energy sources and their rational and environmental sustainable exploitation. In this case, the development of positive synergies using the programming and planning instruments already adopted, is possible [11].

At the moment evaluation models of environmental sustainability, indifferently from level of mathematical method used, are focused on the study of macro-actions and macro-energy polities, omitting the analysis of local validity of technologies in phase of development or already mature, that are characterized by an enormous potential (if applied in social sectors).

The sixth Framework Program of the European Community for research, technological development and demonstration activities (2002-2006) is another basis for the definition of the research objectives. Specifically, in the domain of such research program the development of "technologies for the Information Society" is promoted, which has among its objectives the development of "automated solutions to create and organize virtual knowledge spaces (such as collective memories and digital libraries)" to encourage new contents, services and media applications.

In addition, such Framework Program promotes research towards the so-called sustainable development, which is believed to be put into action only through an effective dissemination of knowledge by means of training and education, as also remarked in the context of the international program "Agenda 21" or the WWF sustainable development education program.

The instruction as a mean for knowledge-sharing and skill-transfer is strongly supported both from the National Government as well as the European Community, which provide several actions for lifelong learning [12-13].

More specifically, it is recognised in the so-called “e-learning” an important step towards realising the vision of technology serving lifelong learning, as described in the “eLearning Programme” of European Community. In this way, the e- learning model provides the necessary degree of flexibility and versatility for the diffusion of knowledge, also towards those potential users that would not otherwise have any possibility to learn.

Such exigency of flexibility is particularly felt in local authorities, especially in those for environmental management, for which the adoption of advanced information technologies for learning is the best medium, or maybe the unique, for skill transfer in the area of sustainable development in general, and in eco-management and audit more specifically.

The teaching systems resulting from the adoption of e-learning technologies can be used by a wide range of users with different levels of technological skills. Such issue, along with the necessity of a knowledge accessibility from users belonging to all the European Community including the countries of next unification, requires a development process of the learning system that must continuously take into account the usability property.

Usability of a learning system expresses its quality in terms of user-friendliness and is characterized by the effectiveness, the efficiency and the degree of satisfaction of users when they meet the objectives during the learning process. The design of a usable system must take into account several features, such as the possible presence of users with different profiles, the independence from the access technology, the interactivity of users also through the definition of learning communities.

Usability criteria are subject to flourishing scientific multi-disciplinary research, which involves Computer Science, Architectural Technology, Psychology, Education Science and several other scientific areas. In the specific field of Computer Science, the research is focused on the definition of innovative techniques to improve usability in e-learning systems, e.g. by tailoring the training paths on each user.

For such purpose, it is recognized that machine learning and soft-computing techniques play a fundamental role as they allow the development of adaptive systems that are able to manage incomplete or uncertain information, as that coming from monitoring activities on human/machine interactions in e-learning systems.

In literature, several solutions have been proposed for the application of intelligent techniques in e-learning systems, such as user profiling and modeling, automatic and dynamic tracking of training paths, etc.

However, such techniques are still subject to thorough scientific research aimed at further improving the effectiveness of the learning process, as well as to test new computational paradigms that find, in e-learning and more specifically in usability, interesting applicative hints as well as stimulating suggestions for further theoretical investigation.

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