

Mandatory and Spontaneous Processes of Impact Assessment: A Comparative Study referred to Sardinia, Italy

Andrea DE MONTIS¹, Stefano DE MONTIS¹

⁽¹⁾ Dipartimento di Ingegneria del Territorio, Sezione Costruzioni e Infrastrutture, via De Nicola, 07100 Sassari, Italia, Ph.: +39 079 229238/41, Fax: +39 079 229243
e-mail: andreadm@uniss.it.

Abstract

The relationships between human settlements and contextual ecological domains can be currently assessed according to different institutional paths: mandatory procedures, such as the environmental impact assessment (EIA) and, recently, the strategic environmental assessment (SEA); and voluntary procedures, such as the certifications released according to the family of ISO 14.000 regulations. These systems coexist and show different goals and inspiring principles, sometimes overlapping other times complementing each other. Anyhow, they attempt in different patterns to protect and enhance the corresponding agricultural and forestry systems.

In the context of the above, the aim of this paper is to discuss some trends about both mandatory and voluntary procedures of environmental evaluation and to provide scientific bases to compare the framework of these “green” policies with the spectra of Sardinian agricultural and forestry systems.

Keywords

Agricultural and forestry systems, sustainable development, environmental impact assessment, strategic environmental assessment, ISO 14000, environmental management systems

1 Introduction: from institutional to voluntary procedures of environmental evaluation

According to several research studies, natural local resources have to be seen as strategic keys for development. This is especially true in weak and backward regions, where these assets characterise the entire territorial system (see Pearce and Turner, 1989, Costanza, 1997).

In this context, several researchers have attempted to define virtuous circles between policies for the enhancement of natural resources and economic development in the Italian agricultural and forestry systems (Cialdea, 1996; Contu et al., 2000 and 2001; De Montis A., 2001; De Montis S. Barra and Pala, 2000; Di Fazio and Fichera 1989; Gambino, 1997). Given so-called weak sustainability (Munda, 1995), regional transformations can only be allowed if the associated territorial assets and planned changes are compatible with the material and non-material needs of the environment.

There is a great deal of literature on the critical dangers facing the Italian agricultural and forestry systems due to the continuous changes caused by, and inherent in, industrial

development (Cannata, 1989), and sometimes also by the building of residential tourist facilities (Butler et al., 1997). Many studies focus on the interface between the environmental and economic systems, and try to establish guidelines for development, which recognise the possibility of integrating construction and production within the local culture. In this area a “hetero-direct” approach to planning, often imported from predominantly urban foreign cultural contexts, may result in irreversible changes in the local environment (Monti, 2002; Nicoletti, 1998; Reho, 1997 and 2000).

In the fields of policy-making and research, since the beginning of the 1970's there has been an expansion of experimentation with tools which can discover new compromise solutions between human productive activities, settlements, and ecological equilibrium.

Among the instruments currently adopted to establish the degree of environmental compatibility one can include the family of mandatory procedures known as environmental impact statements (EIS) and, more recently, strategic environmental assessments (SEA). At the same time individual enterprises and public bodies have voluntarily adopted and developed many new procedures in order to receive certification of their guaranteed beneficial behaviour towards the environment.

While EIS and SEA procedures are institutional obligations, voluntary certification processes can be seen as clear symptoms of the willingness of entrepreneurs to invest in more ecologically friendly plants. Moreover the most recent developments seem to suggest that ecologically friendly “green” certification will be used by public bodies at a greater pace, with positive effects on the entire territorial regional system (Marangon et al., 2003).

Based on the above background remarks, the aim of this paper is to reflect on mandatory and voluntary procedures of environmental assessment in Italy and in Sardinia, elaborating some preliminary remarks on their influence on the agricultural and forestry systems.

The contents of this paper will be as follows:

In the next paragraph, there will be some reflections on the institutional role of mandatory procedures for environmental assessment, referring to EIS and SEA. In the third paragraph the nature and scope of voluntary certification processes will be described, mainly with reference to the ISO 14.000 series of regulations. In the fourth the trend of Italian and Sardinian firms to be certified will be assessed, based on official data and statistics. In the fifth, a critique will be made of the difficulty involved in trying to make ISO 14.000 series certification more widely used in the Sardinian agricultural and forestry context. In the final paragraph, a synthesis of the paper will be presented, and possible areas for further research indicated.

2 EIS and SEA: institutionalising the environmental evaluation

During the 1960's a variety of social, cultural and scientific movements from all over the world pointed out the urgency of compiling rules to control the impact of heavy, mainly industrial, plants on the surrounding environment. As a result, the first concrete action establishing institutionalised procedures for impact assessment was taken in the United States: the National Environmental Policy Act (acronym NEPA) and its Regulations began to take effect at the beginning of 1970. These laws made the evaluation of the

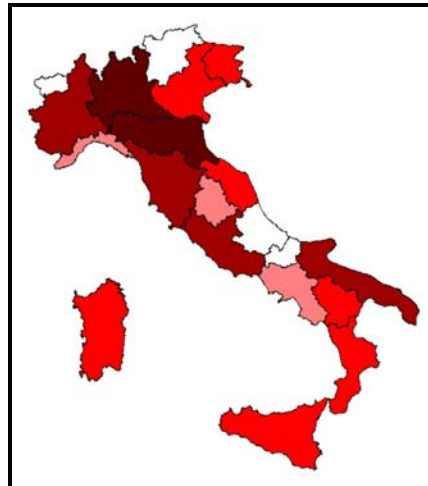
environmental impact of projects and plans mandatory in the USA. Fifteen years later, in 1985, the EC began to follow the same path with the directive 85/337/EEC. In accordance with this act, Italy, as a European member state, in 1988 promulgated Prime Ministerial Decree 377. This established procedures to assess the environmental impact of new constructions, as listed in the appendices of the decree. In 1997, the directive 85/337/EEC was amended by the Council directive 97/11/EC.

Since that date, many regulations have completed a complex legislative framework, according to which in Italy:

1. The State is responsible for the assessment of the impact of large infrastructures (listed in Annex I of the Council directive 97/11/EC) located within the national borders;
2. Each regional administration is responsible for the assessment of the impact of medium-sized buildings (listed in Annex II of the Council directive 97/11/EC) located within its borders.

In Italy examining the number of EIS procedures for large infrastructures reveals that the practice is inadequate and limited. From 1989 to 2003 433 cases were examined, with an average of 30 EIS's per year. They were mainly in Northern and Central Italy: 55 in Lombardy and 46 in Emilia Romagna. The regions with the lowest numbers examined were Valle d'Aosta (1) and Trentino Alto Adige (3). A synthetic overview is presented in figure 1.

Figure 1 Thematic map of the EIS procedures examined by Italian regional administrations from 1989 to 2003. Scale: the darker the shade, the higher the number. Source: APAT, 2003.



The Italian Regional Administration of Sardinia instituted a Department for the environmental impact assessment of medium-sized buildings in 2000, in conformance with the recommendations of the decree of 12 April 1996. Since then 85 procedures have been

examined: 9 in 2000, 14 in 2001, 41 in 2002 and 17 in year 2003. These figures testify to the generally very poor attitude towards environmental evaluation in Sardinia when compared to other Italian regions: for instance, in Piedmont 129 EIA procedures were examined between April 1999 and December 2000 only. This difference in the number of cases seems to be due to the higher level of investment in buildings and in infrastructure that have important impact on the general territorial systems.

As far as the practical application of the law is concerned, the following points should be borne in mind:

1. while evaluation procedures should be conducted mostly using the approach “ex ante”, by means of simulations of the effects on the environment of feasible alternative projects, there is a widespread use of “ex post” approaches to EIS;
2. the requirements recommended by EIS-laws are not unambiguous: as a result, in a procedure for impact assessment official documentation is both created and examined using a variety of frameworks;
3. EIS is a procedure that requires private or public entrepreneurs, local companies and communities and the other stakeholders to collaborate in contexts that are not always harmonious.

A parallel tendency towards institutionalisation can also be seen in the case of strategic environmental assessment (acronym SEA). The literature on the topic is enormous. Among the many references in Italian, the book by Garano and Zoppi (2003) should be mentioned. This recently gathered together an interesting collection of contributions to the studies on SEA and urban and environmental planning.

In recognition of the important effects that certain programs or plans have on the environment, the European Union has promoted strategies for the process of constructing regulations for assessing environmental impact. In 1996 the European Commission adopted a Proposal for a Directive on Environmental Assessment which concerned plans and programs. After a series of amendments to the first draft a text was finalised, and this provided the basis for negotiations among the 15 Member States, which continued throughout 1999. The Ministers of the Environment reached a common position, and this was formally adopted in March 2000. After another year of amendments and political debates on the common text, the Council formally adopted the SEA directive 2001/42/EC during May and June 2001.

So far SEA procedures have not been extensively used, and many scholars and professionals have drafted schemes and general frameworks inspired by the general philosophy of strategic evaluation of plans and programs since the latter half of the 1990's. Thus a few comments are necessary on the contents, and potential influence on mandatory evaluation procedures, of SEA directive 2001/42/EC.

This act heralds a decisive change in the approach to evaluation, especially when compared with the former directive 97/11/EC on environmental impact assessment. According to article 1 of the directive 2001/42/EC, “the objective [...] is to provide for a high level of protection of the environment and to contribute to the integration of environmental

considerations into the preparation and adoption of plans and programs with a view to promoting sustainable development, by ensuring that [...] environmental assessment is carried out of certain plans and programs which are likely to have significant effects on the environment” (EU, 2001).

After the directives on the EIS, an assessment procedure of the effects produced on the environment by a building, or a system of buildings, often already designed at a definitive and detailed level, becomes mandatory. It is possible that other alternative solutions are required for the construction of the relevant building but the process of evaluation usually starts when almost all the decisions about planning and design have been made. On the other hand, the SEA directive encourages clear environmentally aimed analyses and verifications throughout each phase of the construction and monitoring of a plan and formally encourages strong integration with the principle of sustainable development in accordance with the aims of Agenda 21.

This directive is one of the most important recognitions of the institutional need for a deep relationship between evaluation and planning. In a recent research report commissioned by the European Commission (2001), twenty international case studies were assessed to examine possible techniques and tools that may prove useful in making strategic environmental assessments. The suggestions stemming from this study are to become benchmarks for the process of integrating the environment into the strategic decision-making of the Member States.

Table 1 SEA-inspired laws of the Italian regional administrations

Regional and self governing Provincial administrations	SEA-inspired laws
Basilicata	L.R. 48, 14.04.2000
Emilia Romagna	L.R. 20, 23.03.2000
Liguria	L.R. 38, 30.12.1998
Piemonte	L.R. 36, 04.09.1997
Puglia	L.R. 40, 14.12.1998
Toscana	L.R. 285, 09.09.2000
Umbria	L.R. 11, 12.04.2001
Valle d'Aosta	L.R. 5, 16.01.1995
Bolzano	L.R. 28, 10.04.1995
Trento	L.R. 31, 31.10.1997
	L.R. 27, 24.03.2000
	L.R. 11, 06.04.1998
	L.R. 7, 24.07.1998
	L.R. 5, 05.09.1991

According to directive 2001/42/EC, each Member State had to adopt within July 21st 2004 its own regulations for mandatory strategic environmental evaluation of plans and programs. So far Italy has not promulgated any regulation toward this accomplishment. On the other side, some Italian programs, such as those based on the framework of the European structural funds, have been evaluated according to their possible effects on the

environment following the directions of intermediate manuals and guidelines (EC, 1998; Ministry of the Environment, 1999). In addition many Italian regional administrations have approved specific local laws to encourage the development of frameworks of environmental assessment (Table 1). These have been implicitly or explicitly inspired by the scheme proposed in the SEA directive 2001/42/EC (Masala, 2004).

3 Voluntary evaluation procedures: the ISO 14.000 series of environmental regulations

While mandatory processes are included in the planning and management of agricultural, forestry and territorial systems, using the above mentioned evaluation instruments, it is spontaneous behaviour and voluntary actions which are the principal source of the willingness of many businesses to seek the environmental certification connected to the ISO rules of series 14.000 (ISO, 1998a and 1998b). In this respect, correctly conceived environmental certifications may be seen as symptoms of a genuine desire by local communities to adhere to environmentally benign patterns of management and production. In this sense, voluntary assessment procedures could constitute an ideal complement to achieve autonomously a satisfactory level of compatibility with the environmental system. Thus they can be interpreted, in a much wider sense, as concrete actions towards the translation into practice of some principles of Local Agenda 21. After the Rio Conference in 1992, industrial associations, non-governmental organizations and public institutions adopted a great number of rules on voluntary environmental certification.

In the most general terms, this procedure consists of an official statement in which an authorized, independent and external body declares that a specific product or process is conforming to a specific set of environmental rules (Cabras et al., 2003).

The British Standard Institute took the first steps in this direction, with the document Specification for Environmental Management System (acronym BS 7750). This was based on the results of the studies of a commission composed by more than 450 organisations representing 38 production sectors. With CE regulation 1836/1993, the European Union adopted the Environmental Management and Audit Scheme (acronym EMAS). This involves the voluntary adhesion of firms in a community system of eco-management and verification. The ISO 14.000 rules are based on the work of the Strategic Advisory Group for the Environment (acronym SAGE), instituted in 1991, and of the Technical Committee TC 207, instituted in 1993. In 1996 the ISO 14.000 series of regulation was adopted, and at present there are more than twenty versions. Since 1996 some 50,000 firms and businesses have been certified in 118 different countries around the globe. Some figures on the trend of this certification are displayed in Tables 3 and 4.

**Table 2 Characteristics of the family of ISO 14.000 environmental regulations.
After Borlenghi (2000).**

Number of ISO Regulation	Objective of the Certification	Date of publication
14.001/4	Environmental Management System (EMS)	1996
14.010/11/12 (from 2002, replaced by ISO 19011)	Environmental audit	1996

A. De Montis and S. De Montis. "Mandatory and Spontaneous Processes of Impact Assessment: A Comparative Study Referred to Sardinia, Italy". *Agricultural Engineering International: the CIGR Journal of Scientific Research and Development*. Manuscript LW 04 011. Vol. VI. October, 2004.

14.020/21/24/25	Environmental label and declaration	1998-2000
14.031	Environmental performances	1999
14.040/41/42/43	Life Cycle Assessment	1997-2000

According to recent research (Borlenghi, 2000), the strengths of the voluntary standards achieved by means of adherence to the ISO 14.000 rules are as follows: they are elaborated on the basis of a large consensus; they are flexible and adaptable; they contribute to decreasing conflict with other laws; they might induce others to improve their environmental behaviour; they boost harmonisation, thus are welcomed by external bodies (banks, insurance companies, public administrations); they encourage the personnel to adopt ecologically-sound behaviour.

Table 3 Number of certifications issued according to ISO 14.000 standards by world regions.
Source: ISO (2003).

	Dec 1997	Dec 1998	Dec 1999	Dec 2000	Dec 2001	Dec 2002
Africa/West Asia	73	138	337	651	923	1,355
Central and South America	98	144	309	556	681	1,418
North America	117	434	975	1,676	2,700	4,053
Europe	2,626	4,254	7,365	11,021	18,243	23,316
Far East	1,356	2,532	4,350	7,881	12,796	17,757
Australia/New Zealand	163	385	770	1,112	1,422	1,563
World total	4,433	7,887	14,106	22,897	36,765	49,462

Table 4 Number of certifications issued according to ISO 14.000 standards by major states.
Source: ISO (2003).

	Dec 1997	Dec 1998	Dec 1999	Dec 2000	Dec 2001	Dec 2002
Japan	713	1,542	3,015	5,556	8,123	10,620
Germany	352	651	962	1,260	3,380	3,700
Spain	92	164	573	600	2,064	3,228
United Kingdom	644	921	1,492	2,534	2,722	2,917
China	22	94	222	510	1,085	2,803
Sweden	194	304	851	1,370	2,070	2,730
USA	79	291	636	1,042	1,645	2,620
Italy	103	123	243	521	1,295	2,153

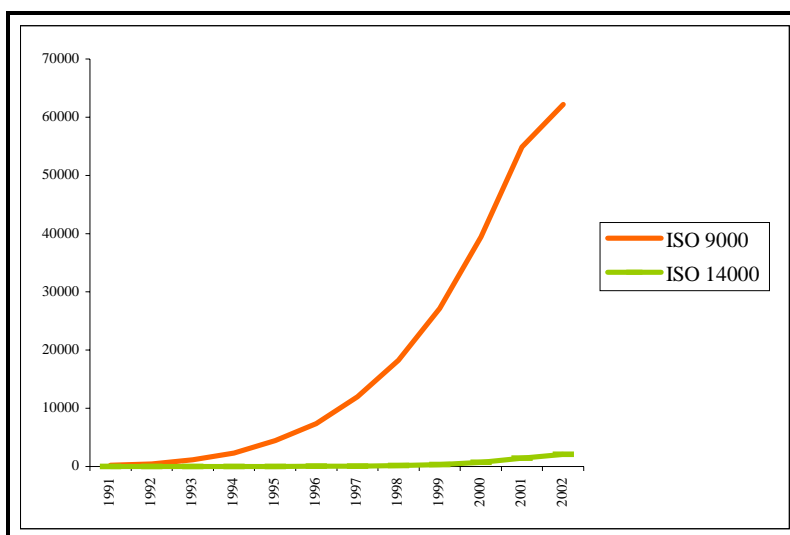
According to Borlenghi (2000), certification of its environmental management system will bring the following advantages to a company: protection of the environment; improved environmental performance; improved relationship with the public; customer satisfaction; increased capital assets; saving on insurance; easier access to funding; improved overall

image; limiting environmental responsibility; increased control of management; taking part in resource conservation; increased efficiency and efficacy; entering the virtuous cycle of continuous improvement.

4 The diffusion of the ISO 14.000 standards certification in Italy

While the number of Italian firms, which take EMAS and BS7750 standards certification, is still negligible, there are some signs of an interesting spread of the environmental certification issued according to the ISO 14.000 standards.

Figure 2 Number of certifications according to ISO 9.000 and to ISO 14.000 released in the last decade by Sincert certified bodies. Source: Sincert, 2003.



With reference to the worldwide comparative picture showed in Table 4, it can be said that the movement of Italian organizations towards obtaining the ISO 14.000 standards certification is remarkable. However, in the Italian internal market a comparison with the diffusion of the ISO 9.000-based certifications reveals that there is still a wide gap between these domains. According to Sincert (2003), the number of certifications issued according to the ISO 14.000 standards in Italy is still much lower than the number of the traditional certifications based on the ISO 9.000 (Figure 2).

Figure 3 The certification movement of Italian firms in 2003: firms certified (box on the left), firms certified according to ISO 14.001 only (box in the centre) and percentage share of ISO 14.001 certified over total number of certified firms (box on the right).

Thematic maps on data from Sincert, 2003. Scale: the darker the shade, the higher the figure.



Within this overall picture, each Italian region behaves in its own particular way. As shown in the box on the left of figure 3, the Region of Lombardia in the North of Italy has the highest number of certified firms (more than 15,000): these organisations have taken a certification according to several regulations and standards generally connected to the quality level of their products (rules with codes AVS Q '94, EN 46001, EN 46002, EN 729-2, EN 729-3, QS 9000).

Table 5 shows the distribution of ISO 14.001 certifications issued in Italy in the accreditation sectors, according to the last update at June 30th 2004 by Sincert. The panorama of Italian ISO 14.001 certifications is not so broad yet, since it covers thirty-nine out of the fifty-eight accreditation sectors indicated by European co-operation for accreditation (EA). The sectors that receive the highest number of ISO certifications include steel manufacturing (438), food, drink and tobacco (383) industries and public services delivery firms (351), while the lowest car refurbishing services delivery (4), health and other social services delivery (4) and airplanes and special vehicles firms (1). In terms of percentage share of ISO 14001 certifications over total number of certifications released, the sectors that show the highest figures are postal and communications services delivery (100 %), recycling services delivery (46 %) and production and distribution of electric energy (42 %), while the lowest car refurbishing services delivery (0.48 %), financial services delivery (0.40 %) and health and other social services delivery (0.15 %).

Table 5 The certification movement of the Italian firms by accreditation sectors at June 2004: firms certified, firms certified according to ISO 14.001 only and percentage share of ISO 14.001 certified over total number of firms. Source: Sincert, 2004.

EA* Code	Accreditation sector	Total Certified Firms	ISO 14001 Certified Firms	Percentage of ISO 14.001 certified over total certified firms
1	Agriculture and fisheries (cultivation, animal husbandry)	366	32	8.74%
2	Mineral extraction (quarries, mines and oil wells)	248	43	17.34%
3	Food Drink and tobacco industries	3,543	383	10.81%
4	Textiles (half-finished, final products, clothing)	837	53	6.33%
5	Tanneries and leather products	267	31	11.61%
6	Wood products (half-finished and final products)	467	27	5.78%
7	Cardboard paper and paper products	397	49	12.34%
8	Publishers	32	0	0.00%
9	Printing and activities connected with printing	417	26	6.24%
10	Coke production and refined petroleum products	95	21	22.11%
12	Chemicals, and chemical products and fibres	1,685	225	13.35%
13	Pharmaceutical products	83	27	32.53%
14	Rubber and plastic products	2,649	191	7.21%
15	Non- metal products	679	65	9.57%
16	Calcium, chalk, concrete and cement and related products	1138	65	5.71%
17	Metals and associated products, production of metal products	7,500	438	5.84%
18	Machines apparatus and machinery	3,788	164	4.33%
19	Electrical and electrical/optical machines	5,400	308	5.70%
20	Shipbuilding and repair	110	6	5.45%
21	Aircraft and spacecraft	150	1	0.67%
22a	Bicycle motorcycle trailer and vehicle production and industries to produce parts and accessories	695	99	14.24%
22b	Products for the railway industry and accessories and parts	72	0	0.00%
23a	Jewellery, gold and costume jewellery products	29	0	0.00%
23c	Production of sports articles	4	0	0.00%
23d	Production of games and toys	4	0	0.00%
23e	Production of furniture and furnishing	808	62	7.67%
23f	Prefabricated insulation products and their application	28	0	0.00%
24	Waste collection, recycling	177	82	46.33%
25	Production and distribution of electrical energy	469	195	41.58%
26	Production and distribution of gas	338	58	17.16%
27	Production and distribution of water	178	36	20.22%
28	Building firms and constructors of plant and services	16,067	108	0.67%
28b	Firms to install manage and maintain plant	39	0	0.00%
29a	Wholesalers, retailers, and intermediaries	6,939	103	1.48%
29b	Bicycle, motorcycle and vehicle repair	839	4	0.48%
29c	Repair of personal and household possessions	40	0	0.00%
30	Hotels restaurants and bars	828	128	15.46%
31	Transport, storage and communications	1,834	47	2.56%
31a	Logistics: transport, storage and despatch	3,299	181	5.49%
31b	Post and telecommunications	14	14	100.00%
32	Financial services, estate agents, renting, insurance and pension funds, With the exception of obligatory social security; Activities connected to insurance and pension funds; estate agency and renting activities, and professional and business activities connected to them	1,264	5	0.40%
32b		23	0	0.00%
33	Technology and informatics	2,216	15	0.68%
34	Technical and engineering consultancies	1,388	42	3.03%
35	Professional business services	5,970	105	1.76%
36	Public administration	525	76	14.48%
37	Education	3,560	0	0.00%
38	Health and social services	2,691	4	0.15%
38b	Services of medical and dental surgeries	12	0	0.00%
38c	Other health services: Clinical analysis, hygiene, and preventive	7	0	0.00%

A. De Montis and S. De Montis. "Mandatory and Spontaneous Processes of Impact Assessment: A Comparative Study Referred to Sardinia, Italy". Agricultural Engineering International: the CIGR Journal of Scientific Research and Development. Manuscript LW 04 011. Vol. VI. October, 2004.

	medicine laboratories, x-ray and photographic laboratories			
38e	Veterinary Services	1	0	0.00%
38f	Social work	432	0	0.00%
39	Public services	1,647	351	21.31%

* European co-operation for accreditation.

Figure 4 ISO 14.001 certifications: Italian regions and growth rate from June 2002 to March 2003. Thematic map on data from Sincert, 2003. Scale: the darker the shade, the higher the growth rate.



Lombardy displays also the highest value of ISO 14.001 certified firms (around 500), as the central box of figure 3 shows. Northern Italy has the largest share of certifications of the whole peninsula. The box on the right of figure 3 refers to the percentage share of ISO 14.001 certified firms with respect to the whole set of certified organizations. In this case, there is no link between high percentage share and more northern areas: the region of Molise scores very high (more than 7 %).

Figure 5 ISO 14.001 certifications: trend of the Italian regions in the last four years.
Source: Sincert, 2003.

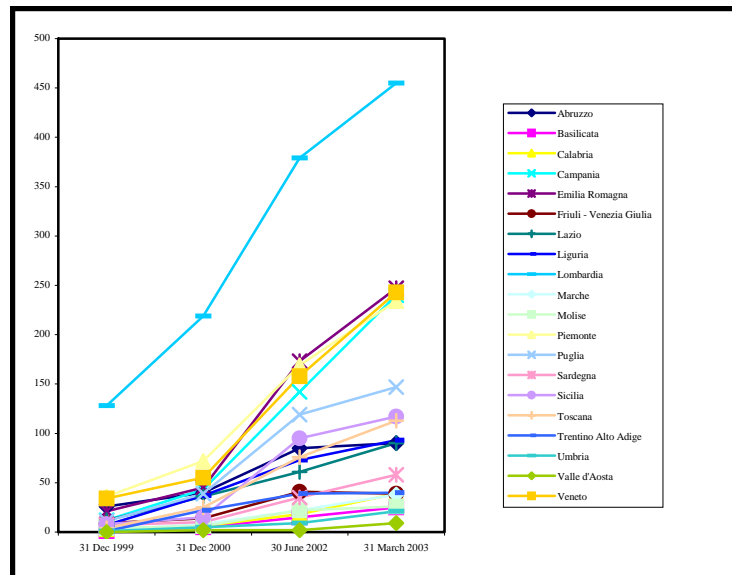
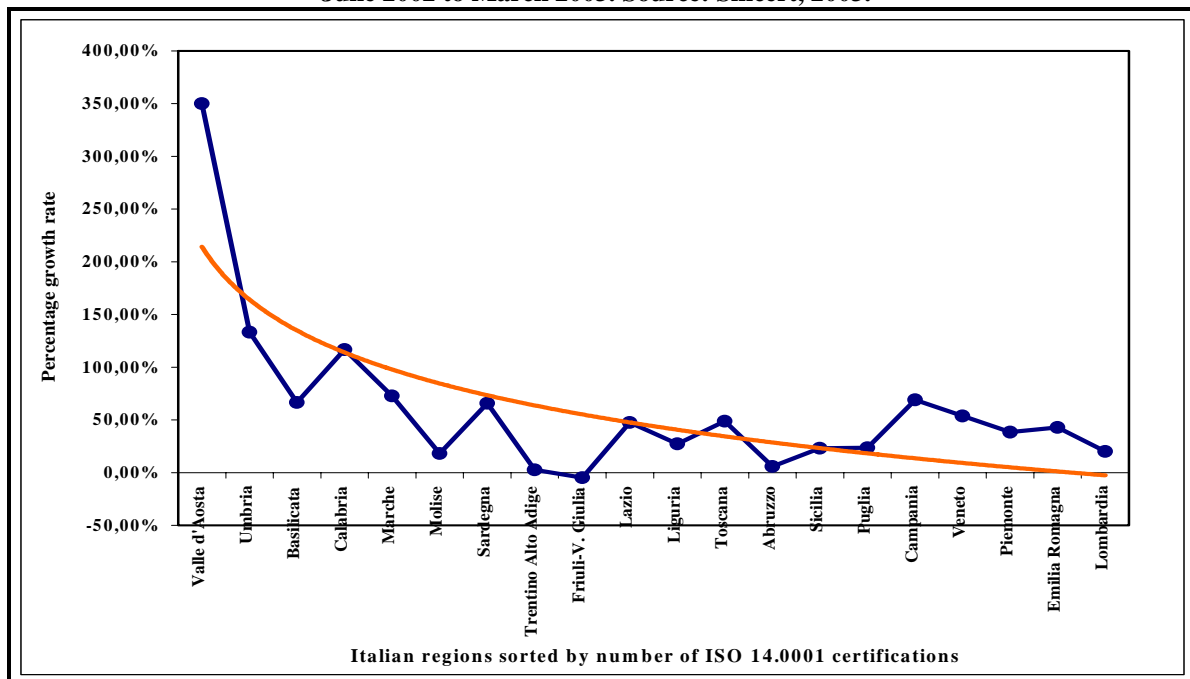


Figure 6 Percentage growth rate and trend lines of ISO 14.001 certifications by Italian regions from June 2002 to March 2003. Source: Sincert, 2003.



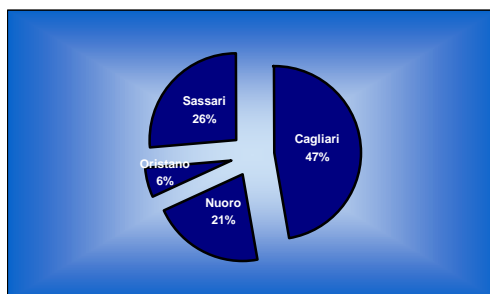
A. De Montis and S. De Montis. "Mandatory and Spontaneous Processes of Impact Assessment: A Comparative Study Referred to Sardinia, Italy". Agricultural Engineering International: the CIGR Journal of Scientific Research and Development. Manuscript LW 04 011. Vol. VI. October, 2004.

Moreover the comparison of the growth rate during the last time period from June 2002 to March 2003 with respect to the series of Italian regions ordered by the number of ISO 14.001 certifications indicates a sort of weak tendency towards convergence, since the corresponding trend line, marked in orange in figure 6, slopes downwards. While Lombardy, which has the highest number of ISO 14.001 certifications, displays a low rate of growth (around 20 %), Valle d'Aosta, which has the lowest number of ISO 14.001 certifications, shows a remarkable growth rate (350 %).

4.1 The certified firm in Sardinia: a rare case study

As figure 3 shows, the island, in absolute terms and with respect to the other Italian regions, does not show a strong tendency to follow a voluntary path towards the ISO general certifications. Indeed it is in the 17th place in the ranking. On the other hand, the results for ISO 14.001 certification are better. It is at 6th place in the ranking of Italian Regions for the percentage of ISO 14.001 certified firms against total certified firms.

Figure 7 Distribution of the ISO 14.001 certified firms in the Sardinian provinces.
Source: Cabras et al., 2003.



According to Cabras et al. (2003), on June, 30 2003 59 firms had been certified according to ISO 14.001 environmental standards in Sardinia. These organizations were mainly private and were in the province of Cagliari (25), the capital town of the region, where almost 50% of the firms were located. Only six firms had taken the certification in the sector of agro-food systems.

According to these authors, the movement towards taking ISO 14.001 environmental certification in Sardinia is still too recent to be fully defined. The evidence suggests that it proceeds at a slower pace than the movement towards obtaining the ISO 9001 standards certification, despite of the need for policies to foster environmental quality and to exploit local natural resources.

The main cause may be the usually high level of investment required to achieve the desired thresholds of environmental performance. On the other hand, in domains rich with natural, cultural and public environmental resources such as Sardinia, there is no doubt that:

1. a widespread level of certification brings benefits not only to the firm itself but also to the image of the local and regional territorial system as a whole;
2. voluntary certification is a powerful way to think of and achieve integration between productive and environmental domains;
3. spontaneous behaviour towards decreasing the negative influence of firms on the environment seems to be a valuable complement to the variety of EIS-induced processes which lead towards greener styles of planning and design.

5 Conclusions

In this paper, a comparative study has been proposed to study the effects of both mandatory and voluntary behaviour and to evaluate their environmental impact. EIS and SEA have been studied for the mandatory and ISO 14.000 regulations in the voluntary area.

The results of this analysis demonstrate how Sardinian administrative bodies have shown limited experience in examining EIS procedures compared to other Italian regions and that EIS development has not been characterized so far by “ex ante” approaches suitable to the assessment of environmental complexity. Bureaucratic attitudes affect the behaviour of professionals and officials often worried about justifying choices that have already been made.

In this respect, voluntary procedures, if correctly managed, might provide useful complementary tools. Evidence from data on the Italian movement towards certification in accordance with the family of ISO 14.000 standards indicates an overall high tendency of firms located in the Northern regions, while in Southern Italy there is some evidence of lagging. With regard to Sardinia, while the percentage of firms certified according to ISO 14.001 standards is low (some 2.5% compared to a maximum of about 20% for Lombardia), it may be considered a fairly dynamic area in the Italian panorama (with a rate of growth of certifications of 65%, from June 2002 to March 2003). It is mainly the agricultural and forestry sectors, which are not yet interested in taking this certification. This phenomenon could be linked to the traditionally greater desire of manufacturing and service industries and businessmen to have an environmental certificate for their organization.

The relatively limited use of the certification practice does not allow one to reach definitive conclusions on the effects of green certification on the territorial and environmental systems. Nevertheless, some future steps can be suggested for the development of further research. As voluntary actions on environmental assessment are obviously valuable, an investigation of the perception that public bodies officials and entrepreneurs of small and medium-sized firms have of the whole certification process could be interesting. Thus a field survey might be organized to assess different patterns of investment and decisions that have been taken by Sardinian firms towards certification according to ISO 14.000 standards. Finally, the survey should aim to discover the expected effects of certification,

with respect to beneficial modifications in the relationships between human productive settlements and agricultural, forestry, and, in general, territorial systems.

6 Acknowledgements

In order to ascribe specific contributions to the authors, Stefano De Montis indicated the general framework presented in section 1, while Andrea De Montis developed the arguments contained in the remaining sections 2, 3, 4 and 5.

The authors wish to acknowledge, indeed, the suggestions and remarks raised by the three anonymous referees on the earlier version of this paper.

7 References

- APAT (Agency for the protection of the environment and technical services), 2003: <http://www.apat.gov.it/site/it-IT/>.
- Borlenghi, R. 2000. *Guida alle norme ISO 14000*. Milano: Hoepli (In Italian).
- Butler, R.M., C. Hall and J. Jenkins 1997. *Tourism and recreation in rural areas*. New York: John Wiley & Sons.
- Cabras E. and E. Careda 2003. *L'innovazione Organizzativa in Sardegna: la certificazione di qualità. Rapporto*. Sassari: CRENOS, DISAABA, ITEM (In Italian).
- Cannata, G. (ed.) 1989. *I sistemi agricoli territoriali italiani*. Milano: Franco Angeli (In Italian).
- Cialdea, D. 1996. *Il Molise, una realtà in crescita. Aree protette e attività agricole*. Milano: Franco Angeli (In Italian).
- European Commission (EC), 1998. *Manuale per la valutazione ambientale dei piani di sviluppo regionale e dei programmi dei fondi strutturali dell'Unione Europea*. London: DG IX (In Italian).
- Contu, P., A. De Montis, and S. De Montis 2002. Criteri di prestazione e sostenibilità: verso un metodo di valutazione dello sviluppo turistico locale. In *Atti del Convegno Le costruzioni per la produzione agricola e il territorio rurale, Impatto sull'ambiente e tutela del paesaggio*, 753-772, Bologna, 19-20, October 2000, Bologna: Madison (In Italian).
- Contu, P., A. De Montis, and S. De Montis 2001. Le aree extraurbane nei recenti strumenti urbanistici della Sardegna. Tendenze contenute obiettivi dei Piani urbanistici provinciali (Pup) e comunali (Puc). In *Atti del VII Convegno Nazionale di Ingegneria Agraria, Ingegneria agraria per lo sviluppo dei paesi del Mediterraneo (CD-ROM)*, Vieste del Gargano, 11-14 September, 2001 (In Italian).
- Costanza, R. (ed.). 1997. *Frontiers in ecological economics*. Cheltenham: Edward Elgar Publishing.
- De Montis, A. 2001. Sviluppo turistico sostenibile ed indicatori della vocazione territoriale: questioni di metodo e casi di studio. *Turistica* 1-2, 13-30, Firenze: Mercury (In Italian).
- De Montis, S., M. Barra, and G. Pala, 2000. Nuove strategie di sviluppo rurale nella Regione Sardegna. In *Atti del Convegno Valorizzazione delle risorse locali e territoriali nel quadro delle politiche per lo sviluppo rurale*, 385-395, Matera, 14-17 June 2000, (In Italian).

- Di Fazio, S. and C.R. Fichera 1989. Architettura rurale e paesaggio. Un rapporto da ristabilire. *Genio Rurale*, 1, 35-42 (In Italian).
- European Commission, 2001. *SEA and Integration of the Environment into Strategic Decision-Making*. ICON IC Consultants Ltd.
- European Union, 2001. *Directive 2001/42/EC of the European Parliament and of the Council on the assessment of the effects of certain plans and programmes on the environment*. Bruxelles: European Union.
- Gambino, R. 1997. *Conservare Innovare. Paesaggio, ambiente, territorio*. Torino: Utet (In Italian).
- Garano, M and C. Zoppi (eds.) 2003. *La valutazione ambientale strategica nella pianificazione territoriale. Nuove prospettive per la gestione delle trasformazioni urbanistiche*. Roma: Gangemi Editore (In Italian).
- International Organization for Standardization (ISO), 1998a. *ISO 14000 - Meet the whole Family!* Genève: ISO Central Secretariat.
- International Organization for Standardization (ISO), 1998b. *Publicizing your ISO 9000 or ISO 14000 certification*. Genève: ISO Central Secretariat.
- International Organization for Standardization (ISO), 2003. *The ISO Survey of ISO 9000 and ISO 14001 Certificates*, Genève: ISO Central Secretariat.
- Marangon, F. and A. Massarutto 2003. La certificazione ambientale territoriale: uno strumento per conciliare l'economia delle reti e l'economia dei luoghi. In *Tra reti e luoghi. Strategie per condividere spazi nel territorio della post-modernità*, eds. S. Fabbro and C. Mungiguerra, 157-173, Monfalcone: Edicom (In Italian).
- Masala R. *La valutazione ambientale nel piano urbanistico comunale*. Bachelor Degree in Civil engineering Final thesis, University of Cagliari, Italy, April 2004. Unpublished (In Italian).
- Ministry of the Environment, 1999. *Linee guida per la valutazione ambientale strategica (VAS)*. Roma: Direzione Generale VIA (In Italian).
- Monti, C. (ed.) 2002. *Costruire sostenibile: l'Europa*. Firenze: Alinea Editrice (In Italian).
- Munda, G. 1995. La sostenibilità socio-ambientale dei sistemi economici. *Urbanistica*, 104, 40-49.
- Nicoletti, M. (ed.) 1998. *Architettura ecosistemica: equilibrio ambientale nella città*. Roma: Gangemi Editore (In Italian).
- Pearce, D.W. and K.T. Turner 1989. *Economics of Natural Resources and the Environment*. Hemel Hempstead: Harvester and Wheatsheaf.
- Reho, M. (ed.) 1997. *La costruzione del paesaggio agrario*. Milano: Franco Angeli (In Italian).
- Reho, M. (ed.) 2000. *Valutazione e decisione per uno sviluppo sostenibile*. Milano: Franco Angeli (In Italian).
- Sincert, (2003): www.sincert.it.